UIC-I-_009___

ANNUAL REPORTS

ANNUAL CLASS I WELL REPORT

Waste Disposal Well #1 January – December 2015



Western Refining Southwest, Inc.
Bloomfield Terminal
Bloomfield, New Mexico
Permit # - UIC-CL1-009
API # - 30-45-29002

Submitted January 28, 2016

Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Ron Weaver

Regional Terminals Manager

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EXECUTIVE SUMMARY

This report provides a summary of activities conducted in 2015 on Waste Disposal Well #1 (WDW-#1) at the Western Refining Bloomfield ("Western") facility. The following is a summary of well operations and well testing activities performed in 2015.

Operational Summary

Injection Volume - The volume injected into the disposal well during 2015 was 10,386,505 gallons. Western suspended refining operations at the Bloomfield Refinery on November 23, 2009. The facility currently operates as a Bulk Terminal. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation.

Sampling and Chemical Analyses - Injection fluids samples were collected on a quarterly basis for chemical analysis, with the following exception. A quarterly sample was not collected during the fourth quarter of 2015 due to the fact that the injection well was not in operation beyond September 22, 2015 as it was plugged and abandoned. Quarterly samples were collected during the 1st, 2nd, and 3rd quarters of 2015. Analytical results did not exhibit characteristics of being a hazardous waste.

Maintenance Operations – On September 22, 2015 Western Refining was scheduled to conduct the annual Mechanical Integrity Test (MIT), Bradenhead, and High Pressure Shutdown Test with a representative of NMOCD present to observe. The Bradenhead Test and High Pressure Shutdown Test passed. In the course of setting up the MIT test, the annulus casing showed a sudden increase in pressure. The test was suspended and the well was shut down. Western began troubleshooting the problem by pressure testing the injection well tubing. The results of the pressure test showed the integrity of the tubing to be good. Western, at this point, believed the issue was with the well packer. This began the attempt to remove the well packer to have it replaced. In the process of attempting to retrieve the packer the well casing was damaged. The damage was determined to un-salvageable and prompted the decision to have the well plugged and

abandoned. Western received conditional approval on October 26th, 2015 from NMOCD District 3 to plug and abandon the well. Well abandonment activities commenced the week of October 26th, 2015 with a representative from OCD on-site to witness the plugging activities. Associated C-103s are included in Appendix A.

Mechanical Integrity Tests - The 2015 MIT was not conducted as the well failed before the test could be set up. The failure took place on September 22, 2015 and the well was shut down as a result of the failure.

Area of Review (AOR) - No wells are known to be currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

Recommendations

Western no longer operates the injection well as a result of un-repairable damage. Western went through the required process to have the well plugged and abandoned. This will be the final report submitted for this well.

1.0 INTRODUCTION

This report provides a summary of activities conducted during 2015 on Waste Disposal Well #1 (WDW #1). The disposal well was part of the Western Bloomfield Terminal facility operations. The facility is located south of Bloomfield, New Mexico in San Juan County. The well location is depicted in Figure 1. The physical address of the facility is as follows:

Bloomfield Terminal

#50 County Road 4990 Bloomfield, NM 87413

The Bloomfield Terminal is located on approximately 263 acres. Bordering the facility is a combination of federal and private properties. Public property managed by the Bureau of Land Management lies to the south. The majority of undeveloped land in the vicinity of the facility is used extensively for oil and gas production and, in some instances, grazing. U.S. Highway 550 is located approximately one-half mile west of the facility. The topography of the main portion of the site is generally flat with steep bluffs to the north.

WDW #1 is owned by San Juan Refining Company, a New Mexico corporation. It is operated by Western Refining Southwest, Inc. formerly known as Giant Industries Arizona, Inc. an Arizona corporation.

1.1 Well Information

Well Name & Number: Waste Disposal Well #1

OCD UIC: UIC-CL1-009
OCD Discharge Plan Permit Number: GW-130

Well Classification: Class I Non-hazardous

API Number: Class I Non-nazardous 30-045-29002

Legal Location: 1250 FEL, 2442FSL, I Sec 27 T29S R11E

Physical Address: #50 Road 4990, Bloomfield, NM 87413

2.0 SUMMARY OF ACTIVITIES

The following list of activities was conducted in 2015 on WDW #1 located at the Bloomfield facility:

- 02/17/15 1st Quarter 2015 Sampling Event
 04/01/15 2nd Quarter 2015 Sampling Event
 07/01/15 3rd Quarter 2015 Sampling Event
 09/22/15 Braidenhead Test
- 09/22/15 High Pressure Shutdown Test

An analytical sample was not collected during the fourth quarter of 2015 due to the fact that the injection well was not operational for the quarter. Quarterly samples collected for laboratory analysis were submitted to Hall Environmental Laboratories located in Albuquerque, New Mexico. Copies of the analytical reports are provided in Appendix B. A summary of the analytical results is provided in Table 3.

A representative of New Mexico Oil Conservation Division (NMOCD) was on-site to witness the Bradenhead Test, High Pressure Shutdown Test, and MIT on September 22, 2015. Only the Braidenhead and High Pressure Tests were conducted successfully. While setting up the MIT test the well failed and prevented the tests from being preformed.

On September 22, 2015 Western Refining was scheduled to conduct the annual MIT, Bradenhead and, High Pressure Shutdown Test with a representative of NMOCD present to observe. The Bradenhead Test and High Pressure Shutdown Test passed. In the course of setting up the MIT test, the annulus casing showed a sudden increase in pressure. The test was suspended and the well was shut down. Western began troubleshooting the problem by pressure testing the injection well tubing. The results of the pressure test showed the integrity of the tubing to be good. Western, at this point, believed the issue was with the well packer. This began the attempt to remove the well packer to have it replaced. In the process of attempting to retrieve the packer the well casing was damaged. The damage was determined to un-salvageable and prompted the decision to have the well plugged and abandoned. Western received conditional approval on October 26th, 2015 from NMOCD District 3 to plug and abandon the well. Well abandonment

activities commenced the week of October 26th, 2015 with a representative from OCD on-site to witness the plugging activities. Associated C-103s are included in Appendix A.

3.0 INJECTION VOLUME

The Monthly Injection Well Report summarizing injection volumes and well performance parameters is presented as Table 1.

3.1 Injection Volume

The volume injected into the disposal well during 2015 was 10,386,505 gallons. Throughout 2015 the injection well operated within the operational limits of less than 1,150 psi.

3.2 Injection Well Down-Time

The injection well was down approximately 4,789 hours in 2015. The well was permanently shut down on September 22, 2015.

4.0 SAMPLING AND CHEMICAL ANALYSIS

Samples were collected of the injection water on a quarterly basis and analyzed for the following per Item #9 of the Bloomfield Refinery Class I (Non-Hazardous) Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal dated March 23, 2004:

- Volatile Organic Compounds (VOCs);
- Semi-Volatile Organic Compounds (SVOCs);
- General Chemistry Parameters (included calcium, potassium, magnesium, sodium, bicarbonate, carbonate, chloride, sulfate, total dissolved solids, pH, and conductivity);
- RCRA 8 Metals; and
- RCRA Characteristics for Ignitability, Corrosivity, and Reactivity.

Fourth quarter samples were not collected due to the well not being operational during that time. First quarter samples were collected February 17, 2015. Second quarter samples were collected April 1, 2015. Third quarter samples were collected July 1, 2015. A summary of the analytical results is provided in Table 3.

All quarterly samples collected for laboratory analysis were submitted to Hall Environmental Analysis Laboratory located in Albuquerque, NM. The analytical results conclude that the injected water did not exhibit characteristics of hazardous waste. The respective quarterly analytical reports and Laboratory Quality Assurance Plan are provided in Appendices B and C, respectively.

5.0 TESTING AND MAINTENANCE ACTIVITIES

In addition to the conducting general preventative maintenance activities on the injection well equipment, the following testing and well maintenance activities were conducted during 2015:

- High-pressure shutdown and Bradenhead Testing.
- Well maintenance to fix problems with the well
- Plug and abandonment of the well

The Mechanical Integrity Testing (MIT) did not take place since the well as not able to be repaired. All activities were conducted following NMOCD approval, and such documentation is provided in Appendix A. The following is a brief summary of the testing and well maintenance activities conducted in 2015.

5.1 Mechanical Integrity Testing

A representative of New Mexico Oil Conservation Division (NMOCD) was on-site to witness a High Pressure Shutdown Test, Bradenhead Test, and MIT on September 22, 2015. The Bradenhead and High Pressure Shutdown test were witnessed by Monica Kuehling of NMOCD-Aztec and the MIT test was not able to be preformed.

5.2 Down-hole maintenance

On September 22, 2015 Western Refining was scheduled to conduct the annual MIT, Bradenhead, and High Pressure Shutdown Test with a representative of NMOCD present to observe. The Bradenhead Test and High Pressure Shutdown Test passed. In the course of setting up the MIT test, the annulus casing showed a sudden increase in pressure. The test was suspended and the well was shut down. Western began troubleshooting the problem by pressure testing the injection well tubing. The results of the pressure test showed the integrity of the tubing to be good. Western, at this point, believed the issue was with the well packer. This began the attempt to remove the well packer to have it replaced. In the process of attempting to retrieve the packer the well casing was damaged. The damage was determined to un-salvageable and prompted the decision to

have the well plugged and abandoned. Western received conditional approval on October 26th, 2015 from NMOCD District 3 to plug and abandon the well. Well abandonment activities commenced the week of October 26th, 2015 with a representative from OCD on-site to witness the plugging activities. Associated C-103s are included in Appendix A.

6.0 WELL EVALUATION

6.1 Well Evaluation

Between January 2015 and September 2015, the injection well operated normally and within the operation limit of 1,150 psi. The well was permanently shut down on September 22, 2015.

6.2 Area of Review (AOR)

The Area of Review data was updated in the 2011 Annual Bottom hole Pressure Surveys and Pressure Fall-Off Tests for Waste Disposal Well #1Report (Cobb & Associates, 2011). At that time, no new wells are known to have been installed within the one-mile radius.

Fifty-eight wells were found within a one-mile radius of WDW #1, which injects water into the Mesaverde formation. The wells and status are spotted on an area map, Figure 3, with a well number listed with the well data in Table 2. Of these wells, 15 have been plugged and abandoned. Four wells are classified as dry holes and are believed to be plugged and abandoned. Twenty-four wells produce petroleum from shallow zones. One well is an Entrada injection well. Fourteen wells produce petroleum from the Dakota and Gallup zones, which are deeper than the Mesaverde interval used for injection purposes. No wells are producing from the injection interval within a one-mile radius of WDW #1.

Twenty-four of the 59 wells have penetrated the injection zone. Of these, three have been plugged. Five wells are currently producing from shallow zones and 14 wells produce from deep zones. There are two injection wells including WDW #1 and Ashcroft SWD #1 well.

No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The following is a summary of well operations and well testing activities performed in 2014.

7.1 Conclusions

Injection Volume - The volume injected into the disposal well during 2015 was 10,386,505 gallons. Western suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation.

Sampling and Chemical Analyses - Injection fluids samples were collected for chemical analysis on a quarterly basis when the well was operational. Analytical results did not exhibit characteristics of hazardous waste.

Maintenance Operations - Down-hole maintenance activities were conducted in 2015 to attempt to repair the injection well. The well was beyond repair and went through the process to have it plugged and abandoned.

Mechanical Integrity Tests - The 2015 well testing program witnessed by a representative of OCD included a High-Pressure Shutdown Test and a Bradenhead Test. The MIT was not conducted since the well was not able to resume operation.

Well Evaluation – The injection well operated normally between January and September 2015 within the operational limit of 1,150 psi throughout 2015.

Area of Review (AOR) - No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

7.2 Recommendations

Western no longer operates the injection well as it has failed and was permanently plugged and abandoned. This will be the final report submitted for this well.

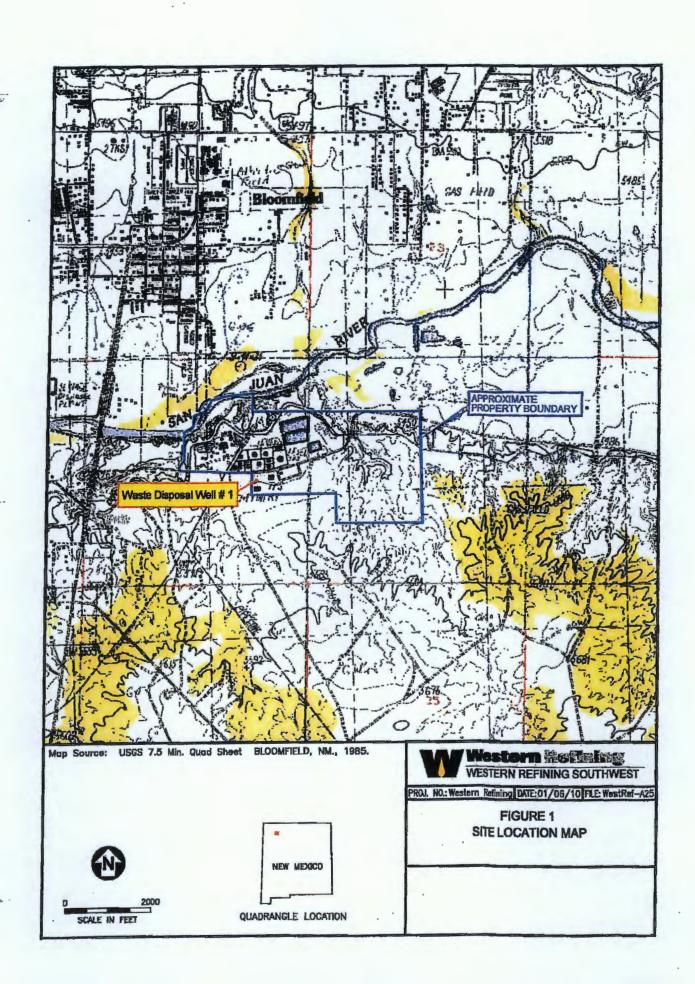
8.0 REFERENCES

Cobb & Associates, 2009a, Evaluation of Disposal Well #1 Bloomfield Refinery, August 26, 2009.

Cobb & Associates, 2011, 2011 Annual Bottom hole Pressure Surveys and Pressure Fall-Off Tests for Waste Disposal Well #1Report December 21, 2011.

Bloomfield Refinery Class I (Non-Hazardous) Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal dated March 23, 2004.

FIGURES



WESTERN REFINING DISPOSAL WELL #1 NW, SW SECTION 26, T29N, R11W

NO.: 30-045-29002



8-5/8", 48#/ft, Surface Casing @ 830' TOC: Surface

Hole Size: 11.0"

Tubing: 2-7/8", Acid Resistant Fluoroline Cement Lined

Wt of Tubing: 6.5 #/ft Wt of Tubing Lined: 7.55 #/ft

Tubing ID: 2.128"
Tubing Drift ID: 2.000"

Minimum ID @ Packer: ~1.87" estimated

Packer: Unknown Packer Type @ 3221'
Could be a Guiberson or similar model Uni-6

Perforations: 3276' - 3408' 4JSPF 0.5 EHD Top of the Cliff House Formation: 3276'

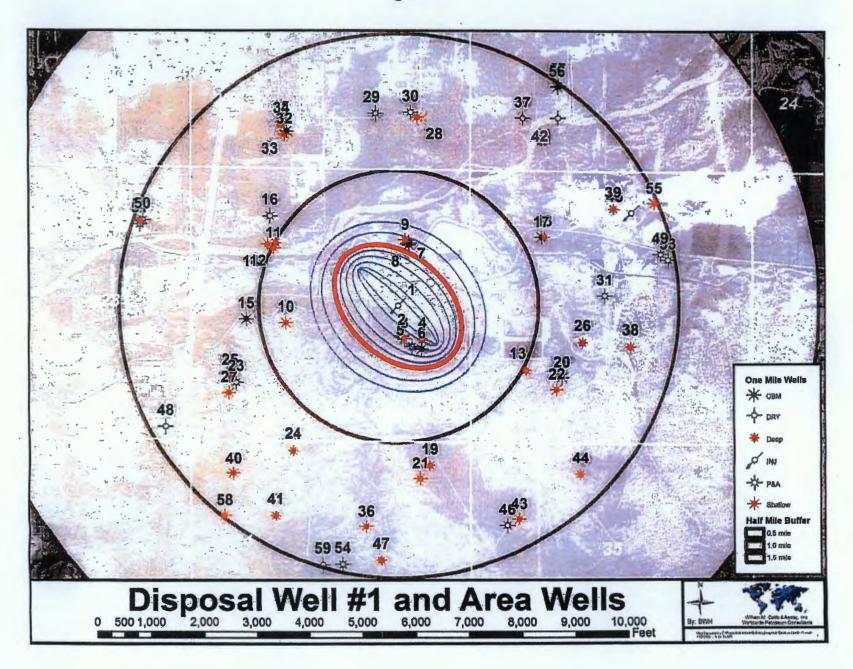
Fill was cleaned out of well on 4/20/06 Fill was orginally tagged at 3325'

Perforations: 3435' - 3460' 4JSPF 0.5 EHD Top of the Menefee Formation: 3400'

RBP: 3520'

5-1/2", 15.5#/ft, Production Casing @3600'

TOC: Surface Hole Size: 7-7/8"



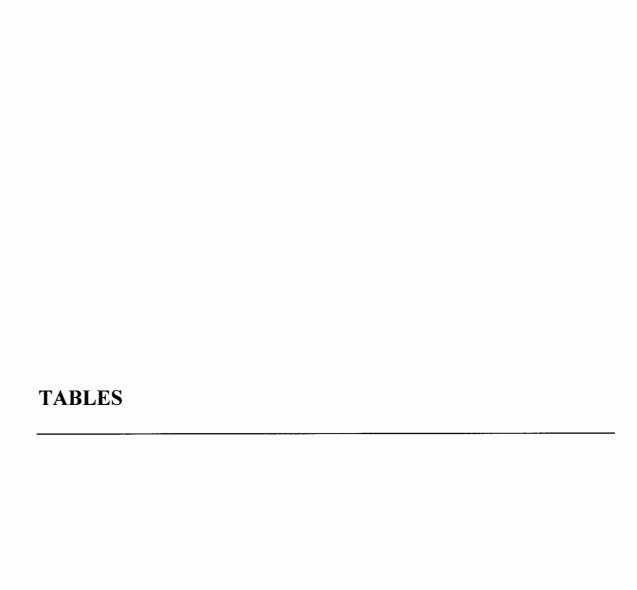


TABLE 1

WESTERN REFINING SOUTHWEST, INC. - BLOOMFIELD TERMINAL P.O. BOX 159 BLOOMFIELD, NEW MEXICO 87413

QUARTERLY INJECTION WELL REPORT DISCHARGE PLAN GW-130 NE1/4 SE1/4 SECTION 27, T29N, R11W NMPM, SAN JUAN COUNTY, NEW MEXICO

	AMOUNT OF WATER	AMOUNT TO SOLAR	TOTALIZER AMOUNT	DOWN-	ir	UECTION PRESSUR	E		INNULAR PRESSUR	E		ON-LINE FLOW RATES	
PERIOD	FROM RIVER	EVAP PONDS	INJECTED	TIME	MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG
2015	(GALLONS)	(GALLONS)	(GALLONS)	(HRS)	(PSIA)	(P5iA)	(PSIA)	(PSIA)	(PSIA)	(PSIA)	(GPM)	(GPM)	(GPM)
JAN	380	1,416,000	-	744	850	823	836	157	128	147	0	0	00
FEB	1,293	-	1,435,535	231	1071	817	979	173	127	159	59	0	35
MAR	578	-	1,957,682	109	1106	871	1044	210	141	157	54	0	43
APR	1,317	285,307	1,137,693	298	1067	854	946	207	140	164	53	0	25
MAY	990	2,156,000		744	875	836	853	193	119	150	0	0	0
JUN	635	2,267,159	1,468,841	119	1090	834	991	188	133	157	54	29	40
JUL	587	1,292,517	1,497,483	152	1108	860	1025	174	115	153	47	36	41
AUG	-	580,533	1,765,467	٥	1082	1025	1063	191	132	166	43	34	39
SEP	-	2,010,196	1,123,804	184	1104	982	1059	199	139	169	41	24	36
ост	-	-	-	_	_	-	-	-	-	-	-	-	•
NOV	-	-	-	-	-	-	-	-		-	-		-
DEC	-		-	-	-	-	-	_		_	_	•	-

The total amount injected in 2015 is:

10,386,505 gaile

NOTE: Well was abaondoned October 28, 2015

CERTIFICATION: Helly Coleurs

DATE: 10-29-2015

Map Seq.	Miles to DW1	WELLNAME	#	<u>APINO</u>	Perf Top	Perf Bottom	<u>Total</u> Depth	P&A Date	<u>ULSTR</u>	OPERATOR	RESERVOIR	Status	Pen. Inj. Zone
1	0.00	DISPOSAL	1	30-045-29002	3276	3514	3514		I-27-29N-11W	WESTERN REFINING	MESAVERDE	INJ	Yes
2	0.11	DAVIS GAS COM F	1	30-045-07825	6157	6298	6298	19-Jan-94	1-27-29N-11W	BP AMERICA	DAKOTA	P&A	Yes
3	0.12	DAVIS GAS COM G	1	30-045-23554	2827	2839	2839		I-27-29N-11W	XTO ENERGY, INC	CHACRA	Shallow	No
4	0.15	DAVIS GAS COM F	1R	30-045-30833	5314	5646	6177		I-27-29N-11W	XTO ENERGY, INC	GALLUP	Deep	Yes
5	0.16	Davis Pooled Unit	1	30-045-07812			1717	18-Oct-82	I-27-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
6	0.18	JACQUE	1	30-045-34463	1543	1714	1714		I-27-29N-11W	HOLCOMB O&G	FRUITLAND COAL	СВМ	No
7	0.23	JACQUE	2	30-045-34409	1483	1689	1689		H-27-29N-11W	HOLCOMB O&G	FRUITLAND COAL	СВМ	No
8	0.23	Davis PU/FB Umbarger	2	30-045-07883			1800	18-Aug-55	H-27-29N-11W	Pre-Ongard		P&A	No
9	0.24	DAVIS GAS COM F	1E	30-045-24084	2701	2810	6262		H-27-29N-11W	XTO ENERGY, INC	CHACRA	Shallow	Yes
10	0.41	CONGRESS	18	30-045-25673	1680	1770	5808		K-27-29N-11W	Burlington	PICTURED CLIFFS	Shallow	Yes
11	0.49	LAUREN KELLY	1	30-045-27361	1326	1354	1354		F-27-29N-11W	MANANA GAS INC	FRUITLAND SAND	Shallow	No
12	0.49	MANGUM	1E	30-045-24673	6024	6160	6160		F-27-29N-11W	Burlington	DAKOTA	Deep	Yes
13	0.51	CALVIN	1	30-045-12003	6176	6348	6348		M-26-29N-11W	Burlington	DAKOTA	Deep	Yes
14	0.52	MARIAN S	1	30-045-27365	2578	2710	2710		F-27-29N-11W	MANANA GAS INC	CHACRA	Shallow	No
15	0.55	MANGUM	1	30-045-07835	1388	1661	6214		L-27-29N-11W	Burlington	FRUITLAND COAL	СВМ	Yes
16	0.56	Black Diamond	1	30-045-07896			800	09-Nov-78	C-27-29N-11W	Pre-Ongard		P&A	No
17	0.57	DAVIS GAS COM J	1	30-045-25329	1462	1645	4030		F-26-29N-11W	HOLCOMB O&G	FRUITLAND COAL	СВМ	Yes
18	0.58	SULLIVAN GAS COM D	1E	30-045-24083	6086	6242	6242		F-26-29N-11W	XTO ENERGY, INC	DAKOTA	Deep	Yes
19	0.60	CONGRESS	16	30-045-25657	6086	6148	6148		A-34-29N-11W	Burlington	GALLUP	Deep	Yes
20	0.64	CALVIN	100	30-045-31118	1468	1760	1760		N-26-29N-11W	Burlington	FRUITLAND COAL	СВМ	No
21	0.64	SUMMIT	9	30-045-24574	2747	2857	2857		A-34-29N-11W	Burlington	CHACRA	Shallow	No
22	0.64	CONGRESS	9	30-045-24572	2746	2869	2869		N-26-29N-11W	ENERGEN	CHACRA	Shallow	No
23	0.64	Garland "B"	1	30-045-07903	1664	1747	1747	27-Jun-75	M-27-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
24	0.65	SUMMIT	15	30-045-25707	5326	5970	5970		C-34-29N-11W	ENERGEN	GALLUP	Deep	Yes

Table 2

<u>Map</u> Seq.	Miles to DW1	WELLNAME	#	<u>APINO</u>	Perf Top	Perf Bottom	<u>Total</u> Depth	P&A Date	ULSTR	OPERATOR	RESERVOIR	Status	Pen. Inj. Zone
25	0.65	GARLAND	3	30-045-24573	2668	2790	2790		M-27-29N-11W	ENERGEN	CHACRA	Shallow	No
26	0.67	CALVIN	3	30-045-25612	5295	5870	5870		K-26-29N-11W	Burlington	GALLUP	Deep	Yes
27	0.68	GARLAND B	1R	30-045-21732	1648	1678	1678		M-27-29N-11W	Burlington	PICTURED CLIFFS	Shallow	No
28	0.70	NANCY HARTMAN	2	30-045-26721	2627	2754	2754		P-22-29N-11W	MANANA GAS INC	CHACRA	Shallow	No
29	0.71	GRACE PEARCE	1	30-045-07959	1380	1466	1466	02-Mar-00	O-22-29N-11W	JOHN C PICKETT	FRUITLAND SAND	P&A	No
30	0.72	HARTMAN	1	30-045-07961	6072	6274	6274	14-Jun-99	P-22-29N-11W	MANANA GAS INC	DAKOTA	P&A	Yes
31	0.73	Davis	1	30-045-07776			1917	11-Nov-58	M-26-29N-11W	Pre-Ongard	(N/A)	P&A	No
32	0.75	MARY JANE	1	30-045-26731	2622	2732	2732		N-22-29N-11W	MANANA GAS INC	CHACRA	Shallow	No
33	0.76	ROYAL FLUSH	1	30-045-34312	1440	1608	1608		N-22-29N-11W	MANANA GAS INC	FRUITLAND COAL	СВМ	No
34	0.79	соок	1	30-045-07940	6052	6226	6226		N-22-29N-11W	MANANA GAS INC	DAKOTA	Deep	Yes
35	0.79	соок	2	30-045-13089	1390	1410	1410		N-22-29N-11W	MANANA GAS INC	FRUITLAND SAND	Shallow	No
36	0.82	SHELLY	2	30-045-20755	1726	1736	1736		G-34-29N-11W	CHAPARRAL O&G	PICTURED CLIFFS	Shallow	No
37	0.82	HARE	3	30-545-02123			2335		M-23-29N-11W	Pre-Ongard	FARMINGTON	DRY	No
38	0.84	CALVIN	1F	30-045-33093	6172	6430	6430		J-26-29N-11W	Burlington	DAKOTA	Deep	Yes
39	0.85	SULLIVAN GAS COM D	1	30-045-07733	6047	6160	6160		B-26-29N-11W	XTO ENERGY, INC	DAKOTA	Deep	Yes
40	0.85	ELLEDGE FEDERAL 34	11	30-045-24834	1060	1064	1525		D-34-29N-11W	MCELVAIN O&G	FARMINGTON,NORTH	Shallow	No
41	0.89	CONGRESS	7E	30-045-24835	6202	6347	6347		F-34-29N-11W	Burlington	DAKOTA	Deep	Yes
42	0.90	HARE	4	30-545-02124			2015		O-23-29N-11W	Pre-Ongard	FARMINGTON	DRY	No
43	0.90	CONGRESS	4E	30-045-24837	2784	2906	6328		E-35-29N-11W	Burlington	CHACRA	Shallow	Yes
44	0.90	CONGRESS	15	30-045-25675	5369	5943	5943		C-35-29N-11W	Burlington	GALLUP	Deep	Yes
45	0.90	ASHCROFT SWD	1	30-045-30788	6952	7070	7382		B-26-29N-11W	XTO ENERGY, INC	MORRISON BLUFF EN	INJ	Yes
46	0.90	LEA ANN	1	30-045-20752	1776	1790	1790	18-Dec-99	E-35-29N-11W	CHAPARRAL O&G	PICTURED CLIFFS	P&A	No
47	0.94	CONGRESS	5	30-045-07672	6171	6340	6340		G-34-29N-11W	Burlington	DAKOTA	Deep	Yes
48	0.94	Viles EE	1	30-045-07751			870		P-28-29N-11W	Pre-Ongard		DRY	No

Table 2

Map Seq.	Miles to DW1	WELLNAME	#	<u>APINO</u>	Perf Top	Perf Bottom	<u>Total</u> <u>Depth</u>	P&A Date	ULSTR	OPERATOR	RESERVOIR	Status	Pen. Ini. Zone
49	0.95	Sullivan	1X	30-045-29107			900	23-Jun-55	G-26-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
50	0.97	Madsen Selby Pooled Unit	2	30-045-07895			1600	05 -M ay-78	A-28-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
51	0.97	Masden-Selby	3	30-045-07762			600	05-Jun-78	A-28-29N-11W	Pre-Ongard		P&A	No
52	0.97	MASDEN GAS COM	1	30-045-07894	6023	6125	6125		A-28-29N-11W	XTO ENERGY, INC	DAKOTA	Deep	Yes
53	0.97	Sullivan	1	30-045-07870			1420	31-Aug-53	G-26-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
54	0.98	CONGRESS	1	30-045-07674			PC	30-Oct-53	J-34-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
55	0.98	EARL B SULLIVAN	1	30-045-23163	2750	2761	2761		B-26-29N-11W	XTO ENERGY, INC	CHACRA	Shallow	No
56	0.99	STATE GAS COM BS	1	30-045-23550	1470	1648	2761		K-23-29N-11W	HOLCOMB O&G	FRUITLAND COAL	СВМ	No
57	0.99	PEARCE GAS COM	1	30-045-07985	6154	6182	6182	10-Mar-97.	K-23-29N-11W	BP AMERICA	DAKOTA	P&A	Yes
58	0.99	CHAPARRAL	1	30-045-20609	1712	1731	1731		E-34-29N-11W	CHAPARRAL O&G	PICTURED CLIFFS	Shallow	No
59	0.99	CONGRESS	2	30-545-02151			Frtind		-34-29N-11W	Pre-Ongard	FRUITLAND SAND	DRY	No

	Total	<u>Pen In</u>	<u>i. Zone</u>
Status	<u>Wells</u>	<u>Yes</u>	<u>No</u>
P&A	15	3	12
Dry	4	0	4
INJ	2	2	0
СВМ	7	2	5
Shallow	17	3	14
Deep	14	14	0
Total	59	24	35

Injection Well 2015 Quarterly Analytical Summary

Table 3

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarte
olatile Organic Compounds (ug/L)		2/17/2015	4/1/2015	7/1/2015	
1,1,1,2-Tetrachloroethane		< 5.0	< 5.0	< 1.0	na
1,1,1-Trichloroethane	territoria de la desta de la desta como de la decidad de la dela del del del de la dela de	< 5.0	< 5.0	< 1.0	na
1,1,2,2-Tetrachloroethane	PN 1566 of The assument of Sententian Control (Sententian Control	< 10	< 10	< 2.0	na
1,1,2-Trichloroethane	iogenedes. Maria l'autorita de como l'achano consecutivo de como en este a reducirio I sel Indirezi	< 5.0	< 5.0	< 1.0	na
1,1-Dichloroethane	NORMERCO BREADENCY OF MATERIA OF HIS PROPERTY AND A STREET	< 5.0	< 5.0	< 1.0	na
1,1-Dichloroethene	to the common the common terms of the common t	< 5.0	< 5.0	< 1.0	na
1,1-Dichloropropene	MMCCC California de debido e menor merco e mono qui que e imprejuyo de Maderia, con	< 5.0	< 5.0	< 1.0	na
1,2,3-Trichlorobenzene	Minimum assessment and an extensive section of water the section (MA) is added to	< 5.0	< 5.0	< 1.0	na
1,2,3-Trichloropropane	NUCCESSOR AND SANDONESS OF A CONTRACT OF A SANDON AND A SANDON ASSESSMENT OF A SANDON ASSESSMENT OF A SANDON A	< 10	< 10	< 2.0	na
1,2,4-Trichlorobenzene	report to the first section of the first of the first of the section of the secti	< 5.0	< 5.0	< 1.0	na
1,2,4-Trimethylbenzene	Ph. Ph. 11 Methodological advantage fra the construction of the control of the	< 5.0	< 5.0	< 1.0	na
1,2-Dibromo-3-chloropropane	tions to a minimi es work-construction on the orthograph to the New York (New York) (New York)	< 10	< 10	< 2.0	na
1,2-Dibromoethane (EDB)		< 5.0	< 5.0	< 1.0	na
1,2-Dichlorobenzene	MANUFALLINANE PROPERTY AND AREA PROPERTY	< 5.0	< 5.0	< 1.0	na
1,2-Dichloroethane (EDC)	500	< 5.0	< 5.0	< 1.0	na
1,2-Dichloropropane	to the second se	< 5.0	< 5.0	< 1.0	na
1,3,5-Trimethylbenzene		< 5.0	< 5.0	< 1.0	na
1,3-Dichlorobenzene	entropy of the state of the second and the state of the second se	< 5.0	< 5.0	< 1.0	na
1,3-Dichloropropane	oproporate action Control of the Section Section (Section Section Sect	< 5.0	< 5.0	< 1.0	na
1,4-Dichlorobenzene	7500	< 5.0	< 5.0	< 1.0	na
1-Methylnaphthalene	POLTO IL SOCIELIZZAZIONI, NI TENNOMI NOVO. 100 MORRORI CON 100 MORRORI (NEL 100 MORRORI (NE	< 20	< 20	< 4.0	na
2,2-Dichloropropane		< 10	< 10	< 2.0	na
2-Butanone	galanda et que proprio de la composiçõe de la composiçõe	< 50	< 50	11	na
2-Chlorotoluene	ger og a demokratiske er spremerer skrivet i i diskrivet vil fransfriktivans	< 5.0	< 5.0	< 1.0	na
2-Hexanone	eran men menteranskar en er er grentet i 1. japan pila har sjøret den en er er	< 50	< 50	< 1.0	na
2-Methylnaphthalene	es and a representative state of the annument of the	< 20	< 20	< 4.0	na
4-Chlorotoluene	Which are Department and The Color of Color of Color of State of S	< 5.0	< 5.0	< 1.0	na
4-Choropyltoluene	ROMA PROSESS NO NO SIGNASANDAN AND AND AND AND AND AND AND AND AN	< 5.0	< 5.0	< 1.0	na
4-Methyl-2-pentanone	The state of the s	< 50	< 50	< 10	na
Acetone	and the second section of the second second section of the second	500	76	72	na
Benzene	500	< 5.0	< 5.0	< 1.0	
$0.27 \pm 0.01 \pm 0.0000000000000000000000000000$	SOU CONTRACT TO THE CONTRACT OF THE CONTRACT O	< 5.0	< 5.0	< 1.0	na
Bromobenzene	and the second of the second o	-	**************************************	***************************************	na
Bromodichloromethane	e ne pour seminare papare mai tenti i i i i i i i i i i i i i i i i i i	< 5.0	< 5.0	< 1.0	na
Bromoform	and the latter was to be about the first of	< 5.0	< 5.0	< 1.0	na
Bromomethane	MCMC-6 [14 - 24 - 24 Annien der der nicht der met der met der	< 15	< 15	< 3.0	na
Carbon disulfide	addition to the latest of the state of the s	< 50	< 50	< 10	na
Carbon Tetrachloride	500	< 5.0	< 5.0	< 1.0	na
Chloropthono	100000	< 5.0	< 5.0	< 1.0	na
Chloroform	6000	< 10	< 10	< 2.0	na
Chloromothono	6000	< 5.0	< 5.0 < 15	< 1.0	na
Chloromethane	the contract of the second of	< 15	MANAGEMENT AND	< 3.0	na
cis-1,2-DCE		< 5.0 < 5.0	< 5.0 < 5.0	< 1.0 < 1.0	na
cis-1,3-Dichloropropene	ennin talkalajanterintaja tajan majajari in timojo oli ji ji ji ji	***************************************	***************************************	######################################	na
Dibromochloromethane	Marine Marine and the second s	< 5.0	< 5.0	< 1.0	na
Dibromomethane	to a reference a manager of a contract to a factorial contract to a factorial contract to a contra	< 5.0	< 5.0	< 1.0	na
Dichlorodifluoromethane	i de la compania del compania de la compania del compania de la compania del compania de la compania de la compania de la compania del compania de la compania de la compania de la compania de la compania del compania	< 5.0	< 5.0	< 1.0	na
Ethylbenzene	FOO	< 5.0	< 5.0	< 1.0	na
Hexachlorobutadiene	500	< 5.0	< 5.0	< 1.0	na
Isopropylbenzene	man and the second seco	< 5.0	< 5.0	< 1.0	na
Methyl tert-butyl ether (MTBE)	to a me continue contratable to the contratable to	< 5.0	< 5.0	< 1.0	na
Methylene Chloride	et also productives on the elementary of the last elementary of the	< 15	< 15	< 3.0	na
Naphthalene	Control of the Contro	< 10	< 15	< 2.0	na
n-Butylbenzene	The state of the s	< 15	< 5.0	< 1.0	na
n-Propylbenzene		< 5.0	< 10	< 3.0	na

Injection Well

Table 3

2015 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Ouarter
sec-Butylbenzene	CHAIR ACCE TO THE STATE OF THE	< 5.0	< 5.0	< 1.0	na
Styrene	oppunggenum - Bussinesses sins "vissi gudisesh das sins im din im in in in in November in in 14 kelinis na	< 5.0	< 5.0	< 1.0	na
tert-Butylbenzene	ANY TRANSPORTED TO THE PROPERTY OF THE PROPERT	< 5.0	< 5.0	< 1.0	na
Tetrachloroethene (PCE)		< 5.0	< 5.0	< 1.0	na
Toluene	management of a contract of the contract of th	< 5.0	< 5.0	1.5	na
trans-1,2-DCE	o compositivativa e e e e e e e e e e e e e e e e e e e	< 5.0	< 5.0	< 1.0	na
trans-1,3-Dichloropropene	nick in distriction of the property of the first indicate and an extension of the contract of	< 5.0	< 5.0	< 1.0	na
Trichloroethene (TCE)	european yr var yn y gegynagia refinan fanna fanna fannar y section eila, aneche en c'hren en del ekklor e fila	< 5.0	< 5.0	< 1.0	na
Trichlorofluoromethane	an de respectación de secono con contracto de contracto de contracto de contracto de contracto de contracto de	< 5.0	< 5.0	< 1.0	na
Vinyl chloride	200	< 5.0	< 5.0	< 1.0	na
Xylenes, Total	AND ALTERNATION AND AND AND AND AND AND AND AND AND AN	< 7.5	< 7.5	< 1.5	na
mi-Volatile Organic Compounds (ug/	Z)	1			
1,2,4-Trichlorobenzene		< 10	< 10	< 10	na
1,2-Dichlorobenzene	on consequent and executative and control of policy and the control of the contro	< 10	< 10	< 10	na
1,3-Dichlorobenzene	erandelliski i ostoon liitioti in oli. Polkuriaks nohaak ölderhekköleh ohte helistöin	< 10	< 10	< 10	na
1,4-Dichlorobenzene	7500	< 10	< 10	< 10	na
1-Methylnaphthalene	W. C. OR. PRINCE OF CHARLEST SPECIAL PRINCES OF CHARLES	< 10	< 10	< 10	na
2,4,5-Trichlorophenol		< 10	< 10	< 10	na
2,4,6-Trichlorophenol	2000	< 10	< 10	< 10	na
2,4-Dichlorophenol	ENGLISH STATE OF THE PROPERTY	< 20	< 20	< 20	na
2,4-Dientolophenol	manus mendenni. Manusum manusum and en en en entre mendenni mendenni par indexe en feren	17	< 10	< 10	na
2,4-Dinitrophenol	6) on healthing . While the sales and the high electronical about a text of the besser of the	< 20	< 20	< 20	na
2,4-Dinitrotoluene	130	< 10	< 10	< 10	na
2,6-Dinitrotoluene	detected and described delay of the control of the	< 10	< 10	< 10	na
2-Chloronaphthalene	too keep value of the second s	< 10	< 10	< 10	na
	nya amanin 	< 10	< 10	< 10	na
2-Chlorophenol 2-Methylnaphthalene	COMPANION CONTRACTOR AND A TABLE TO SEE THE TABLE TO SEE THE SECTION OF THE SECTI	< 10	< 10	< 10	na
	the man court of the section of the	55	14	< 10	na
2-Methylphenol 2-Nitroaniline	Burner Ber German Bernard Bern	< 10	< 10	< 10	na
ALT CHEMICAL PROPERTY OF THE P	E SENTENDA - MANAGEMENT OF STREET STREET, STREET ST.	< 10	< 10	< 10	na
2-Nitrophenol	difficulty for the advances of the system of the section of the se	< 10	< 10	< 10	na
3,3'-Dichlorobenzidine	Alberta Comment of the state of the second of the	79	48	< 10	na na
3+4-Methylphenol 3-Nitroaniline	d a phagaine and the same and the arthur and middle and the same and same and the same and same and the same and	< 10	< 10	< 10	na na
 Composition described described and the control of th	STATUTE THE CONTRACT OF STATE	< 20	< 20	< 20	na
4,6-Dinitro-2-methylphenol	grunnane wegapenggapunghi anana sigo i i i i isana si	< 10	< 10	< 10	na
4-Bromophenyl phenyl ether	and the second of the second o	< 10	< 10	< 10	na na
4-Chloro-3-methylphenol	manufacture in garage of the second contraction	< 10	< 10	< 10	na
4-Chloroaniline	regarders spaces a constitution to the space of the first	< 10	< 10	< 10	na
4-Chlorophenyl phenyl ether 4-Nitroaniline		< 10	< 10	< 10	na
4-Nitrophenol		< 10	< 10	< 10	na
A THE RESIDENCE OF THE PROPERTY OF THE PROPERT	was the contraction and the contract of the co	< 10	< 10	< 10	na na
Acenaphthene Acenaphthylene	grand popular and the rest of the contraction of the	< 10	< 10	< 10	na
Comprehensive Co	or ringer green to the color date and the McModell	< 10	< 10	< 10	na
Aniline Anthracene	The state of the s	< 10	< 10	< 10	na
Anunracene Azobenzene	constants where the second control of the second of the se	< 10	< 10	< 10	na
Benz(a)anthracene	TITLE TO BE A THE BURGET OF STREET AND THE STREET OF STREET STREET, AND STREET STREET	< 10	< 10	< 10	na na
Benzo(a)pyrene		< 10	< 10	< 10	na na
Benzo(a)pyrene Benzo(b)fluoranthene	Marie and Marie Ma	< 10	< 10	< 10	na
Benzo(g,h,i)perylene	and the second service of the second	< 10	< 10	< 10	na
Benzo(k)fluoranthene	E Principal Commission of the	< 10	< 10	< 10	na
The street and approximation of the street o	e branchedbron februarien reneal'h sokrenieu e - 256 - 2566 (1975 - 1975). Franc	< 20	25	< 20	na na
Benzoic acid	The state of the s	< 10	< 10	< 10	na
Benzyl alcohol	once the experience of the annual tendence contains the tendence	< 10	< 10	< 10	na
Bis(2-chloroethoxy)methane	alterfacility (- Magnetius edits - sk. peopleserietus tot et netro-occusionistististististis to			< 10	
Bis(2-chloroethyl)ether	10.71.11.1	< 10 < 10	< 10 < 10	< 10	na na

Injection Well

Table 3

2015 Quarterly Analytical Summary

	Toxicity				
	Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Bis(2-ethylhexyl)phthalate		< 10	12	< 10	na
Butyl benzyl phthalate	The state of the s	< 10	< 10	< 10	na
Carbazole	AND THE PROPERTY OF THE PROPER	< 10	< 10	< 10	na
Chrysene	A CONTRACTOR OF THE CONTRACTOR	< 10	< 10	< 10	na
Dibenz(a,h)anthracene	And the second s	< 10	< 10	< 10	na
Dibenzofuran	Charles Anna Rose Williams Laborator of Charles and Ch	< 10	< 10	< 10	na
Diethyl phthalate	- Magazania (Sampionia) o constitutivi di il 1 4 5 + 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	< 10	< 10	< 10	na
Dimethyl phthalate		< 10	< 10	< 10	na
Di-n-butyl phthalate	Millione reduces and part the relativistic of the removal of the fill of the contract of the c	< 10	< 10	< 10	na
Di-n-octyl phthalate	- New York Committee Commi	< 10	< 10	< 10	na
Fluoranthene		< 10	< 10	< 10	na
Fluorene	enterconnect of an interconnect transfer of the second of the order of the second of the order o	< 10	< 10	< 10	na
Hexachlorobenzene	130	< 10	< 10	< 10	na
Hexachlorobutadiene	500	< 10	< 10	< 10	na
Hexachlorocyclopentadiene	- particulationalists funcional established disease con succession	< 10	< 10	< 10	na
Hexachloroethane	. 3000	< 10	< 10	< 10	na
Indeno(1,2,3-cd)pyrene	Annex control of the	< 10	< 10	< 10	na
Isophorone	ML/TWAMAY AND HORSEN AND THE BLOCK AND THE WAY ON THE STATE OF THE S	< 10	< 10	< 10	na
Naphthalene	2000	< 10	< 10	< 10	na
Nitrobenzene N-Nitrosodimethylamine	2000	< 10 < 10	< 10 < 10	< 10 < 10	na
the second annual second secon	and the second of the second o	< 10	< 10	< 10	na na
N-Nitrosodi-n-propylamine N-Nitrosodiphenylamine	estimations.combered to to a solution of the second of the	< 10	< 10	< 10	na
Pentachlorophenol	100000	< 20	< 20	< 20	na
Phenanthrene	TOOOO	< 10	< 10	< 10	na
Phenol	The control of the state of the	21	< 10	< 10	na
Pyrene	and the second section of the second section of the second section of the second section of the second section	< 10	< 10	< 10	na
Pyridine	5000	< 10	< 10	< 10	na
General Chemistry (mg/L unless otherwise					
Specific Conductance (umhos/cm)		2900	4900	2000	na
Chloride	Man about at a majorate to a majorate de set tra 100 f. set (950	1400	480	na
Sulfate		48	9.5	65	na
Total Dissolved Solids		2290	2890	1220	na
pH (pH Units)	and the first and the first and the first	7.19	6.94	7.45	na
Bicarbonate (As CaCO3)		300	358.6	274.6	na
Carbonate (As CaCO3)		< 2.0	< 2.000	< 2.000	na
Calcium		180	300	120	na
Magnesium		38	57	28	na
Potassium		15	21	7.7	na
Sodium	experimental control of the first think of our own	560	750	280	na
Total Alkalinity (as CaCO3)	<u> </u>	300	358.6	274.6	na
Total Metals (mg/L)	5.0	< 0.000	Z 0 000	< 0.000	
Arsenic	5.0	< 0.020	< 0.020	< 0.020	na
Barium	100.0	0.36	0.44	0.27	na
Cadmium	1.0	< 0.0020	< 0.0020	< 0.0020	na
Chromium	5.0	< 0.0060 < 0.0050	< 0.0060 < 0.0050	< 0.0060 < 0.0050	na
Lead	5	< 0.0050	< 0.0050	< 0.0050	na
Selenium Silver	1 5	< 0.0050	< 0.050	< 0.050	na
Mercury	0.2	< 0.0030	< 0.0030	< 0.0030	na
Ignitability, Corrosivity, and Reactivity	U.Z	<u> </u>	< 0.00020	<u>\ 0.0010</u>	na
Reactive Cyanide (mg/L)		< 0.0200	< 1.00	< 1.00	na
Reactive Cyanide (mg/L) Reactive Sulfide (mg/L)	1100 Marie 110 M	< 0.0200	0.87	< 1.00	na na
- Angel, Angel managaman menangan mengenangan mengenangan kan bersada a 1 1 1 200 sebagai angelangan mengensah mengensah angelangan mengensah angelangan mengensah men	1400 T	***********************			
Ignitability (°F)	< 140° F	>200	>200	>200	na
Corrosivity (ph Units)	$\leq 2 \text{ or} \geq 12.5$	7.22	7.17	7.36	na

Notes:

na = well shut down

APPENDIX A



E-mail address

NEW MEXICO ENERGY, MUNERALS & NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION AZTEC DISTRICT OFFICE 1000 RIO BRAZOS ROAD AZTEC NM 87410 1505) 334-6178 FAX: (505) 334-8170

(505) 334-6178 FAX: (505) 334-6170 http://emnrd.state.nm.us/ocd/District III/3distric.htm

								OIL CONS. DILL
		_		BR	ADENH (submit 1	Copy to above	T REPORT e address)	OIL CONS. DIV DIST. 3 SEP 22 2015 \$30-0 45- 29002
Date of	f Test	, 9.	22	15	Operator	Sanjaar	Jung API #	#30-0 45- Z900Z
Proper	ty Nar	ne S	2000	Sw Dw	ell No	Location	: Unit L Section	27 Township 29 Range //
Well S	tatus(Shut-In						asing 152 Bradenhead 0
OPE	N BR	ADENH	EAD AN	D INTERM	IEDIATE T	O ATMOSPH	ERE INDIVIDUAL	LLY FOR 15 MINUTES EACH
Testing	вн	Bradeni Int	PRESSU head Csg	RE INTERI Int	M Csg			ARACTERISTICS INTERMEDIATE
TIME 5 min_	0		154			Steady Flow_		
10 min_	0	·	153			Surges		.,,
15 min_	0		155			Down to Not	hing	
20 min_						Nothing		
25 min_						Gas	/	
30 min_						Gas & Water		
						Water	'	
If brade	nhead	flowed w	ater, chec	k all of the	descriptions	that apply belo	ow:	
	CLEAI	R	FRESH	SA	LTY	SULFUR	BLACK	·
5 MINU	TE SH	UT-IN P	RESSUR	E BR	ADENHEA	D_0_	INTERMEDIAT	E/V/A
REMAR	KS:	Hari	Du	66 le	hene	Deneo	<u>(</u>	
	\sim 1	(. 0	, \	1 int	1 - MINI	Shutti
	(Y	o en	eng	When	copieu			Thuttie.
By M		4///			Wi	itness_//	omea (rech	Mug
	(Positi	on)						·

Submit 1 Copy To Appropriate District Office	State of New Me	xico	Form C-103				
District I – (575) 393-6161	Energy, Minerals and Natu	ral Resources	Revised August 1, 2011				
1625 N. French Dr., Hobbs, NM 88240			WELL API NO.				
<u>District II</u> (575) 748-1283 811 S. First St., Artesia, NM 88210	OIL CONSERVATION	DIVISION	30-045-29002-00 5. Indicate Type of Lease				
District III - (505) 334-6178	1220 South St. Fran	cis Dr.	STATE FEE				
1000 Rio Brazos Rd., Aztec, NM 87410 <u>District IV</u> – (505) 476-3460	Santa Fe, NM 87	' 505	6. State Oil & Gas Lease No.				
1220 S. St. Francis Dr., Santa Fe, NM	,		N/A				
87505		·					
SUNDRY NOT (DO NOT USE THIS FORM FOR PROPO DIFFERENT RESERVOIR. USE "APPLI PROPOSALS.)	7. Lease Name or Unit Agreement Name Disposal						
1. Type of Well: Oil Well	Gas Well Other - (Disposal W	Vell)	8. Well Number: #001				
	efining Co. / Western Refining South		9. OGRID Number: 037218				
Bloomfield Terminal							
3. Address of Operator			10. Pool name or Wildcat:				
# 50 Road 4990, Bloomfield, NM,	87413		Blanco/Mesa Verde				
4. Well Location							
Unit Letter I : 24	feet from the south	line and125	50 feet from the East line				
Section 27	Township 29 N	Range 11 W	NMPM County San Juan				
	11. Elevation (Show whether DR,	RKB, RT, GR, etc.,					
NOTICE OF IN PERFORM REMEDIAL WORK TEMPORARILY ABANDON PULL OR ALTER CASING DOWNHOLE COMMINGLE OTHER: Annual MIT, Bradenhead	PULL OR ALTER CASING MULTIPLE COMPL CASING/CEMENT JOB DOWNHOLE COMMINGLE						
13. Describe proposed or comp	pleted operations. (Clearly state all p		d give pertinent dates, including estimated date				
		C. For Multiple Cor	npletions: Attach wellbore diagram of				
proposed completion or re-	completion.						
Western Refining Southwest, Inc. – Class I injection well referenced abbe here to monitor the tests.	Bloomfield Terminal requests permove. The tests will be performed on	ission to perform th Tuesday, Septemb	ne annual MIT and Bradenhead test on the er 22 th , 2015. Monica Kuehling has agreed to				
Spud Date:	Rig Release Da	te:					
I hereby certify that the information	above is true and complete to the be	st of my knowledg	e and belief.				
SIGNATURE MANDA //	TITLE En	vironmental Coord	nator DATE 9/3/15				
Type or print name <u>Matthew Kr</u> For State Use Only	akow E-mail address	: <u>matt.krakow@</u>	wnr.com PHONE: <u>505-632-4169</u>				
APPROVED BY:	theling TITLE Envir	ronmantal Ev	19 ineer DATE 9/2/2015				

HEZ ZING OFFICIAL TORKS, TORKS STORE AND				
Submit 1 Copy To Appropriate District Office	State of New Mexico	Form C-103		
<u>District I</u> – (575) 393-6161 Energy,	Minerals and Natural Resources	Revised July 18, 2013 WELL API NO.		
1625 N. French Dr., Hobbs, NM 88240 <u>District II</u> – (575) 748-1283	ONSERVATION DIVISION	30-045-29002-00		
611 S. Filst St., Altesia, NW 66210	220 South St. Francis Dr.	5. Indicate Type of Lease		
1000 Rio Brazos Rd., Aztec, NM 87410	Santa Fe, NM 87505	STATE FEE 6. State Oil & Gas Lease No.		
<u>District IV</u> – (505) 476-3460 1220 S. St. Francis Dr., Santa Fe, NM	5 mile 1 5, 1 mil 5 / 5 65	N/A		
87505 SUNDRY NOTICES AND RE	PORTS ON WELLS	7. Lease Name or Unit Agreement Name		
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL DIFFERENT RESERVOIR. USE "APPLICATION FOR PE	OR TO DEEPEN OR PLUG BACK TO A	_		
PROPOSALS.)		Disposal 8. Well Number: #001		
1. Type of Well: Oil Well Gas Well 2. Name of Operator: San Juan Refining Co. / W	Other – (Disposal Well)	9. OGRID Number: 037218		
Bloomfield Terminal	estern Remning Southwest, nic	9. OGRID Nulliber. 037218		
3. Address of Operator		10. Pool name or Wildcat		
#50 Road 4990, Bloomfield, NM, 87413		Blanco/Mesa Verde		
4. Well Location Unit Letter I: 2442 fe	et from the South line and	1250 feet from the East line		
	ownship 29N Range 11 W			
	n (Show whether DR, RKB, RT, GR, etc.)			
12 Charle Appropriate	Box to Indicate Nature of Notice, I	Papart or Other Data		
12. Check Appropriate		_		
NOTICE OF INTENTION		SEQUENT REPORT OF:		
PERFORM REMEDIAL WORK PLUG AND TEMPORARILY ABANDON CHANGE PLUG AND TEMPORARILY ABANDON DESCRIPTION OF THE PROPERTY AND TEMPORARILY ABANDON DESCRIPTION OF THE PROPERTY AND TEMPORARILY ABANDON DESCRIPTION OF THE PROPERTY AND THE PROPERTY AND THE PROPERTY ABANDON DESCRIPTION OF THE PROPERTY AND T	ABANDON REMEDIAL WORK			
PULL OR ALTER CASING MULTIPLE (<u> </u>		
DOWNHOLE COMMINGLE				
CLOSED-LOOP SYSTEM OTHER:	□ OTHER:	П		
13. Describe proposed or completed operation	s. (Clearly state all pertinent details, and	give pertinent dates, including estimated date		
of starting any proposed work). SEE RUI	LE 19.15.7.14 NMAC. For Multiple Con	npletions: Attach wellbore diagram of		
proposed completion or recompletion. Western RefineryCo. plugged and abandoned the	is well on October 27 - 29, 2015 per the	e attached report:		
Plug #1 with CR at 2785' spot 170 sxs (200.6 cf) Class B cement	from 3533' to 2785'. Tag TOC at 2782'.			
Plug #2 with squeeze holes at 2750' and CR at 2700' spot 56 sx CR.	s (66.08 cf) Class B cement from 2750' to 2647 squ			
Plug #3 with squeeze holes at 2390' and CR at 2350' spot 50 sxs cover the Chacra top. Tag TOC at 2180'.	(59 cf) Class B cement from 2390' to 2235' squeeze	e 32 sxs outside, 5 sxs below leaving 13 sxs on top of CR to		
Plug #4 with 20 sxs (23.6 cf) Class B cement from 1748' to 1570' Plug #5 with 24 sxs (28.32 cf) Class B cement from 1407' to 1197	to cover the Fruitland top.			
Plug #6 spot 113 sxs (133.34 cf) Class B cement from 915' to 150 Plug #7 with 53 sxs Class B cement top off casings and install P&	', to top off casing from 150' to surface with 16 sxs to A marker with coordinates 36° 41′ 48″ N/ 107° 58′ 26′	cover the surface casing shoe. W.		
10/27/15 Rode cement equipment to location. Spot in and RU.		1500 PSI, OK. Pressure test casing to 1000 PSI, OK. Spot		
plug #1 with calculated TOC at 2785'. Sting out. RD.		A NO. CONT.		
	Spot plug #2 with calculated TOC at 2647'. Disp	lace with 15.2 mud. POH. Reverse circulate clean. RU A-		
set 5-1/2" CR at 2350'. Spot plug #3 with calculated To	Casing started flowing from squeeze floies. Si we DC at 2235'. Displace with mud. Reverse circulate v	ell. Check well pressures: casing 180 PSI. Wireline RIH and well clean. RD. SDFD.		
10/29/15 Travel to location. Spot in and RU cement equipment off casings and install P&A marker with coordinates 36	TIH and tag TOC at 2180'. Circulate well clean. S	pot plugs #4, #5 and #6. Cut off wellhead. Spot plug #7 top		
on casings and install Pow market with cooldinates so	1			
Spud Date:	Rig R Approved for plugging of well Liability under bond is retaine	ed pending		
PNR only	Receipt of C-103 (Subsequent Plugging) which may be found			
I hereby certify that the information above is true a	nd complet page under forms			
	A	/ /		
SIGNATURE	TITLE Agent / Enjine	a DATE /1/18/2415		
Type or print name Jaka Thankson	E-mail address: _ j olmew ola	hen. net PHONE: 505-320-1748		
For State Use Only	DEPUTY OIL & GAS	•		
APPROVED BY:	TITLE DISTRICT			
Conditions of Approval (if any):	0.1			

OIL CONS. DIV DIST. 3 SEP 25 2015 WELL API NO. ~045-29002-0 rte Tyr Submit I'Copy To Appropriate District State of New Mexico Form C-103 Energy, Minerals and Natural Resources Revised August 1, 2011 District I -- (575) 393-6161 1625 N. French Dr., Hobbs, NM 88240 District II - (575) 748-1283 30-045-29002-00 OIL CONSERVATION DIVISION 811 S. First St., Artesia, NM 88210 5. Indicate Type of Lease District III - (505) 334-6178 1220 South St. Francis Dr. STATE FEE 🖂 1000 Rio Brazos Rd., Aztec, NM 87410 Santa Fe, NM 87505 District IV - (505) 476-3460 6. State Oil & Gas Lease No. 1220 S. St. Francis Dr., Santa Fe, NM N/A 87505 SUNDRY NOTICES AND REPORTS ON WELLS 7. Lease Name or Unit Agreement Name (DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A Disposal DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH 8. Well Number: #001 1. Type of Well: Oil Well Gas Well Other - (Disposal Well) 2. Name of Operator San Juan Refining Co. / Western Refining Southwest, Inc. -9. OGRID Number: 037218 **Bloomfield Refinery** 3. Address of Operator 10. Pool name or Wildcat: # 50 Road 4990, Bloomfield, NM, 87413 Blanco/Mesa Verde 4. Well Location Unit Letter 2442 feet from the south line and 1250 feet from the East line 11 W Section Township 29 N Range **NMPM** County San Juan 11. Elevation (Show whether DR, RKB, RT, GR, etc.) 12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data NOTICE OF INTENTION TO: SUBSEQUENT REPORT OF: PERFORM REMEDIAL WORK PLUG AND ABANDON REMEDIAL WORK ALTERING CASING **TEMPORARILY ABANDON CHANGE PLANS** COMMENCE DRILLING OPNS. P AND A **PULL OR ALTER CASING** MULTIPLE COMPL CASING/CEMENT JOB DOWNHOLE COMMINGLE OTHER: Troubleshoot injection well problem OTHER: 13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 19.15.7.14 NMAC. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion. Western Refining Southwest, Inc. - Bloomfield Terminal is going to pressure test the tubing on the Class I injection well referenced above. The test would consist of setting a plug using a wireline rig and pressurizing the tubing to determine its integrity in response to the recent MIT failure. The tests will be performed on Thursday, September 25th, 2015. Rig Release Date: Spud Date: I hereby certify that the information above is true and complete to the best of my knowledge and belief. SIGNATURE Environmental Coordinator E-mail address: matt.krakow@wnr.com PHONE: 505-632-4169 Type or print name Matthew Krakow For State Use Only, SEP 2 5 2015 APPROVED BY: Conditions of Approval (if any):

APPENDIX B



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 16, 2015

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990

Bloomfield, NM 87413 TEL: (505) 632-4166 FAX (505) 632-3911

RE: Injection Well 2-17-15 OrderNo.: 1502723

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 2/18/2015 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

Only

4901 Hawkins NE

Albuquerque, NM 87109

Date Reported: 3/16/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

Project: Injection Well 2-17-15

Collection Date: 2/17/2015 11:20:00 AM

Lab ID: 1502723-001

Matrix: AQUEOUS

Received Date: 2/18/2015 8:00:00 AM

Analyses	Result	RL (Qual Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analyst:	LGT
Chloride	950	50	mg/L	100	2/18/2015 2:54:18 PM	R24392
Sulfate	48	5.0	mg/L	10	2/18/2015 2:41:53 PM	R24392
EPA METHOD 7470: MERCURY					Analyst:	MMD
Mercury	ND	0.00020	mg/L	1	2/26/2015 9:17:02 AM	17887
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst:	ELS
Arsenic	ND	0.020	mg/L	1	2/21/2015 12:09:42 PM	17834
Barium	0.36	0.020	mg/L	1	2/21/2015 12:09:42 PM	17834
Cadmium	ND	0.0020	mg/L	1	2/21/2015 12:09:42 PM	17834
Calcium	180	10	mg/L	10	2/21/2015 12:11:20 PM	17834
Chromium	ND	0.0060	mg/L	1	2/21/2015 12:09:42 PM	17834
Lead	ND	0.0050	mg/L	1	2/21/2015 12:09:42 PM	17834
Magnesium	38	1.0	mg/L	1	2/21/2015 12:09:42 PM	17834
Potassium	15	1.0	mg/L	1	2/21/2015 12:09:42 PM	17834
Selenium	ND	0.050	mg/L	1	2/21/2015 12:09:42 PM	17834
Silver	ND	0.0050	mg/L	1	2/21/2015 12:09:42 PM	17834
Sodium	560	10	mg/L	10	2/21/2015 12:11:20 PM	17834
EPA METHOD 8270C: SEMIVOLATII	_ES				Analyst:	DAM
Acenaphthene	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Acenaphthylene	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Aniline	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Anthracene	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Azobenzene	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Benz(a)anthracene	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Benzo(a)pyrene	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Benzo(b)fluoranthene	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Benzo(g,h,i)perylene	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Benzo(k)fluoranthene	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Benzoic acid	ND	20	μg/L	1	2/23/2015 4:43:18 PM	17825
Benzyl alcohol	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Bis(2-chloroethyl)ether	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Bis(2-ethylhexyl)phthalate	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
4-Bromophenyl phenyl ether	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Butyl benzyl phthalate	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
Carbazole	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
4-Chloro-3-methylphenol	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825
4-Chloroaniline	ND	10	μg/L	1	2/23/2015 4:43:18 PM	17825

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 1 of 19

- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1502723

Date Reported: 3/16/2015

Hall Environmental Analysis Laboratory, Inc.

Client Sample ID: Injection Well CLIENT: Western Refining Southwest, Inc.

Injection Well 2-17-15 Collection Date: 2/17/2015 11:20:00 AM Project: Received Date: 2/18/2015 8:00:00 AM

Lab ID: 1502723-001 Matrix: AQUEOUS Result **RL Qual Units DF** Date Analyzed Batch **Analyses EPA METHOD 8270C: SEMIVOLATILES** Analyst: DAM ND 10 μg/L 2/23/2015 4:43:18 PM 17825 2-Chloronaphthalene 1 ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 2-Chlorophenol 4-Chlorophenyl phenyl ether ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 ND 10 μg/L 2/23/2015 4:43:18 PM 17825 Chrysene 1 Di-n-butyl phthalate ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 Di-n-octyl phthalate ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 Dibenz(a,h)anthracene ND 10 μg/L 2/23/2015 4:43:18 PM 17825 Dibenzofuran ND 10 2/23/2015 4:43:18 PM 17825 μg/L 1 1,2-Dichlorobenzene ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 1,3-Dichlorobenzene ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 1,4-Dichlorobenzene 17825 3,3'-Dichlorobenzidine ND 10 μg/L 1 2/23/2015 4:43:18 PM Diethyl phthalate ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 Dimethyl phthalate ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 2,4-Dichlorophenol ND 20 μg/L 2/23/2015 4:43:18 PM 17825 17 10 μg/L 1 2/23/2015 4:43:18 PM 17825 2,4-Dimethylphenol 4,6-Dinitro-2-methylphenol ND 20 μg/L 1 2/23/2015 4:43:18 PM 17825 ND 20 μg/L 1 2/23/2015 4:43:18 PM 17825 2,4-Dinitrophenol ND 2/23/2015 4:43:18 PM 17825 2,4-Dinitrotoluene 10 μg/L 1 2.6-Dinitrotoluene ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 ND 10 1 2/23/2015 4:43:18 PM 17825 Fluoranthene μg/L Fluorene ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 Hexachlorobenzene ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 Hexachlorobutadiene ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 Hexachlorocyclopentadiene ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 ND 17825 10 μg/L 1 2/23/2015 4:43:18 PM Hexachloroethane ND 10 2/23/2015 4:43:18 PM 17825 Indeno(1,2,3-cd)pyrene μg/L 17825 ND 10 μg/L 1 2/23/2015 4:43:18 PM Isophorone ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 1-Methylnaphthalene 2-Methylnaphthalene ND 10 μg/L 1 2/23/2015 4:43:18 PM 55 10 1 2/23/2015 4:43:18 PM 17825 2-Methylphenol μg/L 3+4-Methylphenol 79 10 μg/L 1 2/23/2015 4:43:18 PM 17825 ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 N-Nitrosodi-n-propylamine ND N-Nitros odimethylamine 10 μg/L 1 2/23/2015 4:43:18 PM 17825 N-Nitrosodiphenylamine ND 10 μg/L 2/23/2015 4:43:18 PM 17825 ND 10 μg/L 1 2/23/2015 4:43:18 PM 17825 Naphthalene 17825 2-Nitroaniline ND 10 μg/L 1 2/23/2015 4:43:18 PM 3-Nitroaniline ND 10 μg/L 2/23/2015 4:43:18 PM 17825 ND 10 2/23/2015 4:43:18 PM 17825

Refer to the OC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

4-Nitroaniline

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Holding times for preparation or analysis exceeded Η
- ND Not Detected at the Reporting Limit

Page 2 of 19

P Sample pH Not In Range

μg/L

Reporting Detection Limit

Lab Order 1502723

Date Reported: 3/16/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 2-17-15

Lab ID: 1502723-001

Client Sample ID: Injection Well

Collection Date: 2/17/2015 11:20:00 AM

Received Date: 2/18/2015 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES	3					Analyst	DAM
Nitrobenzene	ND	10		μg/L	1	2/23/2015 4:43:18 PM	17825
2-Nitrophenol	ND	10		μg/L	1	2/23/2015 4:43:18 PM	17825
4-Nitrophenol	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
Pentachlorophenol	ND	20		μg/L	1	2/23/2015 4:43:18 PM	17825
Phenanthrene	ND	10		μg/L	1	2/23/2015 4:43:18 PM	17825
Phenol	21	10		μg/L	1	2/23/2015 4:43:18 PM	1782
Pyrene	ND	10		μg/L	1	2/23/2015 4:43:18 PM	1782
Pyridine	ND	10		μg/L	1	2/23/2015 4:43:18 PM	1782
1,2,4-Trichlorobenzene	ND	10		μg/L	1	2/23/2015 4:43:18 PM	1782
2,4,5-Trichlorophenol	ND	10		μg/L	1	2/23/2015 4:43:18 PM	1782
2,4,6-Trichlorophenol	ND	10		μg/L	1	2/23/2015 4:43:18 PM	1782
Surr: 2-Fluorophenol	42.5	17.6-104		%REC	1	2/23/2015 4:43:18 PM	1782
Surr: Phenol-d5	52.5	17.7-89.9		%REC	1	2/23/2015 4:43:18 PM	1782
Surr: 2,4,6-Tribromophenol	62.3	16.3-122		%REC	1	2/23/2015 4:43:18 PM	1782
Surr: Nitrobenzene-d5	83.4	45.3-117		%REC	1	2/23/2015 4:43:18 PM	1782
Surr: 2-Fluorobiphenyl	72.8	43-113		%REC	1	2/23/2015 4:43:18 PM	1782
Surr: 4-Terphenyl-d14	43.6	47.6-122	S	%REC	1	2/23/2015 4:43:18 PM	1782
EPA METHOD 8260B: VOLATILES						Analyst	cadg
Benzene	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	R245
Toluene	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	
Ethylbenzene	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	R245
Methyl tert-butyl ether (MTBE)	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	R245
1,2,4-Trimethylbenzene	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	R245
1,3,5-Trimethylbenzene	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	R245
1,2-Dichloroethane (EDC)	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	R245
1,2-Dibromoethane (EDB)	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	R245
Naphthalene	ND	10		μg/L	5	2/26/2015 12:27:45 PM	R245
1-Methylnaphthalene	ND	20		μg/L	5	2/26/2015 12:27:45 PM	R245
2-Methylnaphthalene	ND	20		μg/L	5	2/26/2015 12:27:45 PM	R245
Acetone	500	50		μg/L	5	2/26/2015 12:27:45 PM	R245
Bromobenzene	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	R245
Bromodichloromethane	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	R245
Bromoform	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	R245
Bromomethane	ND	15		μg/L	5	2/26/2015 12:27:45 PM	R245
2-Butanone	ND	50		μg/L	5	2/26/2015 12:27:45 PM	R245
Carbon disulfide	ND	50		μg/L	5	2/26/2015 12:27:45 PM	R245
Carbon Tetrachloride	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	R245
Chlorobenzene	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	R245
Chloroethane	ND	10		μg/L	5	2/26/2015 12:27:45 PM	

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 3 of 19

- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1502723

Date Reported: 3/16/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 2-17-15

Lab ID: 1502723-001

Client Sample ID: Injection Well

Collection Date: 2/17/2015 11:20:00 AM Received Date: 2/18/2015 8:00:00 AM

RL Qual Units Analyses Result DF Date Analyzed Batch **EPA METHOD 8260B: VOLATILES** Analyst: cadq Chloroform ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 Chloromethane ND 15 μg/L 5 2/26/2015 12:27:45 PM R24544 2/26/2015 12:27:45 PM R24544 2-Chlorotoluene ND 5.0 μg/L 5 4-Chlorotoluene ND 5.0 5 μg/L 2/26/2015 12:27:45 PM R24544 cis-1.2-DCE ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 cis-1,3-Dichloropropene ND 5.0 5 μg/L 2/26/2015 12:27:45 PM R24544 1,2-Dibromo-3-chloropropane ND 10 5 2/26/2015 12:27:45 PM R24544 μg/L Dibromochloromethane ND 5.0 5 μg/L 2/26/2015 12:27:45 PM R24544 ND Dibromomethane 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 1,2-Dichlorobenzene ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 ND 1,3-Dichlorobenzene 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 1,4-Dichlorobenzene ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 Dichlorodifluoromethane ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 1,1-Dichloroethane ND 5.0 5 2/26/2015 12:27:45 PM R24544 μg/L 1,1-Dichloroethene ND 5.0 5 μg/L 2/26/2015 12:27:45 PM R24544 ND 5.0 5 1,2-Dichloropropane μg/L 2/26/2015 12:27:45 PM R24544 1,3-Dichloropropane ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 ND 10 5 2,2-Dichloropropane μg/L 2/26/2015 12:27:45 PM R24544 1,1-Dichloropropene ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 Hexachlorobutadiene ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 2-Hexanone ND 50 μg/L 5 2/26/2015 12:27:45 PM R24544 Isopropylbenzene ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 4-Isopropyltoluene ND 5.0 5 μg/L 2/26/2015 12:27:45 PM R24544 ND 50 4-Methyl-2-pentanone μg/L 2/26/2015 12:27:45 PM R24544 Methylene Chloride ND 15 5 μg/L 2/26/2015 12:27:45 PM R24544 n-Butylbenzene ND 15 μg/L 5 2/26/2015 12:27:45 PM R24544 n-Propylbenzene ND 5.0 5 μg/L 2/26/2015 12:27:45 PM R24544 sec-Butylbenzene ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 Styrene ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 tert-Butylbenzene ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 1,1,1,2-Tetrachloroethane ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 1,1,2,2-Tetrachloroethane ND 10 μg/L 5 2/26/2015 12:27:45 PM R24544 Tetrachloroethene (PCE) ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 trans-1,2-DCE ND 5.0 5 2/26/2015 12:27:45 PM R24544 μg/L trans-1,3-Dichloropropene ND 5.0 5 μg/L 2/26/2015 12:27:45 PM R24544 ND 1,2,3-Trichlorobenzene 5.0 5 μg/L 2/26/2015 12:27:45 PM R24544 1,2,4-Trichlorobenzene ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 1,1,1-Trichloroethane ND 5.0 μg/L 5 2/26/2015 12:27:45 PM R24544 1,1,2-Trichloroethane ND 5.0 μg/L 2/26/2015 12:27:45 PM R24544

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 4 of 19

- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1502723

Date Reported: 3/16/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

 Project:
 Injection Well 2-17-15
 Collection Date: 2/17/2015 11:20:00 AM

 Lab ID:
 1502723-001
 Matrix: AQUEOUS
 Received Date: 2/18/2015 8:00:00 AM

Analyses	Result	RL (Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analys	t: cadg
Trichloroethene (TCE)	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	1 R24544
Trichlorofluoromethane	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	1 R24544
1,2,3-Trichloropropane	ND	10		μg/L	5	2/26/2015 12:27:45 PM	1 R24544
Vinyl chloride	ND	5.0		μg/L	5	2/26/2015 12:27:45 PM	1 R24544
Xylenes, Total	ND	7.5		μg/L	5	2/26/2015 12:27:45 PM	1 R24544
Surr: 1,2-Dichloroethane-d4	101	70-130		%REC	5	2/26/2015 12:27:45 PM	1 R24544
Surr: 4-Bromofluorobenzene	103	70-130		%REC	5	2/26/2015 12:27:45 PM	1 R24544
Surr: Dibromofluoromethane	101	70-130		%REC	5	2/26/2015 12:27:45 PM	1 R24544
Surr: Toluene-d8	98.7	70-130		%REC	5	2/26/2015 12:27:45 PM	1 R24544
SM2510B: SPECIFIC CONDUCTANC	E					Analys	t: JRR
Conductivity	2900	0.010		µmhos/cm	1	2/18/2015 12:49:27 PM	1 R24379
SM4500-H+B: PH						Analys	t: JRR
рН	7.19	1.68	Н	pH units	1	2/18/2015 12:49:27 PM	1 R24379
SM2320B: ALKALINITY						Analys	t: JRR
Bicarbonate (As CaCO3)	300	20		mg/L CaCO3	1	2/18/2015 12:49:27 PM	1 R24379
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	2/18/2015 12:49:27 PM	1 R24379
Total Alkalinity (as CaCO3)	300	20		mg/L CaCO3	1	2/18/2015 12:49:27 PM	1 R24379
SM2540C MOD: TOTAL DISSOLVED	SOLIDS					Analys	t: KS
Total Dissolved Solids	2290	40.0	*	mg/L	1	2/19/2015 3:19:00 PM	17793

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit Page 5 of 19
- P Sample pH Not In Range
- RL Reporting Detection Limit

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

150219026

Address:

4901 HAWKINS NE SUITE D

1502723

ALBUQUERQUE, NM 87109

Project Name:

Attn:

ANDY FREEMAN

Analytical Results Report

Sample Number

150219026-001

Sampling Date 2/17/2015

Date/Time Received 2/19/2015 1:20 PM

Client Sample ID

1502723-001E / INJECTION WELL

Sampling Time 11:20 AM

Matrix

Water

Sample Location

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	0.02	2/24/2015	CRW	SW646 CH7	
Flashpoint	>200	°F		2/25/2015	KFG	EPA 1010	
pH	7.13	ph Units		2/20/2015	KJS	SM 4500pH-B	
Şulfidə	ND	mg/L	0.45	3/3/2015	HSW	SM4500S2F	
Reactive sulfide	ND	mg/L	0.45	3/3/2015	HSW	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL.

EPA's Maximum Contaminant Level

ND

Not Detected

PQL

Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated.

Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

150219026

Address:

4901 HAWKINS NE SUITE D

1502723

ALBUQUERQUE, NM 87109

Project Name:

Attn:

ANDY FREEMAN

Analytical Results Report Quality Control Data

Lab Control Sai	mple										
Parameter		LCS Result	Units	LCS	Spike	%Rec	AR	%Rec	Prep	Date	Analysis Date
Sulfide		0.200	mg/L	0	.2	100.0	70	-130	3/3/2	2015	3/3/2015
Reactive sulfide		0.200	mg/L	0	.2	100.0	70	-130	3/3/2	2015	3/3/2015
Cyanide (reactive)		0.488	mg/L	0	.5	97.6	80	-120	2/24/	2015	2/24/2015
Matrix Spike											
Sample Number	Parameter		Sample Result	MS Result	Uni	fe	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
150219026-001	Reactive sulfide		ND	0.727	mg/		0.91	79.9	70-130	3/3/2015	3/3/2015
	Cyanide (reactive)		ND	0.953	mg/		1	95.3	80-120	2/24/2015	
Matrix Spike Du	plicate										
Parameter		MSD Result	Units	MSD Spike	%F	Rec	%RPD	AR %RPI) Pre	p Date	Analysis Date
Cyanide (reactive)		0.955	mg/L	1		5.5	0.2	0-25	-	4/2015	2/24/2015
Method Blank											
Parameter			Re	sult	U	nits		PQL	P	rep Date	Analysis Date
Cyanide (reactive)			N	D	n	ıg/L		1	2/2	24/2015	2/24/2015
Reactive sulfide			N	ID	n	ng/L		1	3/	3/2015	3/3/2015
Sulfide			N	D	IT	ıg/L		0.05	3/	3/2015	3/3/2015

AR

Acceptable Range

ND

Not Detected

PQL

Practical Quantitation Limit

RPD

Relative Percentage Difference

Comments:

Certifications held by Aretek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

Monday, March 09, 2015

Hall Environmental Analysis Laboratory, Inc.

WO#:

1502723

16-Mar-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2-17-15

Sample ID MB	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	300.0: Anion:	S		
Client ID: PBW	Batch	1D: R2	4392	F	RunNo: 2	4392				
Prep Date:	Analysis D	ate: 2/	18/2015	S	SeqNo: 7	18760	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sulfate	ND	0.50								

Sample ID LCS SampType: LCS TestCode: EPA Method 300.0: Anions Client ID: Batch ID: R24392 LCSW RunNo: 24392 SeqNo: 718761 Prep Date: Analysis Date: 2/18/2015 Units: mg/L SPK value SPK Ref Val HighLimit Analyte **PQL** %REC LowLimit %RPD **RPDLimit** Qual 4.8 0.50 5.000 96.3 90 110 Chloride Sulfate 9.9 0.50 10.00 0 98.6 90 110

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Е Value above quantitation range
- Analyte detected below quantitation limits J
- RSD is greater than RSDlimit O
- RPD outside accepted recovery limits R
- Spike Recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Reporting Detection Limit

Page 6 of 19

Sample pH Not In Range

RL

Hall Environmental Analysis Laboratory, Inc.

WO#: 1502723

16-Mar-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2-17-15

Sample ID 5mL rb	SampT	уре: МЕ	BLK	Tes	Code: El	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	n ID: R2	4544	R	lunNo: 2	4544				
Prep Date:	Analysis D	Date: 2/	26/2015	S	SeqNo: 7	22682	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
z,z-bichloroproparie	IND	2.0								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

Page 7 of 19

Hall Environmental Analysis Laboratory, Inc.

WO#:

1502723

16-Mar-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2-17-15

Sample ID 5mL rb	SampTy	ype: ME	BLK				8260B: VOL	ATILES		
Client ID: PBW	Batch	ID: R2	4544	R	unNo: 24	1544				
Prep Date:	Analysis Da	ate: 2/	26/2015	S	eqNo: 72	22682	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-isopropyitoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chioride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.9		10.00		99.2	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		104	70	130			
Surr: Dibromofluoromethane	10		10.00		104	70	130			
	9.8		10.00		97.8	70	130			

Sample ID 100ng ics	SampT	ype: LC	S	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: LCSW	Batch	ı ID: R2	4544	F	RunNo: 2	4544				
Prep Date:	Analysis D	ate: 2/	26/2015	8	SeqNo: 722684					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	104	70	130			
Toluene	21	1.0	20.00	0	103	70	130			
Chlorobenzene	20	1.0	20.00	0	102	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

Page 8 of 19

Hall Environmental Analysis Laboratory, Inc.

WO#:

1502723

16-Mar-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2-17-15

Sample ID 100ng Ics	SampTy	ype: LC	s	Tes	tCode: E	PA Method	8260B: VOL	ATILES		
Client ID: LCSW	Batch	ID: R2	4544	F	RunNo: 2	4544				
Prep Date:	Analysis Da	ate: 2/	26/2015	8	SeqNo: 7	22684	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethene	22	1.0	20.00	0	112	7 5.6	144			
Trichloroethene (TCE)	20	1.0	20.00	0	102	70	130			
Surr: 1,2-Dichloroethane-d4	10		10.00		101	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		101	70	130			
Surr: Dibromofluoromethane	10		10.00		102	70	130			
Surr: Toluene-d8	10		10.00		100	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

Page 9 of 19

Hall Environmental Analysis Laboratory, Inc.

WO#: 1502723

16-Mar-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 2-17-15

Sample ID mb-17825	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	8270C: Semi	ivolatiles		
Client ID: PBW	Batch	ID: 17	825	F	RunNo: 2	4458				
Prep Date: 2/20/2015	Analysis D	ate: 2/	23/2015	;	SeqNo: 7	20293	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Aniline	ND	10								
Anthracene	ND	10								
Azobenzene	ND	10								
Benz(a)anthracene	ND	10								
Benzo(a)pyrene	ND	10								
Benzo(b)fluoranthene	ND	10								
Benzo(g,h,i)perylene	ND	10								
Benzo(k)fluoranthene	ND	10								
Benzoic acid	ND	20								
Benzyl alcohol	ND	10								
Bis(2-chloroethoxy)methane	ND	10								
Bis(2-chloroethyl)ether	ND	10								
Bis(2-chloroisopropyl)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	10								
4-Bromophenyl phenyl ether	ND	10								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								
4-Chioro-3-methylphenol	ND	10								
4-Chloroaniline	ND	10								
2-Chloronaphthalene	ND	10								
2-Chlorophenol	ND	10								
4-Chlorophenyl phenyl ether	ND	10								
Chrysene	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Dibenz(a,h)anthracene	ND	10								
Dibenzofuran	ND	10								
1,2-Dichlorobenzene	ND	10								
1,3-Dichlorobenzene	ND	10								
1,4-Dichlorobenzene	ND	10								
3,3'-Dichlorobenzidine	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
2,4-Dichlorophenol	ND	20								
2,4-Dimethylphenol	ND	10								
4,6-Dinitro-2-methylphenol	ND	20								
• •	ND	20								
2,4-Dinitrophenol	ND	20								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
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- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

Page 10 of 19

Hall Environmental Analysis Laboratory, Inc.

WO#:

1502723

16-Mar-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2-17-15

Sample ID mb-17825	SampT	ype: MBLK	Tes	tCode: EPA Metho	d 8270C: Semi	volatiles		
Client ID: PBW	Batch	n ID: 17825	F	RunNo: 24458				
Prep Date: 2/20/2015	Analysis D	ate: 2/23/2015	S	SeqNo: 720293	Units: µg/L			
Analyte	Result	PQL SPK value	SPK Ref Val	%REC LowLimi	t HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	ND	10					-	
2,6-Dinitrotoluene	ND	10						
Fluoranthene	ND	10						
Fluorene	ND	10						
Hexachiorobenzene	ND	10						
Hexachlorobutadiene	ND	10						
Hexachlorocyclopentadiene	ND	10						
Hexachloroethane	ND	10						
Indeno(1,2,3-cd)pyrene	ND	10						
Isophorone	ND	10						
1-Methylnaphthalene	ND	10						
2-Methylnaphthalene	ND	10						
2-Methylphenol	ND	10						
3+4-Methylphenol	ND	10						
N-Nitrosodi-n-propylamine	ND	10						
N-Nitrosodimethylamine	ND	10						
N-Nitrosodiphenylamine	ND	10						
Naphthalene	ND	10						
2-Nitroaniline	ND	10						
3-Nitroaniline	ND	10						
4-Nitroaniline	ND	10						
Nitrobenzene	ND	10						
2-Nitrophenol	ND	10						
4-Nitrophenol	ND	10						
Pentachlorophenol	ND	20						
Phenanthrene	ND	10						
Phenol	ND	10						
Pyrene	ND	10						
Pyridine	ND	10						
1,2,4-Trichlorobenzene	ND	10						
2,4,5-Trichlorophenol	ND	10						
2,4,6-Trichlorophenol	ND	10						
Surr: 2-Fluorophenol	180	200.0		89.4 17.6	104			
Surr: Phenol-d5	160	200.0		78.8 17.7	89.9			
Surr: 2,4,6-Tribromophenol	160	200.0		78.9 16.3	122			
Sun: Nitrobenzene-d5	81	100.0		81.4 45.3	117			
Surr: 2-Fluorobiphenyl	82	100.0		82.2 43				
Surr: 4-Terphenyl-d14	60	100.0		60.2 47.6				
• • • • • • • • • • • • • • • • • • • •								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1502723

16-Mar-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2-17-15

Sample ID Ics-17825	SampT	SampType: LCS TestCode: EPA Method 827						volatiles		
Client ID: LCSW	Batch	n ID: 17 8	825	R	unNo: 24	4458				
Prep Date: 2/20/2015	Analysis D)ate: 2/	23/2015	S	eqNo: 7	20294	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	64	10	100.0	0	64.1	47.9	114			
4-Chloro-3-methylphenol	130	10	200.0	0	65.2	51.7	122			
2-Chlorophenol	130	10	200.0	0	65.7	40.7	113			
1,4-Dichlorobenzene	65	10	100.0	0	65.0	39.6	99.9			
2,4-Dinitrotoluene	50	10	100.0	0	50.5	40.8	113			
N-Nitrosodi-n-propylamine	67	10	100.0	0	67.3	51.2	111			
4-Nitrophenol	130	10	200.0	0	65.4	15.7	86.9			
Pentachlorophenol	120	20	200.0	0	58.1	21.6	104			
Phenol	140	10	200.0	0	70.0	28.6	71.7			
Pyrene	56	10	100.0	0	56.0	54.2	128			
1,2,4-Trichlorobenzene	62	10	100.0	0	62.0	40.9	101			
Surr: 2-Fluorophenol	140		200.0		71.0	17.6	104			
Surr: Phenol-d5	140		200.0		71.3	17.7	89.9			
Surr: 2,4,6-Tribromophenol	140		200.0		69.7	16.3	122			
Surr: Nitrobenzene-d5	70		100.0		70.5	45.3	117			
Surr: 2-Fluorobiphenyl	68		100.0		67.6	43	113			
Surr: 4-Terphenyl-d14	51		100.0		50.9	47.6	122			

Sample ID Icsd-17825	SampT	SampType: LCSD TestCode: EPA Method 82						volatiles		
Client ID: LCSS02	Batch	n ID: 17 8	825	R	RunNo: 2	4458				
Prep Date: 2/20/2015	Analysis D	ate: 2/	23/2015	S	SeqNo: 720295					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	82	10	100.0	0	81.7	47.9	114	24.2	27.2	
4-Chloro-3-methylphenol	170	10	200.0	0	86.0	51.7	122	27.5	25.9	R
2-Chlorophenol	140	10	200.0	0	67.7	40.7	113	2.98	22.5	
1,4-Dichlorobenzene	68	10	100.0	0	67.9	39.6	99.9	4.30	24.6	
2,4-Dinitrotoluene	72	10	100.0	0	72.0	40.8	113	35.2	25.3	R
N-Nitrosodi-n-propylamine	75	10	100.0	0	75.2	51.2	111	11.1	23.6	
4-Nitrophenol	170	10	200.0	0	87.0	15.7	86.9	28.3	34.7	S
Pentachlorophenol	140	20	200.0	0	69.5	21.6	104	17.8	32.8	
Phenol	150	10	200.0	0	74.9	28.6	71.7	6.87	25.5	S
Pyrene	73	10	100.0	0	72.7	54.2	128	25.9	31.4	
1,2,4-Trichlorobenzene	73	10	100.0	0	72.6	40.9	101	15.8	25.9	
Surr: 2-Fluorophenol	160		200.0		77.6	17.6	104	0	0	
Surr: Phenol-d5	150		200.0		75.6	17.7	89.9	0	0	
Surr: 2,4,6-Tribromophenol	180		200.0		90.3	16.3	122	0	0	
Surr: Nitrobenzene-d5	79		100.0		78.9	45.3	117	0	0	
Surr: 2-Fluorobiphenyl	81		100.0		81.0	43	113	0	0	

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits J
- RSD is greater than RSDlimit 0
- RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

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Sample pH Not In Range Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

WO#:

1502723 16-Mar-15

Client:

Western Refining Southwest, Inc.

Project:

Client ID:

Injection Well 2-17-15

Sample ID Icsd-17825

LCSS02

SampType: LCSD

TestCode: EPA Method 8270C: Semivolatiles

Prep Date: 2/20/2015

Batch ID: 17825 Analysis Date: 2/23/2015

PQL

RunNo: 24458

SeqNo: 720295

Units: µg/L

Analyte Surr: 4-Terphenyl-d14 Result

47.6

HighLimit

%RPD

RPDLimit

Qual

72

100.0

SPK value SPK Ref Val

%REC 72.5

LowLimit

122

Qualifiers:

Value exceeds Maximum Contaminant Level.

Ε Value above quantitation range

Analyte detected below quantitation limits

0 RSD is greater than RSDlimit

RPD outside accepted recovery limits R

Spike Recovery outside accepted recovery limits

В Analyte detected in the associated Method Blank

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

P Sample pH Not In Range

Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

2900

WO#: 1502723

0.349

20

16-Mar-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 2-17-15

Conductivity

Sample ID 1502723-001c dup SampType: DUP TestCode: SM2510B: Specific Conductance

Client ID: Injection Well Batch ID: R24379 RunNo: 24379

0.010

Prep Date: Analysis Date: 2/18/2015 SeqNo: 718418 Units: µmhos/cm

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

O RSD is greater than RSDlimit

R RPD outside accepted recovery limits

S Spike Recovery outside accepted recovery limits

B Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

P Sample pH Not In Range

RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1502723 16-Mar-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2-17-15

Sample ID MB-17887

SampType: MBLK

TestCode: EPA Method 7470: Mercury

Client ID:

PBW

Prep Date: 2/25/2015

Prep Date: 2/25/2015

Batch ID: 17887 Analysis Date: 2/26/2015 RunNo: 24523

SeqNo: 722178

Units: mg/L

Qual

Analyte Mercury

Result PQL

SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD

RPDLimit

ND 0.00020

TestCode: EPA Method 7470: Mercury

Sample ID LCS-17887

Client ID: LCSW

SampType: LCS

RunNo: 24523

LowLimit

Batch ID: 17887

Analysis Date: 2/26/2015

SeqNo: 722179

Units: mg/L HighLimit

%RPD **RPDLimit**

Qual

PQL SPK value SPK Ref Val

Analyte

0.005000

80

Mercury 0.0051 0.00020 0

%REC 102

120

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded Η
- ND Not Detected at the Reporting Limit
- Sample pH Not In Range P
- RLReporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1502723

16-Mar-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 2-17-15

			_							
Sample ID MB-17834	Samp	Туре: МЕ	BLK	Test	Code: El	PA 6010B:	Total Recover	able Meta	als	
Client ID: PBW	Bato	ch ID: 17	834	RunNo: 24435						
Prep Date: 2/20/2015	Analysis	Analysis Date: 2/21/2015		S	SeqNo: 719770			0 Units: mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Lead	ND	0.0050								
Magnesium	ND	1.0								
Potassium	ND	1.0								
Selenium	ND	0.050								
Silver	ND	0.0050								
Sodium	ND	1.0								

Sample ID LCS-17834	Samp	Type: LC	s	Tes	tCode: El	PA 6010B:	Total Recover	able Met	als	
Client ID: LCSW	Bato	ch ID: 17	834	F	RunNo: 2	4435				
Prep Date: 2/20/2015	Analysis	Date: 2/	/21/2015	S	SeqNo: 7	19771	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.52	0.020	0.5000	0	104	80	120			
Barium	0.49	0.020	0.5000	0	97.6	80	120			
Cadmium	0.49	0.0020	0.5000	0	98.8	80	120			
Calcium	50	1.0	50.00	0	99.5	80	120			
Chromium	0.50	0.0060	0.5000	0	99.2	80	120			
Lead	0.49	0.0050	0.5000	0	99.0	80	120			
Magnesium	49	1.0	50.00	0	98.7	80	120			
Potassium	47	1.0	50.00	0	94.2	80	120			
Selenium	0.50	0.050	0.5000	0	100	80	120			
Silver	0.11	0.0050	0.1000	0	106	80	120			
Sodium	49	1.0	50.00	0	97.4	80	120			

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Е Value above quantitation range
- Analyte detected below quantitation limits J
- 0 RSD is greater than RSDlimit
- RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit ND
- Reporting Detection Limit
- Sample pH Not In Range

RL

Page 16 of 19

Hall Environmental Analysis Laboratory, Inc.

WO#: 1502723

16-Mar-15

Client:

Western Refining Southwest, Inc.

Project:

Prep Date:

Injection Well 2-17-15

Sample ID 1502723-001c dup

SampType: DUP

Analysis Date: 2/18/2015

TestCode: SM4500-H+B: pH

Client ID: Injection Well Batch ID: R24379

RunNo: 24379

SeqNo: 718422

Units: pH units

Analyte

Result **PQL** SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD

RPDLimit

Qual

7.22 1.68 Н

Qualifiers:

Value exceeds Maximum Contaminant Level.

Value above quantitation range Е

Analyte detected below quantitation limits J

0 RSD is greater than RSDlimit

RPD outside accepted recovery limits R

Spike Recovery outside accepted recovery limits

Analyte detected in the associated Method Blank В

Holding times for preparation or analysis exceeded Η

ND Not Detected at the Reporting Limit

P Sample pH Not In Range RLReporting Detection Limit Page 17 of 19

Hall Environmental Analysis Laboratory, Inc.

WO#:

1502723

16-Mar-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2-17-15

Sample ID mb-1

SampType: MBLK

TestCode: SM2320B: Alkalinity

Batch ID: R24379

RunNo: 24379

Client ID: PBW Prep Date:

Analysis Date: 2/18/2015

SeqNo: 718434

Units: mg/L CaCO3

Analyte Result

RPDLimit

Qual

ND

SPK value SPK Ref Val %REC LowLimit PQL 20

HighLimit

%RPD

Total Alkalinity (as CaCO3)

Sample ID Ics-1 Client ID: LCSW SampType: LCS Batch ID: R24379 TestCode: SM2320B: Alkalinity RunNo: 24379

SeqNo: 718435

Units: mg/L CaCO3

Prep Date: Analyte

Result **PQL**

SPK value SPK Ref Val %REC

0

HighLimit LowLimit

%RPD

RPDLimit

Total Alkalinity (as CaCO3) 80 20 80.00 99.7

Analysis Date: 2/18/2015

110

Qual

Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

0 RSD is greater than RSDlimit

RPD outside accepted recovery limits R

Spike Recovery outside accepted recovery limits

Analyte detected in the associated Method Blank В

Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Sample pH Not In Range Reporting Detection Limit Page 18 of 19

Hall Environmental Analysis Laboratory, Inc.

WO#: 1502723 16-Mar-15

Client:

Western Refining Southwest, Inc.

Project:

Analyte

Injection Well 2-17-15

Sample ID MB-17793

SampType: MBLK

TestCode: SM2540C MOD: Total Dissolved Solids

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID:

PBW Batch ID: 17793 RunNo: 24408

Prep Date: 2/18/2015

Analysis Date: 2/19/2015

Result

SeqNo: 718999

Units: mg/L

SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD **RPDLimit**

Qual

Total Dissolved Solids

ND 20.0

PQL

Sample ID LCS-17793

SampType: LCS Batch ID: 17793

RunNo: 24408

LowLimit

Client ID: LCSW Prep Date: 2/18/2015

Analysis Date: 2/19/2015

Result

SeqNo: 719000

Units: mg/L HighLimit

%RPD

PQL SPK value SPK Ref Val %REC

RPDLimit Qual

Analyte 102 120 Total Dissolved Solids 1020 20.0 1000

Qualifiers:

- Value exceeds Maximum Contaminant Level
- Value above quantitation range
- Analyte detected below quantitation limits
- RSD is greater than RSDlimit 0
- RPD outside accepted recovery limits R
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded Η
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range Reporting Detection Limit

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Hall Environmental Analysis Laboratory 4901 Hawkins NE

Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.kallenvironmental.com

Sample Log-In Check List

Client Name:	Western Refining Southw	Work Order Number.	1502723		RcptNo:	1
Received by/o	tates IM	02/18/15				
Logged By.	Ashley Gallegos	2/18/2015 8:00:00 AM		A		
Completed By	Ashley Gailegos	2/18/2015 8:45:45 AM		A Z		
Reviewed By:		02/18/15		V		
Chain of Cu	•	. ,				
1. Custody s	eals intact on sample bottles?	ı	Yes	No 🗔	Not Present	
2. Is Chain o	f Custody complete?		Yes 🗹	No 🗀	Not Present	
3. How was	lhe sample delivered?		Courier			
<u>Log in</u>						
4. Was an a	itempt made to cool the samp	les?	Yes 💆	No	NA 🗆	
5. Were all s	amples received at a tempera	ture of >0° C to 6.0°C	Yes 🗸	No :	NA [
6. Sample(s) in proper container(s)?		Yes 🗹	No		
7. Sufficient	sample volume for indicated to	est(s)?	Yes 🗹	No 🗌		
8. Are sample	es (except VOA and ONG) pro	operty preserved?	Yes 🗹	No		
9. Was prese	ervative added to bottles?		Yes	No 🗹	NA _	
10.VOA vials	have zero headspace?		Yes 👱	No 🗆	No VOA Vials	
11. Were any	sample containers received b	roken?	Yes	No 🗹	# of preserved	
• -	erwork match bottle labels? repancies on chain of custody)	Yes 🗹	No 🗀	bottles checked for pH:	r (12) unless noted)
13. Are matric	es correctly identified on Chai	n of Custody?	Yes 🗹	Na	Adjusted?	No
14, la it clear v	what analyses were requested	?	Yes 🗹	No [,
	olding times able to be met? fy customer for authorization.)		Yes 🗹	No	Checked by:	Da
Special Han	dling (if applicable)					
16. Was client	notified of all discrepancies v	ith this order?	Yes 🗌	No _	NA 🗹	
Pers	on Notified:	Date	***************************************	and the second s		
By Y	Yhom;	Vie:	eMail	Phone 🗀 Fax	In Person	
Rega	arding:	## ## ## ## ## ## ## ## ## ## ## ## ##	CONTRACTOR OF THE PERSON OF TH			
Clier	nt instructions:					
17. Additional	remarks:					
18. <u>Cooler In</u>						
Cooler		The state of the s	Seal Date	Signed By		
þ	1.7 Good	Yes		ļ		

Chain-of-Custody Record	Turn-Around Time:	— —
Client: Western Refining	Standard □ RushProject Name:	HALL ENVIRONMENTAL ANALYSIS LABORATORY
Moiling Address: 4/		www.hallenvironmental.com
Mailing Address: #50 CR 4990 Bloomfield, NM 874/3	Injection Well 2-17-15	4901 Hawkins NE - Albuquerque, NM 87109
1500mfield, NM 874/3	Project #:	Tel. 505-345-3975 Fax 505-345-4107
Phone #: 505-632 -4(35		Analysis Request
email or Fax#:	Project Manager:	Only) MRO) MRO) So ₄) Si ² S
QA/QC Package: □ Standard		E + TMB's (8021) E + TPH (Gas only) GRO / DRO / MRO) GRO / DRO / MRO) or 8270 SIMS) or 8270 SIMS) als Ca, Mc, Nb, K NO ₃ , NO ₂ , PO ₄ , SO ₄) /OA) (ity, Carresiuify ity, Carresiui
Accreditation	Sampler: Bob	
□ NELAP □ Other	On Ice: Tx/Yes □ No	
□ EDD (Type)	Sample Temperature: 1, 7	
Date Time Matrix Sample Request ID	Container Type and # Preservative Type HEAL No.	BTEX + MTBE + TMB's (8021) BTEX + MTBE + TPH (Gas only) TPH 8015B (GRO / DRO / MRO) TOWN (BACK / WITH TAUTASILITY CARRINITY RECET / WITH TAUTASILITY CARRINITY RECET / WITH TAUTASILITY RECET / WITH TAUTASILITY RECET / WITH TAUTASILITY RECET / WITH TAUTASILITY RECET / WITH THE BUbbles (Y or N)
?-17-5 11:20 HaD - Injection Well	3-40A HC1 -001	
1 1 1	1-Liter amber	
	1-500ml	
/ 		
	1-500ml	
	1-250ml H2504	
	1-500ml HNO3	
	1-500m Na OH	
() ! !	1-50 ml Acetate	
Date: Time: Relinevished by: 17-15 Le 12 Cofert Kraken	Christi Walle 2/11/15 1612	Remarks: Per BK - analyze for RCI
Date: Time: Relinquished by: 17115 1750 NWW Waster Holl Environmental may be such	Date Time 172 18/15 CB	s possibility. Any sub-contracted data will be clearly notated on the analytical report.



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

April 28, 2015

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990

Bloomfield, NM 87413 TEL: (505) 632-4166 FAX (505) 632-3911

RE: Injection Well OrderNo.: 1504086

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 4/2/2015 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

andyl

4901 Hawkins NE

Albuquerque, NM 87109

Lab Order 1504086

Date Reported: 4/28/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

 Project:
 Injection Well
 Collection Date: 4/1/2015 10:15:00 AM

 Lab ID:
 1504086-001
 Matrix: AQUEOUS
 Received Date: 4/2/2015 7:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analyst	LGT
Chloride	1400	50	mg/L	100	4/2/2015 6:46:26 PM	R25272
Sulfate	9.5	5.0	mg/L	10	4/2/2015 6:34:01 PM	R25272
EPA METHOD 7470: MERCURY					Analyst	MED
Mercury	ND	0.00020	mg/L	1	4/13/2015 3:11:02 PM	18653
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst	ELS
Arsenic	ND	0.020	mg/L	1	4/4/2015 12:54:50 PM	18515
Barium	0.44	0.020	mg/L	1	4/4/2015 12:54:50 PM	18515
Cadmium	ND	0.0020	mg/L	1	4/4/2015 12:54:50 PM	18515
Calcium	300	10	mg/L	10	4/4/2015 12:56:16 PM	18515
Chromium	ND	0.0060	mg/L	1	4/4/2015 12:54:50 PM	18515
Lead	ND	0.0050	mg/L	1	4/4/2015 12:54:50 PM	18515
Magnesium	57	1.0	mg/L	1	4/4/2015 12:54:50 PM	18515
Potassium	21	1.0	mg/L	1	4/4/2015 12:54:50 PM	18515
Selenium	ND	0.050	mg/L	1	4/4/2015 12:54:50 PM	18515
Silver	ND	0.0050	mg/L	1	4/4/2015 12:54:50 PM	18515
Sodium	750	10	mg/L	10	4/4/2015 12:56:16 PM	18515
EPA METHOD 8270C: SEMIVOLATIL	_ES				Analyst	DAM
Acenaphthene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Acenaphthylene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Aniline	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Anthracene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Azobenzene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Benz(a)anthracene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Benzo(a)pyrene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Benzo(b)fluoranthene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Benzo(g,h,i)perylene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Benzo(k)fluoranthene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Benzoic acid	25	20	μg/L	1	4/8/2015 3:02:35 PM	18572
Benzyl alcohol	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Bis(2-chloroethyl)ether	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Bis(2-ethylhexyl)phthalate	12	10	μg/L	1	4/8/2015 3:02:35 PM	18572
4-Bromophenyl phenyl ether	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Butyl benzyl phthalate	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Carbazole	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
4-Chloro-3-methylphenol	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
4-Chloroaniline	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Page 1 of 14
- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1504086

Date Reported: 4/28/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

 Project:
 Injection Well
 Collection Date: 4/1/2015 10:15:00 AM

 Lab ID:
 1504086-001
 Matrix: AQUEOUS
 Received Date: 4/2/2015 7:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLA	TILES				Analys	t: DAM
2-Chloronaphthalene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
2-Chlorophenol	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
4-Chlorophenyl phenyl ether	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Chrysene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Di-n-butyl phthalate	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Di-n-octyl phthalate	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Dibenz(a,h)anthracene	ЙD	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Dibenzofuran	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
1,2-Dichlorobenzene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
1,3-Dichlorobenzene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
1,4-Dichlorobenzene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
3,3'-Dichlorobenzidine	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Diethyl phthalate	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Dimethyl phthalate	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
2,4-Dichlorophenol	ND	20	μg/L	1	4/8/2015 3:02:35 PM	18572
2,4-Dimethylphenol	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
4,6-Dinitro-2-methylphenol	ND	20	μg/L	1	4/8/2015 3:02:35 PM	18572
2,4-Dinitrophenol	ND	20	μg/L	1	4/8/2015 3:02:35 PM	18572
2,4-Dinitrotoluene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
2,6-Dinitrotoluene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Fluoranthene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Fluorene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Hexachlorobenzene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Hexachlorobutadiene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Hexachlorocyclopentadiene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Hexachloroethane	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Indeno(1,2,3-cd)pyrene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Isophorone	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
1-Methylnaphthalene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
2-Methylnaphthalene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
2-Methylphenol	14	10	µg/L	1	4/8/2015 3:02:35 PM	18572
3+4-Methylphenol	48	10	µg/L	1	4/8/2015 3:02:35 PM	18572
N-Nitrosodi-n-propylamine	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
N-Nitrosodimethylamine	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
N-Nitrosodiphenylamine	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Naphthalene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
2-Nitroaniline	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
3-Nitroaniline	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
4-Nitroaniline	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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Page 2 of 14

- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1504086

Date Reported: 4/28/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

 Project:
 Injection Well
 Collection Date: 4/1/2015 10:15:00 AM

 Lab ID:
 1504086-001
 Matrix: AQUEOUS
 Received Date: 4/2/2015 7:00:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLAT	ILES				Analys	t: DAM
Nitrobenzene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
2-Nitrophenol	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
4-Nitrophenol	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Pentachlorophenol	ND	20	μg/L	1	4/8/2015 3:02:35 PM	18572
Phenanthrene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Phenol	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Pyrene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Pyridine	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
1,2,4-Trichlorobenzene	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
2,4,5-Trichlorophenol	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
2,4,6-Trichlorophenol	ND	10	μg/L	1	4/8/2015 3:02:35 PM	18572
Surr: 2-Fluorophenol	50.2	17.6-104	%REC	1	4/8/2015 3:02:35 PM	18572
Surr: Phenol-d5	46.5	17.7-89.9	%REC	1	4/8/2015 3:02:35 PM	18572
Surr: 2,4,6-Tribromophenol	65.5	16.3-122	%REC	1	4/8/2015 3:02:35 PM	18572
Surr: Nitrobenzene-d5	60.5	45.3-117	%REC	1	4/8/2015 3:02:35 PM	18572
Surr: 2-Fluorobiphenyl	50.8	43-113	%REC	1	4/8/2015 3:02:35 PM	18572
Surr: 4-Terphenyl-d14	46.9	47.6-122	S %REC	1	4/8/2015 3:02:35 PM	18572
EPA METHOD 8260B: VOLATILES	i .				Analys	t: DJF
Benzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R2525
Toluene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R2525
Ethylbenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R2525
Methyl tert-butyl ether (MTBE)	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R2525
1,2,4-Trimethylbenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R2525
1,3,5-Trimethylbenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R2525
1,2-Dichloroethane (EDC)	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R2525
1,2-Dibromoethane (EDB)	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R2525
Naphthalene	ND	10	μg/L	5	4/2/2015 8:23:27 PM	R2525
1-Methylnaphthalene	ND	20	μg/L	5	4/2/2015 8:23:27 PM	R2525
2-Methylnaphthalene	ND	20	µg/L	5	4/2/2015 8:23:27 PM	R2525
Acetone	76	50	μg/L	5	4/2/2015 8:23:27 PM	R2525
Bromobenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R2525
Bromodichloromethane	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R2525
Bromoform	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R2525
Bromomethane	ND	15	μg/L	5	4/2/2015 8:23:27 PM	R2525
2-Butanone	ND	50	μg/L	5	4/2/2015 8:23:27 PM	R2525
Carbon disulfide	ND	50	μg/L	5	4/2/2015 8:23:27 PM	R2525
Carbon Tetrachloride	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R2525
Chlorobenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R2525
Chloroethane	ND	10	μg/L	5	4/2/2015 8:23:27 PM	R2525

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Page 3 of 14

- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1504086

Date Reported: 4/28/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. Client Sample ID: Injection Well

 Project:
 Injection Well
 Collection Date: 4/1/2015 10:15:00 AM

 Lab ID:
 1504086-001
 Matrix: AQUEOUS
 Received Date: 4/2/2015 7:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analys	:: DJF
Chloroform	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
Chloromethane	ND	15	μg/L	5	4/2/2015 8:23:27 PM	R25251
2-Chlorotoluene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
4-Chlorotoluene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
cis-1,2-DCE	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
cis-1,3-Dichloropropene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,2-Dibromo-3-chloropropane	ND	10	μg/L	5	4/2/2015 8:23:27 PM	R25251
Dibromochloromethane	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
Dibromomethane	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,2-Dichlorobenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,3-Dichlorobenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,4-Dichlorobenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
Dichlorodifluoromethane	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,1-Dichloroethane	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,1-Dichloroethene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,2-Dichloropropane	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,3-Dichloropropane	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
2,2-Dichloropropane	ND	10	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,1-Dichloropropene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
Hexachlorobutadiene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
2-Hexanone	ND	50	μg/L	5	4/2/2015 8:23:27 PM	R25251
Isopropylbenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
4-isopropyltoluene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
4-Methyl-2-pentanone	ND	50	μg/L	5	4/2/2015 8:23:27 PM	R25251
Methylene Chloride	ND	15	μg/L	5	4/2/2015 8:23:27 PM	R25251
n-Butylbenzene	ND	15	μg/L	5	4/2/2015 8:23:27 PM	R25251
n-Propylbenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
sec-Butylbenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
Styrene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
tert-Butylbenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,1,1,2-Tetrachloroethane	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,1,2,2-Tetrachloroethane	ND	10	μg/L	5	4/2/2015 8:23:27 PM	R25251
Tetrachloroethene (PCE)	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
trans-1,2-DCE	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
trans-1,3-Dichloropropene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,2,3-Trichlorobenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,2,4-Trichlorobenzene	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,1,1-Trichloroethane	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251
1,1,2-Trichloroethane	ND	5.0	μg/L	5	4/2/2015 8:23:27 PM	R25251

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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- E Value above quantitation range
- J Analyte detected below quantitation limits
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- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 4 of 14

- P Sample pH Not In Range
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/28/2015

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

Project: Injection Well

Collection Date: 4/1/2015 10:15:00 AM

Lab ID: 1504086-001

Matrix: AQUEOUS

Received Date: 4/2/2015 7:00:00 AM

Result	RL (Qual 1	Units	DF	Date Analyzed	Batch
					Analys	t: DJF
ND	5.0		μg/L	5	4/2/2015 8:23:27 PM	R25251
ND	5.0		μg/L	5	4/2/2015 8:23:27 PM	R25251
ND	10		μg/L	5	4/2/2015 8:23:27 PM	R25251
ND	5.0		μg/L	5	4/2/2015 8:23:27 PM	R25251
ND	7.5		μg/L	5	4/2/2015 8:23:27 PM	R25251
91.2	70-130		%REC	5	4/2/2015 8:23:27 PM	R25251
87.3	70-130		%REC	5	4/2/2015 8:23:27 PM	R25251
101	70-130		%REC	5	4/2/2015 8:23:27 PM	R25251
91.7	70-130		%REC	5	4/2/2015 8:23:27 PM	R25251
					Analys	t: JRR
4900	0.010		µmhos/cm	1	4/3/2015 3:32:30 PM	R25315
					Analys	t: JRR
6.94	1.68	Н	pH units	1	4/3/2015 3:32:30 PM	R25315
					Analys	t: JRR
358.6	20.00		mg/L CaCO3	1	4/3/2015 3:32:30 PM	R25315
ND	2.000		mg/L CaCO3	1	4/3/2015 3:32:30 PM	R25315
358.6	20.00		mg/L CaCO3	1	4/3/2015 3:32:30 PM	R25315
OLIDS					Analys	t: KS
2890	200	*	mg/L	1	4/3/2015 3:48:00 PM	18487
	ND ND ND ND 91.2 87.3 101 91.7 4900 6.94 358.6 ND 358.6	ND 5.0 ND 5.0 ND 10 ND 5.0 ND 7.5 91.2 70-130 87.3 70-130 101 70-130 91.7 70-130 4900 0.010 6.94 1.68 358.6 20.00 ND 2.000 358.6 20.00 OLIDS	ND 5.0 ND 5.0 ND 10 ND 5.0 ND 7.5 91.2 70-130 87.3 70-130 101 70-130 91.7 70-130 4900 0.010 6.94 1.68 H 358.6 20.00 ND 2.000 358.6 20.00 OLIDS	ND 5.0 μg/L ND 5.0 μg/L ND 10 μg/L ND 10 μg/L ND 7.5 μg/L 91.2 70-130 %REC 87.3 70-130 %REC 101 70-130 %REC 91.7 70-130 %REC 4900 0.010 μmhos/cm 6.94 1.68 H pH units 358.6 20.00 mg/L CaCO3 ND 2.000 mg/L CaCO3 OLIDS	ND 5.0 μg/L 5 ND 5.0 μg/L 5 ND 10 μg/L 5 ND 7.5 μg/L 5 ND 7.5 μg/L 5 91.2 70-130 %REC 5 87.3 70-130 %REC 5 101 70-130 %REC 5 91.7 70-130 %REC 5 91.7 10-130 %REC 5 91.7 70-130 %REC 1 4900 0.010 μmhos/cm 1 6.94 1.68 H pH units 1 358.6 20.00 mg/L CaCO3 1 ND 2.000 mg/L CaCO3 1 358.6 20.00 mg/L CaCO3 1	ND 5.0

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit Page
- P Sample pH Not In Range
- Page 5 of 14
- RL Reporting Detection Limit

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

150403019

Address:

4901 HAWKINS NE SUITE D

Project Name:

1504086

Attn:

ALBUQUERQUE, NM 87109 ANDY FREEMAN

Analytical Results Report

Sample Number

150403019-001

Sampling Date 4/1/2015 Date/Time Received 4/3/2015

11:40 AM

Client Sample ID

1504086-001E / INJECTION WELL

Sampling Time 10:15 AM

Matrix

Water

Sample Location

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	1	4/8/2015	CRW	SW846 CH7	
Flashpoint	>200	°F		4/6/2015	KFG	EPA 1010	
pH	7.17	ph Units		4/6/2015	KJS	SM 4500pH-B	
Reactive sulfide	0.872	mg/L	0.36	4/6/2015	HSW	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL

EPA's Maximum Contaminant Level

ND

Not Detected

PQL

Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated.

Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

150403019

Address:

4901 HAWKINS NE SUITE D

ALBUQUERQUE, NM 87109

Project Name:

1504086

Attn:

ANDY FREEMAN

Analytical Results Report Quality Control Data

Lab Control Sample										
Parameter	LCS Result	Units	s LCS	Spike	%Rec	AR	%Rec	Prep	Date	Analysis Date
Cyanide (reactive)	0.555	mg/L	. ().5	111.0	80	-120	4/8/	2015	4/8/2015
Reactive sulfide	0.2	mg/L		0.2	100.0	70	-130	4/6/2	2015	4/6/2015
Matrix Spike							_			
Sample Number Parameter		Sample Result	MS Result	Unit	le:	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
150403019-001A Reactive sulfide		0.872	1.60	mg/		0.73	99.7	70-130	4/6/2015	4/6/2015
150403019-001 Cyanide (reactive)		ND	0.464	mg/		0.5	92.8	80-120	4/8/2015	
Matrix Spike Duplicate										
-	MSD		MSD				AR			
Parameter	Result	Units	Spike	%F		%RPD	%RPI		p Date	Analysis Date
Cyanide (reactive)	0.447	mg/L	0.5	89	.4	3.7	0-25	4/8	9/2015	4/8/2015
Method Blank										•
Parameter		Re	sult	Üı	nits		PQL	Pr	ep Date	Analysis Date
Cyanide (reactive)		N	ID	m	g/L		1	4/	8/2015	4/8/2015
Reactive sulfide		N	ID		g/L		0.5	4/0	5/2015	4/6/2015

AR

Acceptable Range Not Detected

ND

Practical Quantitation Limit

PQL RPD

Relative Percentage Difference

Comments:

Hall Environmental Analysis Laboratory, Inc.

WO#:

1504086 28-Apr-15

Client: Western Refining Southwest, Inc.

Project:

Injection Well

TestCode: EPA Method 300.0: Anions Sample ID MB SampType: MBLK

Client ID: PBW Batch ID: R25272 RunNo: 25272

Prep Date: Analysis Date: 4/2/2015 SeqNo: 747284 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual

ND 0.50 Chloride Sulfate ND 0.50

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range Е
- J Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- RPD outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Sample pH Not In Range Reporting Detection Limit Page 6 of 14

Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

WO#: 1504086

28-Apr-15

Client: Western Refining Southwest, Inc.

Project: Injection Well

Sample ID 5ml rb	SampT	ype: MBL	-K	Tes	tCode: El	PA Method	8260B: VOL	ATILES			
Client ID: PBW	Batch	ID: R25	251	RunNo: 25251							
Prep Date:	Analysis D	ate: 4/2	2015		SeqNo: 7		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLi m it	Qual	
Benzene	ND	1.0									
Toluene	ND	1.0									
Ethylbenzene	ND	1.0									
Methyl tert-butyl ether (MTBE)	ND	1.0									
1,2,4-Trimethylbenzene	ND	1.0									
1,3,5-Trimethylbenzene	ND	1.0									
1,2-Dichloroethane (EDC)	ND	1.0									
1,2-Dibromoethane (EDB)	ND	1.0									
Naphthalene	ND	2.0									
1-Methylnaphthalene	ND	4.0									
2-Methylnaphthalene	ND	4.0									
Acetone	ND	10									
Bromobenzene	ND	1.0									
Bromodichloromethane	ND	1.0									
Bromoform	ND	1.0									
Bromomethane	ND	3.0									
2-Butanone	ND	10									
Carbon disulfide	ND	10									
Carbon Tetrachloride	ND	1.0									
Chlorobenzene	ND	1.0									
Chloroethane	ND	2.0									
Chloroform	ND	1.0									
Chloromethane	ND	3.0									
2-Chlorotoluene	ND	1.0									
4-Chlorotoluene	ND	1.0									
cis-1,2-DCE	ND	1.0									
cis-1,3-Dichloropropene	ND	1.0									
1,2-Dibromo-3-chloropropane	ND	2.0									
Dibromochloromethane	ND	1.0									
Dibromomethane	ND	1.0									
1,2-Dichlorobenzene	ND	1.0									
1,3-Dichlorobenzene	ND	1.0									
1.4-Dichlorobenzene	ND	1.0									
Dichlorodifluoromethane	ND	1.0									
1,1-Dichloroethane	ND	1.0									
1,1-Dichloroethene	ND	1.0									
1,2-Dichloropropane	ND	1.0									
	ND	1.0									
1,3-Dichloropropane	ND ND	2.0									
2,2-Dichloropropane	ND	2.0									

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

Page 7 of 14

Hall Environmental Analysis Laboratory, Inc.

WO#: 15

1504086 28-Apr-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well

Sample ID 5mi rb	mple ID 5mi rb SampType: MBLK						TestCode: EPA Method 8260B: VOLATILES							
Client ID: PBW	Batch I	D: R2	5251	F	RunNo: 2									
Prep Date:	Analysis Da	te: 4/	2/2015	8	SeqNo: 74	46628	Units: µg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual				
1,1-Dichloropropene	ND	1.0												
Hexachlorobutadiene	ND	1.0												
2-Hexanone	ND	10												
sopropylbenzene	ND	1.0												
1-Isopropyitoluene	ND	1.0												
1-Methyl-2-pentanone	ND	10												
Methylene Chloride	ND	3.0												
n-Butylbenzene	ND	3.0												
n-Propylbenzene	ND	1.0												
sec-Butylbenzene	ND	1.0												
Styrene	ND	1.0												
ert-Butylbenzene	ND	1.0												
1,1,1,2-Tetrachloroethane	ND	1.0												
1,1,2,2-Tetrachloroethane	ND	2.0												
Tetrachloroethene (PCE)	ND	1.0												
rans-1,2-DCE	ND	1.0												
rans-1,3-Dichloropropene	ND	1.0												
1,2,3-Trichlorobenzene	ND	1.0												
1,2,4-Trichlorobenzene	ND	1.0												
1,1,1-Trichloroethane	ND	1.0												
1,1,2-Trichloroethane	ND	1.0												
Trichloroethene (TCE)	ND	1.0												
Trichlorofluoromethane	ND	1.0												
1,2,3-Trichloropropane	ND	2.0												
/inyl chloride	ND	1.0												
Kylenes, Total	ND	1.5												
Surr: 1,2-Dichloroethane-d4	9.0		10.00		90.2	70	130							
Surr: 4-Bromofluorobenzene	9.9		10.00		98.5	70	130							
Surr: Dibromofluoromethane	10		10.00		100	70	130							
Surr: Toluene-d8	8.9		10.00		89.1	70	130							

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

Page 8 of 14

Hall Environmental Analysis Laboratory, Inc.

WO#:

1504086

28-Apr-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well

			-						
Sample ID mb-18572	SampTyp	oe: MBLK	Tes	tCode: EPA	Method	8270C: Semi	olatiles/		
Client ID: PBW	Batch I	D: 18572	F	RunNo: 2538	B1				
Prep Date: 4/8/2015	Analysis Dat	te: 4/8/2015	:	Seq N o: 7511	155	Units: µg/L			
Analyte	Result	PQL SPK value	SPK Ref Val	%REC_L	.owLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10							
Acenaphthylene	ND	10							
Aniline	ND	10							
Anthracene	ND	10							
Azobenzene	ND	10							
Benz(a)anthracene	ND	10							
Benzo(a)pyrene	ND	10							
Benzo(b)fluoranthene	ND	10							
Benzo(g,h,i)perylene	ND	10							
Benzo(k)fluoranthene	ND	10							
Benzoic acid	ND	20							
Benzyl alcohol	ND	10							
Bis(2-chloroethoxy)methane	ND	10							
Bis(2-chloroethyl)ether	ND	10							
Bis(2-chloroisopropyl)ether	ND	10							
Bis(2-ethylhexyl)phthalate	ND	10							
4-Bromophenyl phenyl ether	ND	10							
Butyl benzyl phthalate	ND	10							
Carbazole	ND	10							
4-Chloro-3-methylphenol	ND	10							
4-Chloroaniline	ND	10							
2-Chloronaphthalene	ND	10							
2-Chlorophenol	ND	10							
4-Chlorophenyl phenyl ether	ND	10							
Chrysene	ND	10							
Di-n-butyl phthalate	ND	10							
Di-n-octyl phthalate	ND ND	10							
Dibenz(a,h)anthracene	ND	10 10							
Dibenzofuran	ND	10 10							
1,2-Dichlorobenzene 1,3-Dichlorobenzene	ND ND	10 10							
1,4-Dichlorobenzene	ND ND	10							
3,3'-Dichlorobenzene	ND ND	10							
Diethyl phthalate	ND	10							
Dimethyl phthalate	ND ND	10							
2,4-Dichlorophenol	ND ND	20							
2,4-Dimethylphenol	ND	10							
4,6-Dinitro-2-methylphenol	ND ND	20							
2,4-Dinitrophenol	ND ND	20							
z,4-Dinidopnenoi	ND	20							

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range

RL Reporting Detection Limit

Page 9 of 14

Hall Environmental Analysis Laboratory, Inc.

WO#: 1504086

28-Apr-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well

Sample ID mb-18572	SampTy	pe: MBL	_K	TestCode: EPA Method 8270C: Semivolatiles							
Client ID: PBW	Batch ID: 18572			RunNo: 25381							
Prep Date: 4/8/2015	Analysis Da	ite: 4/8 /	/2015	SeqNo: 751155			Units: µg/L				
Analyte	Result	PQL :	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
2,4-Dinitrotoluene	ND	10									
2,6-Dinitrotoluene	ND	10									
Fluoranthene	ND	10									
Fluorene	ND	10									
Hexachlorobenzene	ND	10									
Hexachlorobutadiene	ND	10									
Hexachlorocyclopentadiene	ND	10									
Hexachloroethane	ND	10									
Indeno(1,2,3-cd)pyrene	ND	10									
Isophorone	ND	10									
1-Methylnaphthalene	ND	10									
2-Methylnaphthalene	ND	10									
2-Methylphenol	ND	10									
3+4-Methylphenol	ND	10									
N-Nitrosodi-n-propylamine	ND	10									
N-Nitrosodimethylamine	ND	10									
N-Nitrosodiphenylamine	ND	10									
Naphthalene	ND	10									
2-Nitroaniline	ND	10									
3-Nitroaniline	ND	10									
4-Nitroaniline	ND	10									
Nitrobenzene	ND	10									
2-Nitrophenol	ND	10									
4-Nitrophenol	ND	10									
entachlorophenol	ND	20									
Phenanthrene	ND	10									
Phenol	ND	10									
^O yrene	ND	10									
Pyridine	ND	10									
1,2,4-Trichlorobenzene	ND	10									
2,4,5-Trichlorophenol	ND	10									
2,4,6-Trichlorophenol	ND	10									
Surr: 2-Fluorophenol	170		200.0		86.8	17.6	104				
Surr: Phenol-d5	170		200.0		85.8	17.7	89.9				
Surr: 2,4,6-Tribromophenol	170		200.0		85.6	16.3	122				
Surr: Nitrobenzene-d5	78		100.0		78. 4	45.3	117				
Surr: 2-Fluorobiphenyl	79		100.0		79.3	43	113				
Surr: 4-Terphenyl-d14	80		100.0		80.3	47.6	122				

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

Page 10 of 14

Hall Environmental Analysis Laboratory, Inc.

WO#:

1504086

28-Apr-15

Qual

Client:

Western Refining Southwest, Inc.

Project:

Injection Well

Sample ID MB-18653

SampType: MBLK

TestCode: EPA Method 7470: Mercury

Client ID: PBW

Batch ID: 18653

RunNo: 25477

SPK value SPK Ref Val %REC LowLimit

Prep Date: 4/13/2015

Analysis Date: 4/13/2015

SeqNo: 754166

Units: mg/L

%RPD

RPDLimit

HighLimit

Analyte Mercury

PQL ND 0.00020

Qualifiers:

Value exceeds Maximum Contaminant Level.

Value above quantitation range

Analyte detected below quantitation limits

0 RSD is greater than RSDlimit

R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

Analyte detected in the associated Method Blank В

Holding times for preparation or analysis exceeded Η

ND Not Detected at the Reporting Limit

Sample pH Not In Range P

RLReporting Detection Limit Page 11 of 14

Hall Environmental Analysis Laboratory, Inc.

WO#: 1

1504086

28-Apr-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well

Sample ID MB-18515	Samp	Туре: Мі	BLK	Tes	tCode: E	PA 6010B:	Total Recove	rable Met	als	
Client ID: PBW	Bate	ch ID: 18	515	F	RunNo: 2	5295				
Prep Date: 4/3/2015	Analysis	Date: 4	4/2015	9	SeqNo: 7	47966	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Lead	ND	0.0050								
Magnesium	ND	1.0								
Potassium	ND	1.0								
Selenium	ND	0.050								
Silver	ND	0.0050								
Sodium	ND	1.0								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- RL Reporting Detection Limit

Page 12 of 14

Hall Environmental Analysis Laboratory, Inc.

WO#: 1504086

28-Apr-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well

Sample ID mb-1

SampType: MBLK

TestCode: SM2320B: Alkalinity

Client ID: PBW

Batch ID: R25315

RunNo: 25315

LowLimit

Units: mg/L CaCO3

Prep Date: Analyte

Analysis Date: 4/3/2015

Result

SPK value SPK Ref Val %REC

SPK value SPK Ref Val %REC LowLimit

SeqNo: 748965

%RPD

RPDLimit

Qual

Total Alkalinity (as CaCO3)

Sample ID mb-2

ND 20.00

SampType: MBLK

TestCode: SM2320B: Alkalinity

Client ID:

PBW

Batch ID: R25315

PQL

RunNo: 25315

HighLimit

Units: mg/L CaCO3

Prep Date: Analyte

Analysis Date: 4/3/2015

Result

SeqNo: 748989

HighLimit

%RPD **RPDLimit**

Qual

Total Alkalinity (as CaCO3)

ND 20.00

Qualifiers:

Value exceeds Maximum Contaminant Level.

Ε Value above quantitation range

Analyte detected below quantitation limits

0 RSD is greater than RSDlimit

R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

Analyte detected in the associated Method Blank В

Holding times for preparation or analysis exceeded Η

ND Not Detected at the Reporting Limit

Sample pH Not In Range

Reporting Detection Limit

Page 13 of 14

Hall Environmental Analysis Laboratory, Inc.

WO#: 1504086

28-Apr-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well

Sample ID MB-18487

SampType: MBLK

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: PBW

Batch ID: 18487

RunNo: 25292

Prep Date: 4/2/2015

Analysis Date: 4/3/2015

SeqNo: 747841

Units: mg/L

Analyte

PQL

SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD **RPDLimit** Qual

Total Dissolved Solids

ND

SampType: MS

20.0

TestCode: SM2540C MOD: Total Dissolved Solids

Sample ID 1504086-001BMS Client ID: Injection Well

Batch ID: 18487

RunNo: 25292

Prep Date: 4/2/2015

Analysis Date: 4/3/2015

SeqNo: 747863

Units: mg/L

Analyte Total Dissolved Solids

13000

PQL SPK value SPK Ref Val

10000

%REC 2890 101

LowLimit

HighLimit

RPDLimit

Qual

Qual

Sample ID 1504086-001BMSD

SampType: MSD

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: Injection Well

Batch ID: 18487

200

RunNo: 25292

Units: mg/L

%RPD

Page 14 of 14

Prep Date: 4/2/2015

Analysis Date: 4/3/2015

SeqNo: 747864

RPDLimit

Total Dissolved Solids

13100

PQL 200

SPK value SPK Ref Val 10000 2890

%REC LowLimit 102

HighLimit %RPD 120

0.841

Qualifiers:

Value exceeds Maximum Contaminant Level.

Spike Recovery outside accepted recovery limits

- E Value above quantitation range
- J Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- RPD outside accepted recovery limits

- Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Reporting Detection Limit RL
- P Sample pH Not In Range



Hall Environmental Analysis Laboratory 4901 Hawkias NE Albuquerque, NM 87109

TEL: 595-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name	Western Refining Southw	Work Order Number.	15040	086		RcptNo:	1
Received by/da	nte: AT	OHali5					
Logged By:	Lindsay Mangin	4/2/2015 7:00:00 AM		0	g gyllygi o		
Completed By:	Lindsay Mangin	4/2/2015 9:21:57 AM		0	+4H40		
Reviewed By:	Q ₁	04/02/15		V	• •		
Chain of Cus	stody	0//0//					
	els intect on sample bottles?		Yes		No 🗆	Not Present	
2. Is Chain of	Custody complete?		Yes	¥	No 🗔	Not Present	
3. How was th	nc sample delivered?		Cour	<u>ner</u>			
<u>Log In</u>							
4. Was an att	tempt made to cool the sample:	5?	Yes	₹	No 🗍	NA	
5. Were all sa	imples received at a temperatu	re of >0°C to 60°C	Yes	¥	No :	NA !	
6. Sample(s)	in proper container(s)?		Yes	\mathbf{V}	No 🗀		
7. Sufficient s	ample volume for indicated test	t(s)?	Yes	>	No L		
8. Are sample	s (except VOA and ONG) prop	erly preserved?	Yes		No		
9. Was preser	rvative added to bottles?		Yes	100/15	No 🗹	4 -001A	2 of 3 and 3 of
10. VOA vials h	nave zero headspace?	Ċ	Yes	1	No L	No VOA Vials	2 of 3 and 3 of have bushles. -es o4/volus
	sample containers received bro	ken?	Yes		No 🗹		-cs orthopics
						# of preserved bottles checked	1,2
	rwork match bottle labels?		Yes	Y	No L	for pH:	or 12 unless noted)
•	epancies on chain of custody) es correctly identified on Chain e	of Custody?	Yes	Z	No.	Adjusted?	no
	hat analyses were requested?	•	Yes	¥	No		Q.C.
	lding times able to be met? y customer for authorization.)		Yes	☑	No 🗍	Checked by:	G2
Special Hand	dlin <u>g (if applicable)</u>						
	notified of all discrepancies with	h this order?	Yes		No 🗆	NA 🗹	
	on Notified:	Date [M. Alexander and the second se		. W * Maked	
By W			еМа	il Phon	e Fax	in Person	
Rega				5			
_	t Instructions		**************			······································	
17. Additional	remarks:						
18. Cooler Info		Continue Continue c	Sael D.	un I e	mad Du		
Cooler N		Seal Intact Seal No 8	Seal Da	ne i sig	ned By		
1					i		

C	hain-	of-Cu	stody Record	Turn-Around	Time:			,		ш	AI		FN	IV1	T D	O B	M	EN	ΤΔΙ	,	
Client:	Nesi	ern	Refining	Standard Project Name):					A	N	AL	YS:	IS	L		OR	AT			
Mailing	Address	#50	CR 4990	Tried	Tionwe	11 4-1-15		490)1 Ha	awkir	ns Ni	E	Albu	quer	que,	, NM	8710)9			
Blow	mf	ield	NM 87413	Project #:				Te	l. 50	5-34	5-39	75	Fa	x 50	05-3	45-4°	107				
			1-4135	Po #	126/12	43							alys	is R	Requ	est					I
email or				Project Mana	ger:		1)	only)	9	٢,	2			3			4	14			
QA/QC F	-	-	Level 4 (Full Validation)				's (8021)	TPH (Gas o	3 (GRO / DRO / MRO)	À	M) BAKED	SIMS)		,PO4,S	2 PCB's			Corrosiu. TY	N V		
Accredi				Sampler: B			TMB	표	□	#	E C	2		ဂ္ဂ	/ 8082			2	A	5	ž
O NEL		☐ Other				□ No	+	+	8	#		82	<u>s</u>	တ္မီ	/ SS		<u>∿</u> I		1	, W 2	5
□ EDD	(Type)_			Sample Tem	perature: "{	0	MTBE	MTBE	9			9	leta	5	ici	র ?	<u>}</u> {	#	3	સુ	ç
Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL NO.	BTEX + M	BTEX + M	TPH 8015B	TEMPERATE	Total Marie	PAH's (8310 or	RCRA 8 Metals	Anions (F,CI,NO ₃ ,NO ₂ ,PO ₄ ,SO ₄)	8081 Pesticides	8260B (VOA)	8270 (Semi-VOA)	Realing Realing	Ec. PH.	177 N	IAL DULLUR
4-1-15	10:15	H20	injectionwell	3-10A	HCI	-001									7	X					
1	1				amber	-001										7>	ZT				
				1-500ml		-001											>	X			
				1-500ml		-001				X									X		•
					H2504	-001					X										_
					HNO3	-001							X								_
					NOH	-001												X		,	_
				1-500ml	Zin Acetata	-001														X	_
																					_
															\perp					\sqcup	_
							L														_
																					_
Date: 4-1-15 Date:	Time:	Relinquishe	Krakow)	Received by:	t Was	Date Time 4/1//5/1615 Date Time	Rer	nark	s:												
1/4/5	182\$	samoles subr	nited to Hall Environmental may be sub-	contracted to other a	ccredited laboratori	es. This serves as notice of thi	s possi	bility.	Anv su	ıb-cont	tracted	data v	vill be o	dearty	notate	ed on ti	ne anai	Mtical re	oort.		_



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

OrderNo.: 1507094

August 06, 2015

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4166 FAX (505) 632-3911

RE: Injection Well 7-1-15

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 7/2/2015 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

andy

4901 Hawkins NE

Albuquerque, NM 87109

Lab Order 1507094

Hall Environmental Analysis Laboratory, Inc. Date Reported: 8/6/2015

CLIENT: Western Refining Southwest, Inc. Client Sample ID: Injection Well

Project: Injection Well 7-1-15 Collection Date: 7/1/2015 9:00:00 AM

Lab ID: 1507094-001 Matrix: AQUEOUS Received Date: 7/2/2015 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst	LGT
Chloride	480	50		mg/L	100	7/2/2015 5:18:55 PM	R27295
Sulfate	65	5.0		mg/L	10	7/2/2015 5:06:31 PM	R27295
SM2510B: SPECIFIC CONDUCTANCE	E					Analyst:	JRR
Conductivity	2000	0.010		µmhos/cm	1	7/6/2015 11:31:17 AM	R27329
SM2320B: ALKALINITY						Analyst:	JRR
Bicarbonate (As CaCO3)	274.6	20.00		mg/L CaCO3	1	7/6/2015 11:31:17 AM	R27329
Carbonate (As CaCO3)	ND	2.000		mg/L CaCO3	1	7/6/2015 11:31:17 AM	R27329
Total Alkalinity (as CaCO3)	274.6	20.00		mg/L CaCO3	1	7/6/2015 11:31:17 AM	R27329
SM2540C MOD: TOTAL DISSOLVED	SOLIDS					Analyst:	KS
Total Dissolved Solids	1220	40.0	*	mg/L	1	7/8/2015 5:09:00 PM	20129
SM4500-H+B: PH						Analyst:	JRR
pН	7.45	1.68	Н	pH units	1	7/6/2015 11:31:17 AM	R27329
EPA METHOD 7470: MERCURY						Analyst:	JLF
Mercury	ND	0.0010		mg/L	5	7/8/2015 4:47:51 PM	20158
EPA 6010B: TOTAL RECOVERABLE	METALS					Analyst:	MED
Arsenic	ND	0.020		mg/L	1	7/9/2015 10:51:23 AM	20102
Barium	0.27	0.020		mg/L	1	7/9/2015 10:51:23 AM	20102
Cadmium	ND	0.0020		mg/L	1	7/16/2015 12:13:28 PM	20102
Calcium	120	5.0		mg/L	5	7/9/2015 1:02:36 PM	20102
Chromium	ND	0.0060		mg/L	1	7/14/2015 3:52:06 PM	20102
Lead	ND	0.0050		mg/L	1	7/9/2015 10:51:23 AM	20102
Magnesium	28	1.0		mg/L	1	7/9/2015 10:51:23 AM	20102
Potassium	7.7	1.0		mg/L	1	7/9/2015 10:51:23 AM	20102
Selenium	ND	0.050		mg/L	1	7/16/2015 12:13:28 PM	20102
Silver	ND	0.0050		mg/L	1	7/16/2015 12:13:28 PM	20102
Sodium	280	5.0		mg/L	5	7/9/2015 1:02:36 PM	20102
EPA METHOD 8270C: SEMIVOLATILI	≣S					Analyst:	DAM
Acenaphthene	ND	10		μg/L	1	7/10/2015 1:30:30 PM	20095
Acenaphthylene	ND	10		μg/L	1	7/10/2015 1:30:30 PM	20095
Aniline	ND	10		μg/L	1	7/10/2015 1:30:30 PM	20095
Anthracene	ND	10		μg/L	1	7/10/2015 1:30:30 PM	20095
Azobenzene	ND	10		μg/L	1	7/10/2015 1:30:30 PM	20095
Benz(a)anthracene	ND	10		μg/L	1	7/10/2015 1:30:30 PM	20095
Benzo(a)pyrene	ND	10		μg/L	1	7/10/2015 1:30:30 PM	20095
Benzo(b)fluoranthene	ND	10		μg/L	1	7/10/2015 1:30:30 PM	20095
Benzo(g,h,i)perylene	ND	10		μg/L	1	7/10/2015 1:30:30 PM	20095

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- Sample Diluted Due to Matrix D
- Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- Analyte detected in the associated Method Blank
- E Value above quantitation range
- Analyte detected below quantitation limits Page 1 of 20
- P Sample pH Not In Range
- Reporting Detection Limit

Lab Order 1507094

Date Reported: 8/6/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 7-1-15

Lab ID: 1507094-001

Client Sample ID: Injection Well

Collection Date: 7/1/2015 9:00:00 AM

Received Date: 7/2/2015 7:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLA	TILES				Analyst	: DAM
Benzo(k)fluoranthene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Benzoic acid	ND	20	μg/L	1	7/10/2015 1:30:30 PM	20095
Benzyl alcohol	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Bis(2-chloroethyl)ether	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Bis(2-ethylhexyl)phthalate	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
4-Bromophenyl phenyl ether	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Butyl benzyl phthalate	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Carbazole	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
4-Chloro-3-methylphenol	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
4-Chloroaniline	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
2-Chloronaphthalene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
2-Chlorophenol	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
4-Chlorophenyl phenyl ether	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Chrysene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Di-n-butyl phthalate	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Di-n-octyl phthalate	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Dibenz(a,h)anthracene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Dibenzofuran	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
1,2-Dichlorobenzene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
1,3-Dichlorobenzene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
1,4-Dichlorobenzene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
3,3'-Dichlorobenzidine	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Diethyl phthalate	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Dimethyl phthalate	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
2,4-Dichlorophenol	ND	20	μg/L	1	7/10/2015 1:30:30 PM	20095
2,4-Dimethylphenol	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
4,6-Dinitro-2-methylphenol	ND	20	μg/L	1	7/10/2015 1:30:30 PM	20095
2,4-Dinitrophenol	ND	20	μg/L	1	7/10/2015 1:30:30 PM	20095
2,4-Dinitrotoluene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
2,6-Dinitrotoluene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Fluoranthene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Fluorene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Hexachlorobenzene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Hexachlorobutadiene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Hexachlorocyclopentadiene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Hexachloroethane	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Indeno(1,2,3-cd)pyrene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 2 of 20
- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1507094

Date Reported: 8/6/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. Client Sample ID: Injection Well

Project: Injection Well 7-1-15 **Collection Date:** 7/1/2015 9:00:00 AM

Lab ID: 1507094-001 Matrix: AQUEOUS Received Date: 7/2/2015 7:00:00 AM

Analyses	Result	RL Qu	ual Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILE	S				Analyst	: DAM
Isophorone	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
1-Methylnaphthalene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
2-Methylnaphthalene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
2-Methylphenol	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
3+4-Methylphenol	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
N-Nitrosodi-n-propylamine	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
N-Nitrosodimethylamine	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
N-Nitrosodiphenylamine	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Naphthalene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
2-Nitroaniline	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
3-Nitroaniline	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
4-Nitroaniline	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Nitrobenzene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
2-Nitrophenol	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
4-Nitrophenol	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Pentachlorophenol	ND	20	μg/L	1	7/10/2015 1:30:30 PM	20095
Phenanthrene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Phenol	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Pyrene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Pyridine	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
1,2,4-Trichlorobenzene	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
2,4,5-Trichlorophenol	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
2,4,6-Trichlorophenol	ND	10	μg/L	1	7/10/2015 1:30:30 PM	20095
Surr: 2-Fluorophenol	66.2	14.9-111	%REC	1	7/10/2015 1:30:30 PM	20095
Surr: Phenol-d5	64.1	11.3-108	%REC	1	7/10/2015 1:30:30 PM	20095
Surr: 2,4,6-Tribromophenol	75.7	15.7-154	%REC	1	7/10/2015 1:30:30 PM	20095
Surr: Nitrobenzene-d5	84.6	47.8-106	%REC	1	7/10/2015 1:30:30 PM	20095
Surr: 2-Fluorobiphenyl	63.7	21.3-123	%REC	1	7/10/2015 1:30:30 PM	20095
Surr: 4-Terphenyl-d14	51.4	14.3-135	%REC	1	7/10/2015 1:30:30 PM	20095
EPA METHOD 8260B: VOLATILES					Analyst	BCN
Benzene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
Toluene	1.5	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
Ethylbenzene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
Naphthalene	ND	2.0	μg/L	1	7/9/2015 8:19:52 PM	R27397

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 3 of 20
- P Sample pH Not In Range
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

 Project:
 Injection Well 7-1-15
 Collection Date: 7/1/2015 9:00:00 AM

 Lab ID:
 1507094-001
 Matrix: AQUEOUS
 Received Date: 7/2/2015 7:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analys	t: BCN
1-Methylnaphthalene	ND	4.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
2-Methylnaphthalene	ND	4.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
Acetone	72	10	μg/L	1	7/9/2015 8:19:52 PM	R2739
Bromobenzene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
Bromodichloromethane	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
Bromoform	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
Bromomethane	ND	3.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
2-Butanone	11	10	μg/L	1	7/9/2015 8:19:52 PM	R2739
Carbon disulfide	ND	10	μg/L	1	7/9/2015 8:19:52 PM	R2739
Carbon Tetrachloride	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
Chlorobenzene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
Chloroethane	ND	2.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
Chloroform	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
Chloromethane	ND	3.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
2-Chlorotoluene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
4-Chlorotoluene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
cis-1,2-DCE	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
Dibromochloromethane	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
Dibromomethane	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
1,2-Dichlorobenzene	ND	1.0	µg/L	1	7/9/2015 8:19:52 PM	R2739
1,3-Dichlorobenzene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
1,4-Dichlorobenzene	ND	1.0	µg/L	1	7/9/2015 8:19:52 PM	R2739
Dichlorodifluoromethane	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
1,1-Dichloroethane	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
1,1-Dichloroethene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
1,2-Dichloropropane	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
1,3-Dichloropropane	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
2,2-Dichloropropane	ND	2.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
1,1-Dichloropropene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
Hexachlorobutadiene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
2-Hexanone	ND	10	μg/L	1	7/9/2015 8:19:52 PM	R2739
Isopropylbenzene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
4-Isopropyltoluene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
4-Methyl-2-pentanone	ND	10	μg/L	1	7/9/2015 8:19:52 PM	R2739
Methylene Chloride	ND	3.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
n-Butylbenzene	ND	3.0	μg/L	1	7/9/2015 8:19:52 PM	R2739
n-Propylbenzene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R2739

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 4 of 20
- P Sample pH Not In Range
- RL Reporting Detection Limit

Lab Order 1507094

Date Reported: 8/6/2015

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. Client Sample ID: Injection Well

Project: Injection Well 7-1-15 **Collection Date:** 7/1/2015 9:00:00 AM

Lab ID: 1507094-001 Matrix: AQUEOUS Received Date: 7/2/2015 7:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analys	t: BCN
sec-Butylbenzene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
Styrene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
tert-Butylbenzene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
trans-1,2-DCE	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
1,1,1-Trichloroethane	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
1,1,2-Trichloroethane	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
Trichloroethene (TCE)	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
Trichlorofluoromethane	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
1,2,3-Trichloropropane	ND	2.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
Vinyl chloride	ND	1.0	μg/L	1	7/9/2015 8:19:52 PM	R27397
Xylenes, Total	ND	1.5	μg/L	1	7/9/2015 8:19:52 PM	R27397
Surr: 1,2-Dichloroethane-d4	96.9	70-130	%REC	1	7/9/2015 8:19:52 PM	R27397
Surr: 4-Bromofluorobenzene	90.8	70-130	%REC	1	7/9/2015 8:19:52 PM	R27397
Surr: Dibromofluoromethane	103	70-130	%REC	1	7/9/2015 8:19:52 PM	R27397
Surr: Toluene-d8	95.5	70-130	%REC	1	7/9/2015 8:19:52 PM	R27397

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- $R \quad \ RPD \ outside \ accepted \ recovery \ limits$
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 5 of 20
- P Sample pH Not In Range
- RL Reporting Detection Limit

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

150707035

Address:

4901 HAWKINS NE SUITE D

Project Name:

1507094

ALBUQUERQUE, NM 87109

Attn:

ANDY FREEMAN

Analytical Results Report

Sample Number Client Sample ID	150707035-001 1507094-001E / INJE		pling Date	7/1/2015		Date/Time Received 7/7/2015 Sampling Time 9:00 AM					
Matrix Comments	Water		ple Location								
Parameter		Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier			
Cyanide (reacti	ive)	ND	mg/L	1	7/15/2015	CRW	SW846 CH7				
Flashpoint		>200	۰۴		7/15/2015	KFG	EPA 1010				
pН		7.36	ph Units		7/8/2015	KMC	SM 4500pH-B				
Reactive sulfide	e	ND	mg/L	1	7/15/2015	HSW	SW846 CH7				

Authorized Signature

John Coddington, Lab Manager

MCL

EPA's Maximum Contaminant Level

ND PQL Not Detected

Practical Quantitation Limit

This report shall not be reproduced except in full without the written approval of the laboratory. The results reported relate only to the samples indicated. Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D · Spokane WA 99202 · (509) 838-3999 · Fax (509) 838-4433 · email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

150707035

Address:

4901 HAWKINS NE SUITE D

Project Name:

1507094

ALBUQUERQUE, NM 87109

Attn:

ANDY FREEMAN

Analytical Results Report Quality Control Data

Lab Control San	nple										
Parameter		LCS Result	Units	LCS	Spike	%Rec	AR	%Rec	Prep	Date	Analysis Date
Reactive sulfide		0.816	mg/L	0.9	07	90.0	70	-130	7/15/	2015	7/15/2015
Cyanide (reactive)		0.486	mg/L	. 0.	.5	97.2	80	-120	7/15/	2015	7/15/2015
Matrix Spike									-		
Comple Number	Daramatar		Sample	MS	Unit	.	MS	%Rec	AR %Rec	Prep Date	Analysis Date
	Parameter Reactive sulfide		Result ND	Result 0.816			Spike 0.907	90.0	70-130	7/15/2015	-
					mg/						
150707035-001	Cyanide (reactive)		ND	0.462	mg/	'L	0.5	92.4	80-120	7/15/2015	7/15/2015
Matrix Spike Du	plicate	wan						40			
Parameter		MSD Result	Units	MSD Spike	%F	Rec	%RPD	AR %RPD) Pre	p Date	Analysis Date
Cyanide (reactive)		0.454	mg/L	0.5	90		1.7	0-25		5/2015	7/15/2015
Method Blank										-	
Parameter			Re	sult	Ų	nits		PQL	Pr	ep Date	Analysis Date
Cyanide (reactive)			N	ID	m	ıg/L		1	7/1	5/2015	7/15/2015
Reactive sulfide			N	ID	m	ig/L		1	7/1	5/2015	7/15/2015

AR

Acceptable Range

ND

Not Detected

PQL RPD Practical Quantitation Limit Relative Percentage Difference

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

Page 1 of 1 Wednesday, July 22, 2015

Hall Environmental Analysis Laboratory, Inc.

WO#:

1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-1-15

Sample ID MB	SampT	ype: ME	BLK	Tes	tCode: E	PA Method	300.0: Anions	5		
Client ID: PBW	Batch	1 ID: R2	7295	F	RunNo: 2	7295				
Prep Date:	Analysis D	ate: 7/	2/2015	S	SeqNo: 8	17819	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sulfate	ND	0.50								

Sample ID LCS	SampType: LC	s	Test	tCode: El	PA Method	300.0: Anions	5		
Client ID: LCSW	Batch ID: R2	7295	R	RunNo: 2	7295				
Prep Date:	Analysis Date: 7/	2/2015	S	SeqNo: 8	17820	Units: mg/L			
Analyte	Result PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	5.0 0.50	5.000	0	99.0	90	110			
Sulfate	10 0.50	10.00	0	103	90	110			

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
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- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- Page 6 of 20

- P Sample pH Not In Range
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

WO#: 1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

SampType: MBLK

Project:

Sample ID rb1

Injection Well 7-1-15

Sample ID 100ng LCS	SampT	ype: LC	s	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: LCSW	Batcl	1 ID: R2	7397	F	RunNo: 2	7397				
Prep Date:	Analysis D	ate: 7/	9/2015	S	SeqNo: 8	22125	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	18	1.0	20.00	0	90.9	70	130			
Toluene	17	1.0	20.00	0	87.2	70	130			
Chlorobenzene	17	1.0	20.00	0	85.5	70	130			
1,1-Dichloroethene	19	1.0	20.00	0	95.4	70	130			
Trichloroethene (TCE)	17	1.0	20.00	0	84.0	70	130			
Surr: 1,2-Dichloroethane-d4	9.3		10.00		93.4	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		99.3	70	130			
Surr: Dibromofluoromethane	11		10.00		106	70	130			
Surr: Toluene-d8	10		10.00		100	70	130			

TestCode: EPA Method 8260B: VOLATILES

	'										
	Client ID: PBW	Batch	ID: R2	7397	R	unNo: 2	7397				
	Prep Date:	Analysis Da	ate: 7/	9/2015	S	eqNo: 8	22418	Units: µg/L			
ı	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
	Benzene	ND	1.0							1	
	Toluene	ND	1.0								
	Ethylbenzene	ND	1.0								
	Methyl tert-butyl ether (MTBE)	ND	1.0								
	1,2,4-Trimethylbenzene	ND	1.0								
	1,3,5-Trimethylbenzene	ND	1.0								
	1,2-Dichloroethane (EDC)	ND	1.0								
	1,2-Dibromoethane (EDB)	ND	1.0								
	Naphthalene	ND	2.0								
	1-Methylnaphthalene	ND	4.0								
	2-Methylnaphthalene	ND	4.0								
	Acetone	ND	10								
	Bromobenzene	ND	1.0								
	Bromodichloromethane	ND	1.0								
	Bromoform	ND	1.0								
	Bromomethane	ND	3.0								
	2-Butanone	ND	10								
	Carbon disulfide	ND	10								
	Carbon Tetrachloride	ND	1.0								
	Chlorobenzene	ND	1.0								
	Chloroethane	ND	2.0								
	Chloroform	ND	1.0								
	Chloromethane	ND	3.0								
	2-Chlorotoluene	ND	1.0								

Qualifiers:

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- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-1-15

Sample ID rb1	SampT	ype: MBLK		Tes	tCode: E	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	ID: R2739 7	7	F	RunNo: 2	7397				
Prep Date:	Analysis D	ate: 7/9/20	15	S	SeqNo: 8	22418	Units: µg/L			
Analyte	Result	PQL SP	K value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachioroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
1,2,0 Homoropropane	110	2.0								

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- H Holding times for preparation or analysis exceeded
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- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- Page 8 of 20

- P Sample pH Not In Range
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

WO#:

1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-1-15

Sample ID rb1	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	Batch ID: R27397			RunNo: 2	7397				
Prep Date:	Analysis D	ate: 7/	9/2015	S	SeqNo: 8	22418	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	10		10.00		102	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		104	70	130			
Surr: Dibromofluoromethane	11		10.00		107	70	130			
Surr: Toluene-d8	9.9		10.00		98.7	70	130			

Qualifiers:

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- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1507094 *06-Aug-15*

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-1-15

Sample ID mb-20095	SampTy	/pe: M l	BLK	Tes	tCode: E	PA Method	8270C: Semi	volatiles		44.18
Client ID: PBW	Batch	ID: 20	095	· F	RunNo:	27414				
Prep Date: 7/6/2015	Analysis Da	ate: 7 /	10/2015	5	SeqNo:	822558	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Aniline	ND	10								
Anthracene	ND	10								
Azobenzene	ND	10								
Benz(a)anthracene	ND	10								
Benzo(a)pyrene	ND	10								
Benzo(b)fluoranthene	ND	10								
Benzo(g,h,i)perylene	ND	10								
Benzo(k)fluoranthene	ND	10								
Benzoic acid	ND	20								
Benzyl alcohol	ND	10								
Bis(2-chloroethoxy)methane	ND	10								
Bis(2-chloroethyl)ether	ND	10								
Bis(2-chloroisopropyl)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	10								
4-Bromophenyl phenyl ether	ND	10								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								
4-Chloro-3-methylphenol	ND	10								
4-Chloroaniline	ND	10								
2-Chloronaphthalene	ND	10								
2-Chlorophenol	ND	10								
4-Chlorophenyl phenyl ether	ND	10								
Chrysene	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Dibenz(a,h)anthracene	ND	10								
Dibenzofuran	ND	10								
1,2-Dichlorobenzene	ND	10								
1,3-Dichlorobenzene	ND	10								
1,4-Dichlorobenzene	ND	10								
3,3'-Dichlorobenzidine	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
2,4-Dichlorophenol	ND	20								
2,4-Dimethylphenol	ND	10								
4,6-Dinitro-2-methylphenol	ND	20								
2,4-Dinitrophenol	ND	20								
_, opo	.,,,									

Qualifiers:

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- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-1-15

Sample ID mb-20095	SampT	ype: M	BLK	Tes	tCode: E	PA Method	8270C: Semi	volatiles		
Client ID: PBW	Batch	1D: 20	095	F	RunNo: 2	7414				
Prep Date: 7/6/2015	Analysis D	ate: 7	/10/2015	5	SeqNo: 8	22558	Units: µg/L			
Analyte	Result	PQL		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	ND	10								
2,6-Dinitrotoluene	ND	10								
Tuoranthene	ND	10								
luorene	ND	10								
Hexachlorobenzene	ND	10								
Hexachlorobutadiene	ND	10								
lexachlorocyclopentadiene	ND	10								
lexachloroethane	ND	10								
ndeno(1,2,3-cd)pyrene	ND	10								
sophorone	ND	10								
-Methylnaphthalene	ND	10								
?-Methylnaphthalene	ND	10								
?-Methylphenol	ND	10								
3+4-Methylphenol	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodimethylamine	ND	10								
N-Nitrosodiphenylamine	ND	10								
Naphthalene	ND	10								
2-Nitroaniline	ND	10								
3-Nitroaniline	ND	10								
l-Nitroaniline	ND	10								
Vitrobenzene	ND	10								
?-Nitrophenol	ND	10								
-Nitrophenol	ND	10								
Pentachlorophenol	ND	20								
Phenanthrene	ND	10								
Phenol	ND	10								
Pyrene	ND	10								
yridine	ND	10								
,2,4-Trichlorobenzene	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
Surr: 2-Fluorophenol	140		200.0		69.6	14.9	111			
Surr: Phenol-d5	150		200.0		74.2	11.3	108			
Surr: 2,4,6-Tribromophenol	150		200.0		75.2	15.7	154			
Surr: Nitrobenzene-d5	75		100.0		75.0	47.8	106			
Surr: 2-Fluorobiphenyl	76		100.0		75.9	21.3	123			
Surr: 4-Terphenyl-d14	52		100.0		52.2	14.3	135			

Qualifiers:

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-1-15

Sample ID Ics-20095	SampT	ype: LC	s	Tes	tCode: El	PA Method	8270C: Semi	volatiles		
Client ID: LCSW	Batch	ID: 20	095	F	RunNo: 2	7414				
Prep Date: 7/6/2015	Analysis D	ate: 7/	10/2015	8	SeqNo: 8	22559	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	51	10	100.0	0	51.2	47.8	99.7			
4-Chloro-3-methylphenol	110	10	200.0	0	56.2	58.1	103			S
2-Chlorophenol	73	10	200.0	0	36.7	49.5	96.8			S
1,4-Dichlorobenzene	34	10	100.0	0	33.8	40.4	89.4			S
2,4-Dinitrotoluene	42	10	100.0	0	41.8	38.6	91.3			
N-Nitrosodi-n-propylamine	51	10	100.0	0	51.1	53.9	95.6			S
4-Nitrophenol	93	10	200.0	0	46.3	26.4	108			
Pentachlorophenol	98	20	200.0	0	49.1	36.5	86.6			
Phenol	85	10	200.0	0	42.7	29.3	108			
Pyrene	56	10	100.0	0	56.2	45.7	100			
1,2,4-Trichlorobenzene	43	10	100.0	0	42.9	39.3	94.5			
Surr: 2-Fluorophenol	67		200.0		33.4	14.9	111			
Surr: Phenol-d5	86		200.0		43.0	11.3	108			
Surr: 2,4,6-Tribromophenol	120		200.0		62.3	15.7	154			
Surr: Nitrobenzene-d5	47		100.0		46.6	47.8	106			S
Surr: 2-Fluorobiphenyl	53		100.0		53.0	21.3	123			
Surr: 4-Terphenyl-d14	44		100.0		44.1	14.3	135			

Sample ID Icsd-20095	SampT	SampType: LCSD TestCode: EPA Method 8270C: Semivolatiles									
Client ID: LCSS02	Batch	iD: 20	095	F	RunNo: 2	7414					
Prep Date: 7/6/2015	Analysis D	ate: 7/	10/2015	S	SeqNo: 8	22560	Units: μg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Acenaphthene	76	10	100.0	0	76.1	47.8	99.7	39.1	28.2	R	
4-Chloro-3-methylphenol	160	10	200.0	0	81.3	58.1	103	36.4	24.4	R	
2-Chlorophenol	150	10	200.0	0	76.8	49.5	96.8	70.6	28.1	R	
1,4-Dichlorobenzene	72	10	100.0	0	72.5	40.4	89.4	72.9	31.2	R	
2,4-Dinitrotoluene	55	10	100.0	0	54.6	38.6	91.3	26.4	44.4		
N-Nitrosodi-n-propylamine	76	10	100.0	0	76.4	53.9	95.6	39.6	24.2	R	
4-Nitrophenol	130	10	200.0	0	63.8	26.4	108	31.8	36.6		
Pentachlorophenol	130	20	200.0	0	65.8	36.5	86.6	29.1	29.5		
Phenol	160	10	200.0	0	77.8	29.3	108	58.2	30	R	
Pyrene	69	10	100.0	0	69.3	45.7	100	20.8	31		
1,2,4-Trichlorobenzene	86	10	100.0	0	85.7	39.3	94.5	66.6	24	R	
Surr: 2-Fluorophenol	140		200.0		70.6	14.9	111	0	0		
Surr: Phenol-d5	160		200.0		79.2	11.3	108	0	0		
Surr: 2,4,6-Tribromophenol	160		200.0		82.0	15.7	154	0	0		
Surr: Nitrobenzene-d5	80		100.0		79.5	47.8	106	0	0		
Surr: 2-Fluorobiphenyl	77		100.0		77.3	21.3	123	0	0		

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
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- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-1-15

Sample ID Icsd-20095	SampTy	pe: LC	SD	Test	Code: El	PA Method	volatiles			
Client ID: LCSS02	Batch	ID: 20	095	R	tunNo: 2	7414				
Prep Date: 7/6/2015	Analysis Da	ate: 7/	10/2015	S	eqNo: 8	22560	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	51		100.0		51.2	14.3	135	0	0	

Sample ID mb-20218	SampTy	/pe: M E	BLK	Tes	tCode: El	ivolatiles				
Client ID: PBW	Batch	ID: 20	218	F	RunNo: 2	7531				
Prep Date: 7/13/2015	Analysis Da	ate: 7/	15/2015	S	SeqNo: 8	26536	Units: %RE	С		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	90		200.0		45.0	14.9	111			
Surr: Phenol-d5	75		200.0		37.3	11.3	108			
Surr: 2,4,6-Tribromophenol	140		200.0		69.6	15.7	154			
Surr: Nitrobenzene-d5	64		100.0		64.4	47.8	106			
Surr: 2-Fluorobiphenyl	61		100.0		61.2	21.3	123			
Surr: 4-Terphenyl-d14	45		100.0		45.2	14.3	135			

Sample ID Ics-20218	SampType	: LCS	TestCode: E	volatiles				
Client ID: LCSW	Batch ID	20218	RunNo: 2	7531				
Prep Date: 7/13/2015	Analysis Date	7/15/2015	SeqNo: 8	26537	Units: %RE	C		
Analyte	Result P	QL SPK value	SPK Ref Val %REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	110	200.0	53.4	14.9	111			
Surr: Phenol-d5	82	200.0	41.0	11.3	108			
Surr: 2,4,6-Tribromophenol	150	200.0	74.7	15.7	154			
Surr: Nitrobenzene-d5	74	100.0	74.2	47.8	106			
Surr: 2-Fluorobiphenyl	74	100.0	73.5	21.3	123			
Surr: 4-Terphenyl-d14	44	100.0	44.2	14.3	135			

Sample ID Icsd-20218	SampTy	SampType: LCSD			tCode: El	volatiles				
Client ID: LCSS02	Batch	ID: 20	218	F	RunNo: 2	7531				
Prep Date: 7/13/2015	Analysis Da	ate: 7/	15/2015	S	SeqNo: 8	26538	Units: %RE	С		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	100		200.0		52.2	14.9	111	0	0	
Surr: Phenol-d5	84		200.0		41.8	11.3	108	0	0	
Surr: 2,4,6-Tribromophenol	150		200.0		75.7	15.7	154	0	0	
Surr: Nitrobenzene-d5	76		100.0		76.0	47.8	106	0	0	
Surr: 2-Fluorobiphenyl	69		100.0		68.5	21.3	123	0	0	
Surr: 4-Terphenyl-d14	46		100.0		45.5	14.3	135	0	0	

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-1-15

Sample ID 1507094-001b dup

SampType: DUP

TestCode: SM2510B: Specific Conductance

Client ID: Injection Well Batch ID: **R27329**

RunNo: 27329

Units: µmhos/cm

Prep Date:

Analysis Date: 7/6/2015

SeqNo: 819171

SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD **RPDLimit** Qual

Result **PQL**

Analyte Conductivity

2000 0.010

0.0491

Qualifiers:

Value exceeds Maximum Contaminant Level.

Sample Diluted Due to Matrix D

Η Holding times for preparation or analysis exceeded

Not Detected at the Reporting Limit ND

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

E Value above quantitation range

Analyte detected below quantitation limits

Sample pH Not In Range

Reporting Detection Limit

P

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-1-15

Sample ID MB-20158

SampType: MBLK

TestCode: EPA Method 7470: Mercury

LowLimit

LowLimit

Client ID:

PBW

Batch ID: 20158

RunNo: 27365

Prep Date: 7/8/2015

Analysis Date: 7/8/2015

SeqNo: 820590

Units: mg/L

HighLimit

%RPD **RPDLimit**

Qual

Analyte

ND 0.00020

Sample ID LCS-20158

SampType: LCS

TestCode: EPA Method 7470: Mercury

%RPD

Mercury

Client ID: LCSW

Batch ID: 20158

RunNo: 27365

102

120

Prep Date: 7/8/2015

Analysis Date: 7/8/2015

0.0051

Result

0.005000

SPK value SPK Ref Val

SeqNo: 820591 %REC

Units: mg/L HighLimit

RPDLimit

Qual

Analyte Mercury

Sample ID 1507094-001DMS

SampType: MS

TestCode: EPA Method 7470: Mercury

Client ID:

Injection Well

Batch ID: 20158

RunNo: 27365

Prep Date: 7/8/2015

Analysis Date: 7/8/2015

PQL

0.00020

SeqNo: 820635

Units: mg/L

RPDLimit

Qual

Analyte

0.0059

PQL

SPK value SPK Ref Val 0.0010 0.005000

%REC 118

LowLimit HighLimit 75 125 %RPD

Mercury

Sample ID 1507094-001DMSD

SampType: MSD

SPK value SPK Ref Val %REC

TestCode: EPA Method 7470: Mercury

Client ID: Prep Date: 7/8/2015

Injection Well

Batch ID: 20158 Analysis Date: 7/8/2015 RunNo: 27365 SeqNo: 820638

Units: mg/L

RPDLimit Qual

Analyte Mercury

SPK value SPK Ref Val %REC PQL 0.0058 0.0010 0.005000

116

LowLimit 75

HighLimit 125

1.62

%RPD

20

Qualifiers:

- Value exceeds Maximum Contaminant Level
- D Sample Diluted Due to Matrix
 - Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit ND
- RPD outside accepted recovery limits
- % Recovery outside of range due to dilution or matrix
- В Analyte detected in the associated Method Blank
- E Value above quantitation range

Reporting Detection Limit

- J Analyte detected below quantitation limits
- Sample pH Not In Range

RL

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

Project:	Injec	ction Well 7-1-	15								
Sample ID	MB-20102	Samp	Туре: МЕ	BLK	Tes	tCode: E	PA 6010B:	Total Recove	rable Met	als	
Client ID:	PBW	Bato	h ID: 20	102	F	RunNo: 2	7378				
Prep Date:	7/6/2015	Analysis [Date: 7 /	9/2015	8	SeqNo: 8	21352	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		ND	0.020								
Banum		ND	0.020								
Calcium		ND	1.0								
Lead		ND	0.0050								
Magnesium Potassium		ND ND	1.0 1.0								
Sodium		ND ND	1.0								
		110	1.0								
Sample ID	LCS-20102	·	Type: LC		Tes	tCode: E	PA 6010B:	Total Recove	rable Met	als	
Client ID:	LCSW	Batc	h ID: 20	102	F	RunNo: 2	7378				
Prep Date:	7/6/2015	Analysis [Date: 7 /	9/2015	8	SeqNo: 8	21353	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		0.52	0.020	0.5000	0	103	80	120			
Barium		0.49	0.020	0.5000	0	98.5	80	120			
Calcium		51	1.0	50.00	0	102	80	120			
Lead		0.50	0.0050	0.5000	0	100	80	120			
Magnesium		50	1.0	50.00	0	101	80	120			
Potassium		48	1.0	50.00	0	96.8	80	120			
Sodium		49	1.0	50.00	0	98.9	80	120			
Sample ID	MB-20102	Samp	Гуре: МЕ	BLK	Tes	tCode: E	PA 6010B:	Total Recove	rable Meta	als	
Client ID:	PBW	Batc	h ID: 20	102	F	RunNo: 2	7491				
Prep Date:	7/6/2015	Analysis [Date: 7/	14/2015	S	SeqNo: 8	24974	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium		ND	0.0060								
Sample ID	LCS-20102	Samp ⁻	Гуре: LC	S	Tes	Code: E	PA 6010B:	Total Recove	rable Meta	als	
Client ID:	LCSW	Batc	h ID: 20	102	R	lunNo: 2	7491				
Prep Date:	7/6/2015	Analysis [Date: 7/	14/2015	S	SeqNo: 8	24975	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium		0.49	0.0060	0.5000	0	98.5	80	120			
Sample ID	MB-20102	Samp	Гуре: МЕ	BLK	Test	Code: El	PA 6010B: 1	Total Recover	able Meta	als	
Client ID:	PBW		h ID: 20 1			lunNo: 2					
Prep Date:		Analysis [S	eqNo: 8	26932	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- Analyte detected in the associated Method Blank
- Ε Value above quantitation range
- Analyte detected below quantitation limits

Page 16 of 20

- Р Sample pH Not In Range
- Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

Result

0.50

0.50

0.10

PQL

0.0020

0.050

0.0050

WO#:

1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

Project:

Analyte

Cadmium

Selenium

Silver

Injection Well 7-1-15

Sample ID MB-20102	SampType: MBLK TestCode: EPA 6010B: Total Recoverable Metals
Client ID: PBW	Batch ID: 20102 RunNo: 27540
Prep Date: 7/6/2015	Analysis Date: 7/16/2015 SeqNo: 826932 Units: mg/L
Analyte	Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Cadmium	ND 0.0020
Selenium	ND 0.050
Silver	ND 0.0050
Sample ID LCS-20102	SampType: LCS TestCode: EPA 6010B: Total Recoverable Metals
Client ID: LCSW	Batch ID: 20102 RunNo: 27540
Prep Date: 7/6/2015	Analysis Date: 7/16/2015 SeqNo: 826933 Units: mg/L

0

0

0

%REC

101

99.7

105

LowLimit

80

80

80

HighLimit

120

120

120

%RPD

RPDLimit

Qual

SPK value SPK Ref Val

0.5000

0.5000

0.1000

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-1-15

Sample ID 1507094-001b dup

SampType: DUP
Batch ID: R27329

TestCode: SM4500-H+B: pH

RunNo: 27329

Client ID: Injection Well
Prep Date:

Analysis Date: 7/6/2015

15 Seal

SeqNo: **819204**

Units: pH units

Analyte

Result

PQL SPK value

SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD RPDLimit

Qual

Н

nH.

7.46 1.68

. .

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-1-15

Sample ID mb-1

SampType: MBLK

TestCode: SM2320B: Alkalinity

Client ID: PBW

Batch ID: R27329

RunNo: 27329

Prep Date:

Client ID:

Prep Date:

Analysis Date: 7/6/2015

SeqNo: 819128

Units: mg/L CaCO3

Analyte

SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD

RPDLimit

Qual

Total Alkalinity (as CaCO3)

LCSW

ND

20.00

TestCode: SM2320B: Alkalinity

RPDLimit

Sample ID Ics-1

SampType: LCS Batch ID: R27329

RunNo: 27329 SeqNo: 819129

Units: mg/L CaCO3

Analyte

Result PQL

Analysis Date: 7/6/2015 SPK value SPK Ref Val

%REC

HighLimit

%RPD

Total Alkalinity (as CaCO3)

78.36

Result

Result

79.44

20.00 80.00 98.0

110

Qual

Sample ID mb-2 Client ID: PBW

SampType: MBLK

SPK value SPK Ref Val %REC LowLimit

TestCode: SM2320B: Alkalinity RunNo: 27329

HighLimit

Prep Date:

Batch ID: R27329 Analysis Date: 7/6/2015

PQL

SeqNo: 819152

Units: mg/L CaCO3

RPDLimit

Analyte Total Alkalinity (as CaCO3)

ND 20.00

SampType: LCS

TestCode: SM2320B: Alkalinity

Sample ID Ics-2 Client ID: LCSW

Batch ID: R27329

RunNo: 27329

Units: mg/L CaCO3

Prep Date:

Analysis Date: 7/6/2015

SeqNo: 819153

HighLimit

%RPD

Analyte Total Alkalinity (as CaCO3)

PQL 20.00 SPK value SPK Ref Val 80.00

%REC LowLimit 99.3

90

110

%RPD

RPDLimit Qual

Page 19 of 20

- Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- Η Holding times for preparation or analysis exceeded Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- Value above quantitation range
- J Analyte detected below quantitation limits
- Sample pH Not In Range
- Reporting Detection Limit
- % Recovery outside of range due to dilution or matrix
- В Analyte detected in the associated Method Blank

Hall Environmental Analysis Laboratory, Inc.

WO#:

1507094

06-Aug-15

Client:

Western Refining Southwest, Inc.

Project:

Analyte

Injection Well 7-1-15

Sample ID MB-20129

SampType: MBLK

TestCode: SM2540C MOD: Total Dissolved Solids

LowLimit

LowLimit

Client ID:

PBW

Batch ID: 20129

RunNo: 27360

Prep Date: 7/7/2015

Analysis Date: 7/8/2015

SPK value SPK Ref Val %REC

SeqNo: 820297

Units: mg/L HighLimit

%RPD **RPDLimit**

Qual

Total Dissolved Solids

SampType: LCS

ND 20.0

Sample ID LCS-20129

Batch ID: 20129

RunNo: 27360

120

Client ID: LCSW Prep Date: 7/7/2015

Analysis Date: 7/8/2015

SeqNo: 820298

Units: mg/L HighLimit

%RPD **RPDLimit**

Qual

Result **PQL** SPK value SPK Ref Val 1000

101

%REC

Total Dissolved Solids

1010

20.0

Analyte

TestCode: SM2540C MOD: Total Dissolved Solids

Qualifiers:

Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

Holding times for preparation or analysis exceeded Η

Not Detected at the Reporting Limit ND

RPD outside accepted recovery limits R

% Recovery outside of range due to dilution or matrix S

Analyte detected in the associated Method Blank В

E Value above quantitation range

Analyte detected below quantitation limits J

Sample pH Not In Range

Reporting Detection Limit

Page 20 of 20



нии влуновшения лишума ваооговогу

4901 Hawkins NE Albuquerque, NM 87109

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

Sample Log-In Check List

Western Refining Southw Work Order Number: 1507094 RcptNo: 1 Client Name: Received by/date: anne Sham 7/2/2015 7:00:00 AM Logged By: **Anne Thorne** Completed By: **Anne Thome** 7/2/2015 Reviewed By: Chain of Custody Not Present 1. Custody seals intact on sample bottles? Yes 🗌 No 🗌 Yes 🗹 Not Present No 🗌 2. Is Chain of Custody complete? 3. How was the sample delivered? Courier Log In Yes 🗸 No 🗆 NA 🗌 4. Was an attempt made to cool the samples? No 🗌 NA 🗌 5. Were all samples received at a temperature of >0° C to 6.0°C Yes 🗸 No 🗀 Yes 🗸 Sample(s) in proper container(s)? No 🗆 Yes 🗸 7. Sufficient sample volume for indicated test(s)? No 🗆 Yes 🗹 8. Are samples (except VOA and ONG) properly preserved? NA 🗆 No 🔽 Yes 🗌 9. Was preservative added to bottles? No 🗌 No VOA Vials 10. VOA vials have zero headspace? Yes Yes No 🗹 11. Were any sample containers received broken? # of preserved bottles checked Yes V No 🔲 for pH: 12. Does paperwork match bottle labels? (2)unless noted) (Note discrepancies on chain of custody) No 🗆 Adjusted⁴ Yes 🗸 13. Are matrices correctly identified on Chain of Custody? No 🗌 Yes 🗹 14. Is it clear what analyses were requested? Yes 🗸 No 🗆 Checked by 15. Were all holding times able to be met? (If no, notify customer for authorization.) Special Handling (if applicable) Yes 🗌 No \square NA 🗹 16. Was client notified of all discrepancies with this order? Person Notified: Date By Whom: eMail Phone Fax In Person Via: Regarding: Client Instructions: 17. Additional remarks: 18. Cooler Information Cooler No Temp °C | Condition | Seal Intact | Seal No Seal Date Signed By 1.0 Good Yes

C	hain-	of-Cu	stody Record	Turn-Around	Time:										TD	~ !			MT.	A I	
Client: Western Refining			Refining	X Standard □ Rush				HALL ENVIRONMENTAL ANALYSIS LABORATORY													
				Project Name) :																
Mailing Address: #50 CR 4990				Injection well 7-1-15 Project #:			www.hallenvironmental.com 4901 Hawkins NE - Albuquerque, NM 87109														
Bloomfield, NN87413				Project #:		•		Tel. 505-345-3975 Fax 505-345-4107													
			52-4/35	P.O.# 126/0939			Analysis Request														
email o				Project Mana		<u> </u>	ï		<u>Ş</u>	<u>ô</u>			Y	(7)				T.	P	₹	Τ
QA/QC Package: Standard Level 4 (Full Validation)					•			TMB's (8021)	TPH (Gas only)	DRO/MRO)	7 7 2	IMS)	18, Na.	, Fo₄,s€	PCB's				rresivi	AIK, C	
Accreditation □ NELAP □ Other □ Other			Sampler:	Beb	amana v s		- TMB	- TPH	四/Q		8270 S	3	3,NÓ ₂ ,	/ 8082		2	4	ø,	-	Ž Ž	
□ EDD (Type)					176) <u>-</u>		踞	띪	(GRO		ō	tals	S.	des		<u></u>	17	性	ر د اد	ح إ	
Date	Time	Matrix	Sample Request ID		Preservative Type			BTEX + MTBE	BTEX + MTBE	TPH 8015B	1711 (wedned + 10:17 () / EDB (Wethod 504.+) R. V.	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F,CI,NO3,NÓ2,	8081 Pesticides / 8082 PCB	8260B (VOA)	8270 (Semi	1901 ta	Reactivity C	1.17.12.12 1.17.12.12.12	Air Ruhhles
7-1-15	9:00	Hao	injection well	5-VOA	HCI		-001	i							1	X					T
i	-	1			amber		-od										X		T		T
				1-500ml			700									T		X			Τ
				1-500 m			700			7									<u> </u>	₹ <u></u>	T
				1-125ml	Ho504		70				17					\top		\top	1	1	†
				1	HNO3		-00				<u> </u>	1	X	•	\dashv	1	寸	十	\top		†
				l	NaOH		7001			1				1		\neg		\	$\sqrt{}$		†
				1	ZN aceto	+,	-001										_	- -	$\overline{}$	×	⇟
		•			2579 101.81										1						Ť
				""																	Τ
																					I
																					I
Date: 7-/-15	Time:	Relinquish	ed by:	Received by:	Walle	Date 7////	Time 12/5	Ren	narks	:			, ,	,	•						
Date:	Time:	Relinquish	od by:	Received by:	Jan De	Date 07/02	Time - 115 - U7 V] Đ													
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Hall Environmental Analysis Laboratory

QUALITY ASSURANCE PLAN

Effective Date: August 13th, 2014

Revision 9.9

www.hallenvironmental.com

Control Number: 00000158

Approved By:

Andy Freeman

Laboratory Manager

Approved By:

8/12/2014

Carolyn Swanson

Quality Assurance/Quality Control Officer

Approved By:	
	ol. l.
Yeu	8/13/14
lan Cameron	Date
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John Caldwell Date
Assistant Laboratory Manager
Semi-Volatiles Technical Director

Rene Aguilera Date
Volatiles Technical Director

Tiffany Shaw Date
Metals Technical Director

Stacey McCoy Date
Wet Chemistry Technical Director

Stephanie Shaffers Date
Microbiology Technical Director

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Logging in Samples and Storage

11.0 Data Reduction, Validation, Reporting, and Record Keeping 51

Grubbs Outliers

Total Nitrogen

Weighting

RPD (Relative Percent Difference)

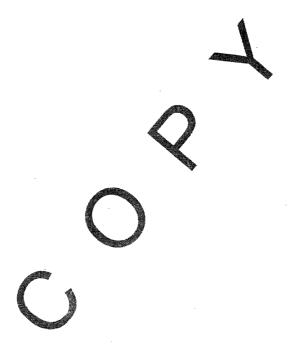
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3.0 Introduction

Purpose of Document

The purpose of this Quality Assurance Plan is to formally document the quality assurance policies and procedures of Hall Environmental Analysis Laboratory, Inc. (HEAL), for the benefit of its employees, clients, and accrediting organizations. HEAL continually implements all aspects of this plan as an essential and integral part of laboratory operations in order to ensure that high quality data is produced in an efficient and effective manner.

Objectives

The objective of HEAL is to achieve and maintain excellence in environmental testing. This is accomplished by developing, incorporating and documenting the procedures and policies specified by each of our accrediting authorities and outlined in this plan. These activities are carried out by a laboratory staff that is analytically competent, well-qualified, and highly trained. An experienced management team, knowledgeable in their area of expertise, monitors them. Finally, a comprehensive quality assurance program governs laboratory practices and ensures that the analytical results are valid, defensible, reproducible, reconstructable and of the highest quality.

HEAL establishes and thoroughly documents its activities to ensure that all data generated and processed will be scientifically valid and of known and documented quality. Routine laboratory activities are detailed in method specific standard operating procedures (SOP). All data reported meets the applicable requirements for the specific method or methods that are referenced, ORELAP, TCEQ, EPA, client specific requirements and/or State Bureaus. In the event that these requirements are ever in contention with each other, it is HEAL's policy to always follow the most prudent requirement available. For specific method requirements refer to HEAL's Standard Operating Procedures (SOP's), EPA methods, Standard Methods 20' edition, ASTM methods or state specific methods.

HEAL management ensures that this document is correct in terms of required accuracy and data reproducibility, and that the procedures contain proper quality control measures. HEAL management additionally ensures that all equipment is reliable, well-maintained and appropriately calibrated. The procedures and practices of the laboratory are geared towards not only strictly following our regulatory requirements but also allowing the flexibility to conform to client specific specifications. Meticulous records are maintained for all samples and their respective analyses so that results are well-documented and defensible in a court of law.

The HEAL Quality Assurance/Quality Control Officer (QA/QCO) and upper management are responsible for supervising and administering this quality assurance program, and

ensuring each individual is responsible for its proper implementation. All HEAL management remains committed to the encouragement of excellence in analytical testing and will continue to provide the necessary resources and environment conducive to its achievement.

Policies

Understanding that quality cannot be mandated, it is the policy of this laboratory to provide an environment that encourages all staff members to take pride in the quality of their work. In addition to furnishing proper equipment and supplies, HEAL stresses the importance of continued training and professional development. Further, HEAL recognizes the time required for data interpretation. Therefore, no analyst should feel pressure to sacrifice data quality for data quantity. Each staff member must perform with the highest level of integrity and professional competence, always being alert to problems that could compromise the quality of their technical work.

Management and senior personnel supervise analysts closely in all operations. Under no circumstance is the willful act or fraudulent manipulation of analytical data condoned. Such acts must be reported immediately to HEAL management. Reported acts will be assessed on an individual basis and resulting actions could result in dismissar. The laboratory staff is encouraged to speak with lab managers or senior management if they feel that there are any undo commercial, financial, or other pressures, which might adversely affect the quality of their work; or in the event that they suspect that data quality has been compromised in any way. HEAL's Quality Assurance quality Control Officer is available if any analyst and/or manager wishes to anonymously report any suspected or known breaches in data integrity.

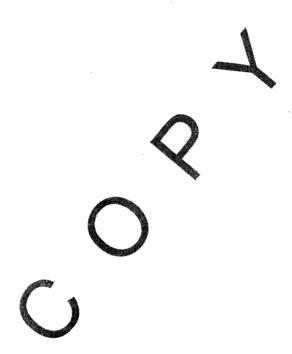
Understanding the importance of meeting curtomer requirements in addition to the requirements set forth in statutory and requirements, HEAL shall periodically seek feedback from customers and evaluate the feedback in order to initiate improvements.

All proprietary rights and client information at HEAL (including national security concerns) are considered confidential. No information will be given out without the express verbal or written permission of the client. All reports generated will be held in the strictest of confidence.

HEAL shall continually improve the effectiveness of its management system through the use of the policies and procedures outlined in this Quality Assurance Plan. Quality control results, internal and external audit findings, management reviews, new and continual training and corrective and preventive actions are continually evaluated to identify possible improvements and to ensure that appropriate communication processes are taking place regarding the effectiveness of the management system. HEAL shall ensure that the

integrity of the quality system is maintained when changes to the system are planned and implemented.

This is a controlled document. Each copy is assigned a unique tracking number and when released to a client or accrediting agency the QA/QCO keeps the tracking number on file. This document is reviewed on an annual basis to ensure that it is valid and representative of current practices at HEAL.



4.0 Organization and Responsibility

Company

HEAL is accredited in accordance with the 2009 TNI standard (see NELAC accredited analysis list in the QA Department or on the company website), through ORELAP and TCEQ and by the Arizona Department of Health Services. Additionally, HEAL is qualified as defined under the State of New Mexico Water Quality Control Commission regulations and the New Mexico State Drinking Water Bureau. HEAL is a locally owned small business that was established in 1991. HEAL is a full service environmental analysis laboratory with analytical capabilities that include both organic and inorganic methodologies and has performed analyses of soil, water, and air as well as various other matrices for many sites in the region. HEAL's client base includes local, state and federal agencies, private consultants, commercial industries as well as individual homeowners. HEAL has performed as a subcontractor to the state of New Mexico and to the New Mexico Department of Transportation. HEAL has been acclaimed by its customers as producing quality results and as being adaptive to client-specific needs.

The laboratory is divided into an organic section, an inorganic section and a microbiology section. Each section has a designated managemechnical director. The technical directors report directly to the laboratory manager, who oversees all operations.

Certifications

ORELAP - NELAC Oregon Primary accrediting authority.

TCEQ - NELAC Texas Secondary accrediting authority.

The Arizona Department of Health Services

The New Mexico Drinking Water Burgau

See our website at www.hallenvironmental.com or the QA Office for copies of current licenses and licensed parameters.

In the event of a certification being revoked or suspended, HEAL will notify, in writing, those clients that require the affected certification.

Personnel

HEAL management ensures the competence of all who operate equipment, perform environmental tests, evaluate results, and sign test reports. Personnel performing specific tasks shall be qualified on the basis of appropriate education, training, experience and /or demonstrated skills.

HEAL ensures that all personnel are aware of the relevance and importance of their activities and how each employee contributes to the achievement of the objectives defined throughout this document.

All personnel shall be responsible for complying with HEAL's quality assurance/quality control requirements that pertain to their technical function. Each technical staff member must have a combination of experience and education to adequately demonstrate specific knowledge of their particular function and a general knowledge of laboratory operations, test methods, quality assurance/quality control procedures, and records management.

All employees' training certificates and diplomas are kept on file with demonstrations of capability for each method they perform. An Organizational Chartican be found at the end of this section and a personnel list is available in the current Controlled Document Logbook.

Laboratory Director

The Laboratory Director is responsible for overall technical direction and business leadership of HEAL. The Laboratory Manager, the Project Manager and Quality Assurance/Quality Control Officer report directly to the Laboratory Director. Someone with a minimum of 7 years of directly related experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

Laboratory Manager/Lead Technical Director

The Laboratory Manager shall exercise day—to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results. The Laboratory Manager shall be experienced in the fields of accreditation for which the laboratory is approved or seeking accreditation. The Laboratory Manager shall certify that personnel with appropriate educational and/or technical background perform all tests for which HEAL is accredited. Such certification shall be documented.

The Laboratory Manager shall monitor standards of performance in quality control and quality assurance and monitor the validity of the analyses performed and data generated at HEAL to assure reliable data.

The Laboratory Manager is responsible for the daily operations of the laboratory. The Laboratory Manager is the lead technical director of the laboratory and, in conjunction with the section technical directors, is responsible for coordinating activities within the laboratory with the overall goal of efficiently producing high quality data within a reasonable time frame.

In events where employee scheduling or current workload is such that new work cannot be incorporated, without missing hold times, the Laboratory Manager has authority to modify employee scheduling, re-schedule projects or, when appropriate, allocate the work to approved subcontracting laboratories.

Additionally, the laboratory manager reviews and approves new analytical procedures and methods, and performs a final review of most analytical results. The Laboratory Manager provides technical support to both customers and HEAL staff.

The Laboratory Manager also observes the performance of supervisors to ensure that good laboratory practices and proper techniques are being taught and utilized, and to assist in overall quality control implementation and strategic planning for the future of the company. Other duties include assisting in establishing laboratory policies that lead to the fulfillment of requirements for various certification programs, assuring that all Quality Assurance and Quality Control documents are reviewed and approved, and assisting in conducting Quality Assurance Audits.

The laboratory manager addresses questions or complaints that cannot be answered by the section managers.

The Laboratory Manager shall have a bachelor's degree in a chemical, environmental, biological sciences, physical sciences or engineering field, and at least five years of experience in the environmental analysis of representative inorganic and organic analytes for which the laboratory seeks or maintains accreditation.

Assistant Laboratory Manager

The Assistant Laboratory Manager shall aid the Laboratory Manager in exercising dayto-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results. The Assistant Laboratory Manager shall be experienced in the fields of accreditation for which the laboratory is approved or seeking accreditation.

The Assistant Laboratory Manager is responsible for helping the Laboratory Manager in the daily operations of the laboratory. In conjunction with the section Technical Directors, the Assistant Laboratory Manager is responsible for coordinating activities within the laboratory with the overall goal of efficiently producing high quality data within a reasonable time frame.

The Assistant Laboratory Manager shall have at least ten years of experience in environmental analysis of representative inorganic and/or organic analytes for which the laboratory seeks or maintains accreditation.

Quality Assurance Quality Control Officer

The Quality Assurance/Quality Control Officer (QA/QCO) serves as the focal point for QA/QC and shall be responsible for the oversight and/or review of quality control data. The QA/QCO functions independently from laboratory operations and shall be empowered to halt unsatisfactory work and/or prevent the reporting of results generated from an out-of-control measurement system. The QA/QCO shall objectively evaluate data and perform assessments without any outside/managerial influence. The QA/QCO shall have direct access to the highest level of management at which decisions are made on laboratory policy and/or resources. The QA/QCO shall notify laboratory management of deficiencies in the quality system in periodic, independent reports.

The QA/QCO shall have general knowledge of the analytical test methods for which data review is performed and have documented training and or experience in QA/QC procedures and in the laboratory's quality system. The QA/QCO will have a minimum of a BS in a scientific or related field and a minimum of three years of related experience.

The QA/QCO shall schedule and conduct internal audits as per the Internal Audit SOP at least annually, monitor and trend Corrective Action Reports as per the Data Validation SOP, periodically review control charts for out of control conditions, and initiate any appropriate corrective actions.

The QA/QCO shall oversee the analysis of proficiency testing in accordance with our standards and monitor any corrective actions issued as a result of this testing.

The QA/QCO reviews all standard operating procedures and statements of work in order to assure their occurate and compliance to method and regulatory requirements.

The QA/QCO shall be responsible for maintaining and updating this quality manual.

Project Managers

The role of the project manager is to act as a liaison between HEAL and our clients. The Project Manager updates clients on the status of projects in-house, prepares quotations for new work, and is responsible for HEAL's marketing effort.

All new work is assessed by the Project Manager and reviewed with the other managers so as to not exceed the laboratory's capacity. In events where employee scheduling or current workload is such that new work cannot be incorporated without missing hold times, the Project Manager has authority to re-schedule projects.

It is also the duty of the project manager to work with the Laboratory Manager and QA/QCO to insure that before new work is undertaken, the resources required and accreditations requested are available to meet the client's specific needs.

Additionally, the Project Manager can initiate the review of the need for new analytical procedures and methods, and perform a final review of some analytical results. The Project Manager provides technical support to customers. Someone with a minimum of 2 years of directly related experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

Technical Directors

Technical Directors are full-time members of the staff at HEAL who exercise day-to-day supervision of laboratory operations for the appropriate relds of accreditation and reporting of results for their department within HEAL. A Technical Director's duties shall include, but not be limited to, monitoring standards of performance in quality control and quality assurance, monitoring the validity of the analyses performed and the data generated in their sections to ensure reliable data, overseeing training and supervising departmental staff, scheduling including work for their sections, and monitoring laboratory personnel to ensure that proper procedures and techniques are being utilized. They supervise and implement new Quality Control procedures as directed by the QA/QCO, update and maintain quality control records including, but not limited to, training forms, IDOCs, IDOCPs, and MDLs, and evaluate laboratory personnel in their Quality Control activities. In addition, technical directors are responsible for upholding the spirit and intent of HEAL's data integrity procedures.

As Technical Directors of their associated section, they review analytical data to acknowledge that data meets all criteria set forth for good Quality Assurance practices. Someone with a minimum of a years of experience in the environmental analysis of representative analytes for which HEAL seeks or maintains accreditation and a bachelor's degree in a scientific or related discipline should fill this position.

The education requirements for a Technical Director may be waived at the discretion of HEAL's accrediting agencies.

Health and Safety / Chemical Hygiene Officer

Page 13 of 59 Quality Assurance Plan 9.9 Effective August 13th, 2014 Refer to the most recent version of the Health and Safety and Chemical Hygiene Plans for the roles, responsibilities, and basic requirements of the Health and Safety Officer (H&SO) and the Chemical Hygiene Officer (CHO). These jobs can be executed by the same employee.

Analyst I, II and III

Analysts are responsible for the analysis of various sample matrices including, but not limited to, solid, aqueous, and air, as well as the generation of high quality data in accordance with the HEAL SOPs and QA/QC guidelines in a reasonable time as prescribed by standard turnaround schedules or as directed by the Section Manager or Laboratory Manager.

Analysts are responsible for making sure all data generated is entered in the database in the correct manner and the raw data is reviewed, signed and delivered to the appropriate peer for review. An analyst reports daily to the section manager and will inform them as to material needs of the section specifically pertaining to the analyses performed by the analyst. Additional duties may include preparation of samples for analysis, maintenance of lab instruments or equipment, and cleaning and providing technical assistance to lower level laboratory staff.

The senior analyst in the section may be asked to perform supervisory duties as related to operational aspects of the section. The analyst may perform all duties of a lab technician.

The position of Analyst is a full or part time hourly position and is divided into three levels, Analyst I, II, and III. All employees hard into an Analyst position at HEAL must begin as an Analyst I and remain there at a minimum of three months regardless of their education and experience. Analytical aust have a minimum of an AA in a related field or equivalent experience (equivalent experience means years of related experience can be substituted for the education requirement). An Analyst I is responsible for analysis, in trument operation, including calibration and data reduction. Analyst II must have a minimum in an AA in a related field or equivalent experience and must have documented and demonstrated aptitude to perform all functions of an Analyst II. An Analyst II is responsible for the full analysis of their test methods, routine instrument maintenance, purchase of consumables as dictated by their Technical Director, advanced data reduction, and basic data review. Analyst II may also assist Analyst III in method development and, as dictated by their Technical Director, may be responsible for the review and/or revision of their method specific SOPs. Analyst III must have Bachelor's degree or equivalent experience and must have documented and demonstrated aptitude to perform all functions of an Analyst III. An Analyst III is responsible for all tasks completed by an Analyst I and II as well as advanced data review, non-routine instrument maintenance, assisting their technical director in basic supervisory duties and method development.

Laboratory Technician

A laboratory technician is responsible for providing support to analysts in the organics, inorganics and disposal departments. Laboratory Technicians can assist analysts in basic sample preparation, general laboratory maintenance, glassware washing, chemical inventories, sample disposal and sample kit preparation. This position can be filled by someone without the education and experience necessary to obtain a position as an analyst.

Sample Control Manager

The sample control manager is responsible for receiving samples and reviewing the sample login information after it has been entered into the computer. The sample control manager also checks the samples against the chain-of-custody for any sample and/or labeling discrepancies prior to distribution.

The sample control manager is responsible for sending but samples to the sub-contractors along with the review and shipping of field sampling bottle kits. The sample control manager acts as a liaison between the laboratory and field sampling crew to ensure that the appropriate analytical less is assigned. If a discrepancy is noted, the sample control manager or sample custodian will contact the customer to resolve any questions or problems. The sample control manager is an integral part of the customer service team.

This position should be filled by some the with a high school diploma and a minimum of 2 years of related experience and car also be filled by a senior manager.

Sample Custodians

Sample Custodians work directly under the Sample Control Manager. They are responsible for sample intake into the laboratory and into the LIMS. Sample Custodians take orders from our clients and prepare appropriate bottle kits to meet the clients' needs. Sample Custodians work directly with the clients in properly labeling and identifying samples as well as properly filling out legal COCs. When necessary, Sample Custodians contact clients to resolve any questions or problems associated with their samples. Sample Custodians are responsible for distributing samples throughout the laboratory and are responsible for notifying analysts of special circumstances such as short holding times or improper sample preservation upon receipt.

Sample Disposal Custodian

The sample disposal custodian is responsible for characterizing and disposing of samples in accordance to the most recent version of the sample disposal SOP. The sample disposal custodian collects waste from the laboratory and transports it to the disposal warehouse for storage and eventual disposal. The sample disposal custodian is responsible for maintaining the disposal warehouse and following the requirements for documentation, integrity, chemical hygiene and health and safety as set forth in the various HEAL administrative SOPs. The sample disposal custodian is responsible for overseeing any laboratory technicians employed at the disposal warehouse.

This position should be filled by someone with a high school diploma and a minimum of 1 year of related experience.

Bookkeeper

The Bookkeeper is responsible for the preparation of quarterly financials and quarterly payroll reports. The bookkeeper monitors payables, receivables, deposits, pays all bills and maintains an inventory of administrative supplies. The Brokkeeper completes final data package assembly and oversees the consignment of final reports. The Bookkeeper assists in the project management of drinking water compliance samples for NMED and NMEFC and any other tasks as assigned by the aboratory Manager. This position should be filled by someone with a degree in accourting or a minimum of a high school diploma and at least 4 years of directly related experience.

Administrative Assistant

The Administrative Assistant is responsible for aiding administrative staff in tasks that include but are not limited to: the processing and consignment of final reports, and the generation of client specific spreadsheets. This position should be filled by someone with a minimum of a high so fool diploma.

IT Specialist

The IT Specialist is responsible for the induction and maintenance of all hard and software technology not maintained through a service agreement. The IT Specialist follows the requirements of this document, all regulatory documents and the EPAs Good Automated Laboratory Practices. This position should be filled by someone with a degree in a computer related field, or at least two years of directly related experience.

Delegations in the Absence of Key Personnel

Planned absences shall be preceded by notification to the Laboratory Manager. The appropriate staff members shall be informed of the absence. In the case of unplanned absences, the superior shall either assume the responsibilities and duties or delegate the responsibilities and duties to another appropriately qualified employee.

In the event that the Laboratory Manager is absent for a period of time exceeding fifteen consecutive calendar days, another full-time staff member meeting the basic qualifications and competent to temporarily perform this function will be designated. If this absence exceeds thirty-five consecutive calendar days, HEAL will notify ORELAP in writing of the absence and the pertinent qualifications of the temporary laboratory manager.

Laboratory Personnel Qualification and Training

All personnel joining HEAL shall undergo orientation and training. During this period the new personnel shall be introduced to the organization and their responsibilities, as well as the policies and procedures of the company. They shall also undergo on-the-job training and shall work with trained staff. They will be shown required tasks and be observed while performing them.

When utilizing staff undergoing training, appropriate supervision shall be dictated and overseen by the appropriate section technical lirector. Prior to analyzing client samples, a new employee, or an employee new to a procedure, must meet the following basic requirements. The SOP and Method(s) for the analysis must be read and signed by the employee indicating that they read, understand, and intend to comply with the requirements of the documents. The employee must undergo documented training. Training is conducted by a senior analyst familiar with the procedure and overseen by the section Technical Director. This training is documented by any means deemed appropriate by the trainer and section Technical Director, and kept on file if the employees file located in the QA/QCO's office. The employee must perform a successful Initial Demonstration of Capability (IDOC). See the current Document Control Logbook for the training documents and checklists utilized at HEAL to ensure that all of these requirements are met. Once all of the above requirements are met it is incumbent upon the section Technical Director to determine at which point the employee can begin to perform the test unsupervised. Certification to Complete Work Unsupervised (see the current Document Control Logbook) is then filled out by the employee and technical director.

IDOCs are required for all new analysts and methods prior to sample analysis. IDOCs are also required any time there is a change in the instrument, analyte list or method. If more than twelve months have passed since an analyst performed an IDOC and they

have not performed the method and/or have not met the continuing DOC requirements, the analyst must perform an IDOC prior to resuming the test.

All IDOCs shall be documented through the use of the certification form which can be found in the current Document Control Logbook. IDOCs are performed by analyzing four Laboratory Control Spikes (LCSs). Using the results of the LCSs the mean recovery is calculated in the appropriate reporting units and the standard deviations of the population sample (n-1) (in the same units) as well as the relative percent difference for each parameter of interest. When it is not possible or pertinent to determine mean and standard deviations HEAL assesses performance against establish and documented criteria dictated in the method SOP. The mean and standard deviation are compared to the corresponding acceptance criteria for precision and accuracy in the test method (if applicable) or in laboratory-generated acceptance criteria. In the event that the HEAL SOP or test method(s) fail to establish the pass/fail criteria the default limits of +/- 20% for calculated recovery and <20% relative percent difference based on the standard deviation will be utilized. If all parameters meet the acceptance criteria, the IDOC is successfully completed. If any one of the parameters do not meet the acceptance criteria, the performance is unacceptable for that parameter and the analyst must either locate and correct the source of the problem and repeat the test for all parameters of interest or repeating test for all parameters that failed to meet criteria. Repeat failure, however, confirms a general problem with the measurement system. If this occurs the source of the problem must be identified and the test repeated for all parameters of interest

New employees that do not have prior analysis experience will not be allowed to perform analysis until they have demonstrated attention to detail with minimal errors in the assigned tasks. To ensure a sustained level of quality performance among staff members, continuing demonstration of capability shall be performed at least once a year. These are as an Annual Documentation of Continued Proficiency (ADOCP).

At least once per year an ADOCP must be completed. This is achieved by the acceptable performance of a blind sample (typically by using a PT sample, but can be a single blind (to the analyst) sample), by performing another IDOC, or by summarizing the data of four consecutive laboratory control samples with acceptable levels of precision and accuracy (these limits are those currently listed in the LIMS for an LCS using the indicated test method(s).) ADOCPs are documented using a standard form and are kept on file in each analyst's employee folder. ADOCPs may be demonstrated as an analyst group utilizing LIMS control charting, so long as all listed analysts participated, the results are consecutive and pass the requirements for precision and accuracy.

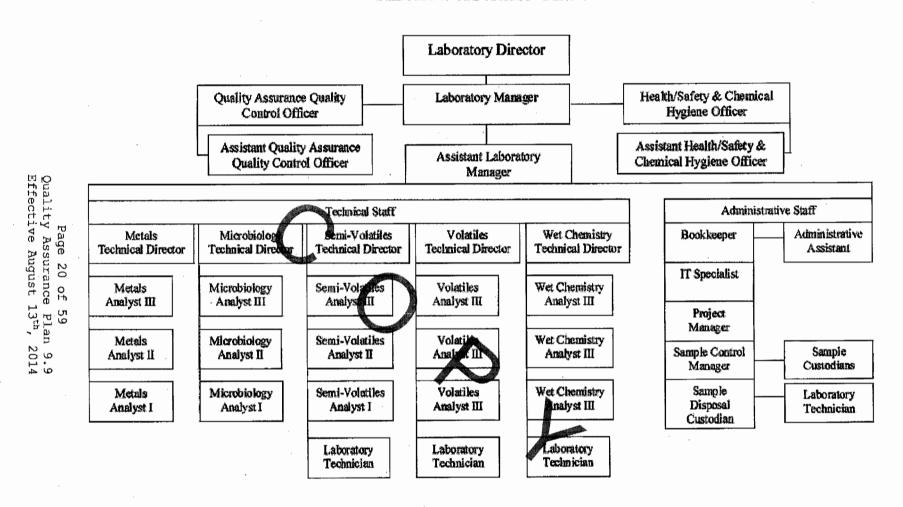
Each new employee shall be provided with data integrity training as a formal part of their new employee orientation. Each new employee will sign an ethics and data integrity agreement to ensure that they understand that data quality is our main objective. Every HEAL employee recognizes that although turnaround time is

important, quality is put above any pressure to complete the task expediently. Analysts are not compensated for passing QC parameters nor are incentives given for the quantity of work produced. Data Integrity and Ethics training are performed on an annual basis in order to remind all employees of HEAL's policy on data quality. Employees are required to understand that any infractions of the laboratory data integrity procedures will result in a detailed investigation that could lead to very serious consequences including immediate termination, debarment, or civil/criminal prosecution.

Training for each member of HEAL's technical staff is further established and maintained through documentation that each employee has read, understood, and is using the latest version of this Quality Assurance Manual. Training courses or workshops on specific equipment, analytical techniques, or laboratory procedures are documented through attendance sheets, certificates of attendance, training forms, or quizzes. This training documentation is located in analyst specific employee folders in the QA/QCO Office. On the front of all methods, SOPs, and procedures for HEAL, there is a signoff sheet that is signed by all pertinent employees, indicating that they have read, understand, and agree to perform the most recent version of the document.

The effectiveness of training will be evaluated during routine data review, annual employee reviews, and internal and external audits. Repetitive errors, complaints and audit findings serve as indicators that training has been ineffective. When training is deemed to have been ineffective a brief review of the training process will be completed and a re-training conducted as soon as possible.

HEAL Personnel Chart



5.0 Receipt and Handling of Samples

Reviewing Requests, Tenders and Contracts

All contracts and written requests by clients are closely reviewed to ensure that the client's data quality objectives can be met to their specifications. This review includes making sure that HEAL has the resources necessary to perform the tests to the clients specifications.

When HEAL is unable to meet the clients specifications their samples will be subcontracted to an approved laboratory capable of meeting the client's data quality objectives.

Sampling

Procedures

HEAL does not provide field sampling for any projects. Sample kits are prepared and provided for clients upon request. The sample kits contain the appropriate sampling containers (with a preservative when necessary), labels, blue ice (The use of "blue ice" by anyone except HEAL personnel is discouraged because it generally does not maintain the appropriate temperature of the sample. If blue ice is used, it should be completely frozen at this time of use, the sample should be chilled before packing, and special notice taken at sample receipt to be certain the relative demperature has been maintained.), a cooler, chain-of-custody forms, plastic bags, bubble wrap, and any special sampling instructions. Sample kits are reviewed prior to shipment for accuracy and completeness.

Containers

Containers which are sent out for sampling are purchased by HEAL from a commercial source. Glass containers are certified "EPA Cleaned" QA level 1. Plastic containers are certified clean when required These containers are received with a Certificate of Analysis verifying that the containers have been cleaned according to the EPA wash procedure. Containers are used once and discarded. If the samples are collected and stored in inappropriate containers the laboratory may not be able to accurately quantify the amount of the desired components. In this case, re-sampling may be required.

Preservation

If sampling for analyte(s) requires preservation, the sample custodians fortify the containers prior to shipment to the field, or provide the preservative for the sampler to add in the field. The required preservative is introduced into the vials in uniform amounts

and done so rapidly to minimize the risk of contamination. Vials that contain a preservative are labeled appropriately. If the samples are stored with inappropriate preservatives, the laboratory may not be able to accurately quantify the amount of the desired components. In this case re-sampling may be required.

Refer to the current Login SOP and/or the current price book for detailed sample receipt and handling procedures, appropriate preservation and holding time requirements.

Sample Custody

Chain-of-Custody Form

A Chain-of-Custody (COC) form is used to provide a record of sample chronology from the field to receipt at the laboratory. HEAL's COC contains the client's name, address, phone and fax numbers, the project name and number, the project manager's name, and the field sampler's name. It also identifies the date and time of sample collection, sample matrix, field sample ID number, number/volume of sample containers, sample temperature upon receipt, and any sample preservative information.

There is also a space to record the HEAL ID number assigned to samples after they are received. Next to the sample information is a space for the client to indicate the desired analyses to be performed. There is a section for the client to indicate the data package level as well as any accreditation requirements. Junely, there is a section to track the actual custody of the samples. The custody section contains lines for signatures, dates and times when samples are relinquished and recorded. The COC form also includes a space to record special sample related instructions, sampling anomalies, time constraints, and any sample disposal considerations.

It is paramount that all COCs arrive at LEAL complete and accurate so that the samples can be processed and allocated for testing in a timely and efficient manner. A sample chain-of-custody form can be found in the current Document Control Logbook or on line at www.hallenvironmental.com

Should a specific project or client require the use of an internal COC, advanced notification and approval must be estained. The use of internal COCs are not part of our standard operating procedure.

Receiving Samples

Samples are received by authorized HEAL personnel. Upon arrival, the COC is compared to the respective samples. After the samples and COC have been determined to be complete and accurate, the sampler signs over the COC. The HEAL staff member in turn signs the chain-of-custody, also noting the current date, time, and sample temperature. This relinquishes custody of the samples from the sampler and

delegates sample custody to HEAL. The first (white) copy of the COC form is filed in the appropriate sample folder. The second (yellow) copy of the COC form is filed in the COC file in the sample control manager's office. The third (pink) copy of the COC form is given to the person who has relinquished custody of the samples.

Logging in Samples and Storage

Standard Operating Procedures have been established for the receiving and tracking of all samples (refer to the current HEAL Login SOP). These procedures ensure that samples are received and properly logged into the laboratory and that all associated documentation, including chain of custody forms, is complete and consistent with the samples received. Each sample set is given a unique HEAL tracking ID number. Individual sample locations within a defined sample set are given a unique sample ID suffix-number. Labels with the HEAL numbers, and tests requested, are generated and placed on their respective containers. The pH of preserved, non-volatile samples is checked and noted if out of compliance. Due to the nature of the samples, the pHs of volatiles samples are checked after analysis. Samples are reviewed prior to being distributed for analysis.

All samples received that are requested for compliance, whether on the COC or by contract, will be identified as compliance samples in the LIMS so as to properly notify the analytical staff that they are to be analyzed in accordance with the test method(s) as well as the compliance requirements.

Samples are distributed for analysis based upon the requested tests. In the event that sample volume is limited and different departments at HEAL are required to share the sample, volatile work takes precedence and will always be analyzed first before the sample is sent to any other department for analysis.

Care will be taken to store samples isolated from laboratory contaminants, standards and highly contaminated samples

All samples that require thermal preservation shall be acceptably stored at a temperature range just above freezing to 6 unless specified at another range by the SOP and Method.

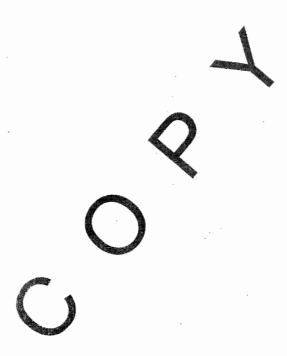
Each project (sample set) is entered into the Laboratory Information Management System (LIMS) with a unique ID that will be identified on every container. The ID tag includes the Lab ID, Client ID, date and time of collection, and the analysis/analyses to be performed. The LIMS continually updates throughout the lab. Therefore, at any time, an analyst or manager may inquire about a project and/or samples status. For more information about the login procedures, refer to the Sample Login SOP.

Disposal of Samples

Samples are held at HEAL for a minimum of thirty days and then transferred to the HEAL warehouse for disposal. Analytical results are used to characterize their respective sample contamination level(s) so that the proper disposal can be performed. These wastes will be disposed of according to their hazard as well as their type and level of contamination. Refer to the Hall Environmental Analysis Laboratory Chemical Hygiene Plan and current Sample Disposal SOP for details regarding waste disposal.

Waste drums are provided by an outside agency. These drums are removed by the outside agency and disposed of in a proper manner.

The wastes that are determined to be non-hazardous are disposed of as non-hazardous waste in accordance with the Chemical Hygiene Plan and Sample Disposal SOP.



6.0 Analytical Procedures

All analytical methods used at HEAL incorporate necessary and sufficient Quality Assurance and Quality Control practices. A Standard Operating Procedure (SOP) is used to provide the necessary criteria to yield acceptable results. These procedures are reviewed at least annually and revised as necessary and are attached as a pdf file in the Laboratory Information Management System (LIMS) for easy access by each analyst. The sample is often consumed or altered during the analytical process. Therefore, it is important that each step in the analytical process be correctly followed in order to yield valid data.

When unforeseen problems arise, the analyst, technical director, and, when necessary, laboratory manager meet to discuss the factors involved. The analytical requirements are evaluated and a suitable corrective action or resolution is established. The client is notified in the case narrative with the final report or before, if the validity of their result is in question.

List of Procedures Used

Typically, the procedures used by HEAL are EPA approved methodologies or 20th edition Standard Methods. However, proprietary methods for eliminary specific samples are sometimes used. On occasion, multiple methods or multiple method revisions are used, in this event the SOP is written to include the requirements of all referenced methods. The following tables list EPA and Standard Methods Methods numbers with their corresponding analytes and/or instrument classification.

Methods Utilized at HEAL

Drinking Water(DW) Non-Potable Water (NPW) Solids (S)

Methodology	Matrix	Title of Method .
180.1.	DW NPW	"Turbidity (Nephelometric)"
200.2	DW NPW	"Sample Preparation Procedure For Spectrochemical Determination of Total Recoverable Elements"
200.7	DW	"Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry"
200.8	DW NPW	"Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry."
245.1	DW NPW	"Mercury (Manual Cold Vapor Technique)"

300.0	DW NPW	"Determination of Inorganic Anions by Ion Chromatography"
413.2	S NPW S	"Oil and Grease"
418.1	NPW S	"Petroleum Hydrocarbons (Spectrophotometric, Infrared)"
504.1	DW	"EDB, DBCP and 123TCP in Water by Microextraction and Gas Chromatography"
524.2	DW	"Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry"
552.3	DW.	"Determination of Haloacetic Acids and Dalapon in Drinking Water by lon-Exchange Liquid-Solid Extraction and Gas Chromatography with an Electron Capture Detector"
624	NPW	Appendix A to Part 136 Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater Method 624-Purgeables"
1311	s	"Toxicity Characteristic Leaching Procedure
1311ZHE	s	"Toxicity Characteristic Leaching Procedure"
166 4 A	NPW	"N-Hexane Extractable Material HEM; Oil and Grease) and Silica Gel Treated N-Hexane Extractable Material) by Extraction and Gravimetry"
3005A	NPW	"Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by FAA or ICP Spectroscopy"
3010A	NPW	"Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis LAA or ICP Spectroscopy"
3050B	S	"Acid Digestion of Sediment, Sludge, and Soils"
3510C	DW NPW	"Separatory Funnel Liquid-Liquid Extraction"
3540	s	"Soxhlet Extraction"
3545	S	"Pressurized Fluid Extraction(PFE)"
3665	NPW S	"Sulfuric Acid/Permanganate Cleanup"
5030B	NPW	"Purge-and-Trap for Aqueous Samples"
5035	s	"Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples"
6010B	NPW S	"Inductively Coupled Plasma-Atomic Emission Spectrometry"

 "Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)" NPW "Aromatic and Halogenated Volatiles By Gas Chromatography Using Photoionization and/or Electrolytic Conductivity Detectors" NPW "Nonhalogenated Volatile Organics by Gas Chromatography" (Gasoline Range and Diesel Range Organics) NPW s "Organochlorine Pesticides by Gas Chromatography" NPW s "Polychlorinated Biphenyls (PCBs) by Gas Chromatography" 	7470A	NPW	"Mercury in Liquid Waste (Manual Cold-Vapor Technique)"
Schromatography Using Photoionization and/or Electrolytic Conductivity Detectors" NPW S (Gasoline Range and Diesel Range Organics) 8081A NPW S "Organochlorine Pesticides by Gas Chromatography" 8082 NPW S "Polychlorinated Biphenyls (PCBs) by Gas Chromatography" 8260B NPW S "Volatile Organic Compounds by Gas Chromatography" 8270C NPW S Spectrometry (GC/MS)" 8310 NPW S "Semivolatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)" 8310 NPW S "Polynuclear Aromatic Hydrocarbons" 9060 NPW "Total Organic Carbon" 9067 NPW "Phenolics (Spectrophotometric) MBTH With Distillation)" 9095A S "Paint Filter Liquids Test" H-8167 NPW "Method 8167 Chlorina Total" Walkley/Black S FOC/TOC WB SM2340B NPW "2340 Hardness" SM2540 B NPW "2510 Conductivity" SM2540 C NPW "Total Dissolved Solids Dried at 103-105° C" SM2540 D NPW "Total Suspended Solids Dried at 103-105° C" SM4500-NH3 NPW "PH Value" SM4500-NH3 NPW "4500-NH3" Ammonia	7471A	s	"Mercury in Solid or Semisolid Waste (Manual Cold Vapor
## South Substitution of the compound of the c	8021B		"Aromatic and Halogenated Volatiles By Gas Chromatography Using Photoionization and/or Electrolytic
## B081A SPW s "Organochlorine Pesticides by Gas Chromatography" ## B082 NPW s "Polychlorinated Biphenyls (PCBs) by Gas Chromatography" ## B260B SPECTROMERY (GC/MS)" ## B270C SPECTROMERY (GC/MS)" ## Semivolatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)" ## B310 NPW SEMIVOLET Aromatic Hydrocarbons ## Polynuclear Aromatic Hydrocarbons ## Polynuclear Aromatic Hydrocarbons ## Polynuclear Aromatic Hydrocarbons ## Phenolics (Spectrophotorpatric MBTH With Distillation)" ## Phenolics (Spectrophotorpatric MBTH With Distillation)" ## Polynuclear Aromatic Hydrocarbons ## Phenolics (Spectrophotorpatric MBTH With Distillation)" ## Polynuclear Aromatic Hydrocarbons ## Phenolics (Spectrophotorpatric MBTH With Distillation)" ## Polynuclear Aromatic Hydrocarbons ## Polynuclear Aromatic Hydrocar	8015D		"Nonhalogenated Volatile Organics by Gas Chromatography"
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SM2540 C NPW "Total Dissolved Solids Dried at 180° C" SM2540 D NPW "Total Suspended Solids Dried at 103-105° C" SM4500-H+B NPW "PH Value" SM4500-NH3 C "4500-NH3" Ammonia	SM2540 B	NPW	"Total Solids Dried at 103-105° C"
SM4500-H+B DW NPW "pH Value" SM4500-NH3 C NPW s "4500-NH3" Ammonia	SM2540 C	1	"Total Dissolved Solids Dried at 180° C"
SM4500-H+B	SM2540 D	NPW	"Total Suspended Solids Dried at 103-105° C"
C s "4500-NH3" Ammonia	SM4500-H+B		"pH Value"
SM4500-Norg NPW "4500-Norg" Total Kjeldahl Nitrogen (TKN)		1	"4500-NH3" Ammonia
	SM4500-Norg	NPW	"4500-Norg" Total Kjeldahl Nitrogen (TKN)

С	s	
SM5210 B	NPW	"5210 B. 5-day BOD Test"
SM5310 B	DW	"5310" Total Organic Carbon (TOC)
SM9223B	NPW	"9223 Enzyme Substrate Coliform Test"
SIVIBZZSB	DW	
8000B	NPW	"Determinative Chromatographic Separations"
8000B	s	
8000C	NPW	"Determinative Chromatographic Separations"
80000	s	

Criteria for Standard Operating Procedures

HEAL has Standard Operating Procedures (SOPs) for each of the test methods listed above. These SOPs are based upon the listed methods and detail the specific procedure and equipment utilized as well as the quality requirements necessary to prove the integrity of the data. SOPs are reviewed or revised every twelve months or sooner if necessary. The review/revision is documented in the Master SOP Logbook filed in the QA/QC Office. All SOPs are available in the LIMS under the Documents and SOPs menu.

Hand written corrections or alterations to SOPs are not permitted. In the event that a correction is needed and a revision is not immediately cossible, a corrective action report will be generated documenting the correction or alteration, signed by the section Technical Director and the QA/QC Officer and will be scanned into the current SOP and will document the change until a new revision is possible.

Controlled documents such as calibration tummary forms, analysis bench sheets, etc. are tracked as appendices in SOPs, through the controlled Document Logbook with copies available through the LIMS or through the MOAL as bound logbooks.

Each HEAL test method SOF shall include or reference the following topics where applicable:

Identification of the test method:

Applicable matrix or matrices;

Limits of detection and quantitation;

Scope and application, including parameters to be analyzed;

Summary of the test method:

Definitions:

Interferences:

Safety;

Equipment and supplies;

Reagents and standards:

Page 28 of 59 Quality Assurance Plan 9.9 Effective August 13th, 2014 Sample collection, preservation, shipment and storage;

Quality control parameters;

Calibration and standardization;

Procedure;

Data analysis and calculations;

Method performance;

Pollution prevention;

Data assessment and acceptance criteria for quality control measures;

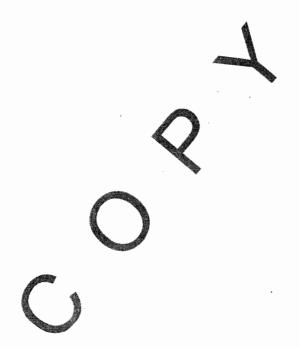
Corrective actions for out-of-control data;

Contingencies for handling out-of-control or unacceptable data;

Waste management;

References; and

Any tables, diagrams, flowcharts and validation data.



7.0 Calibration

All equipment and instrumentation used at HEAL are operated, maintained and calibrated according to manufacturers' guidelines, as well as criteria set forth in applicable analytical methodology. Personnel who have been properly trained in their procedures perform the operation and calibration. Brief descriptions of the calibration processes for our major laboratory equipment and instruments are found below.

Thermometers

The thermometers in the laboratory are used to measure the temperatures of the refrigerators, freezers, ovens, water baths, incubators, hot blocks, ambient laboratory conditions, TCLP Extractions, digestion blocks, and samples at the time of log-in. All NIST traceable thermometers are either removed from use upon their documented expiration date or they are checked annually with a NIST-certified thermometer and a correction factor is noted on each thermometer log. See the most current Login SOP for detailed procedures on this calibration procedure.

Data Loggers are used to record refrigerator temperatures. These data loggers are calibrated quarterly with NIST-certified thermometers.

The NIST thermometer should be recalibrated at least every five years or whenever the thermometer has been exposed to temperature extremes.

Refrigerators/Freezers

Each laboratory refrigerator or freezer contains thermometer capable of measuring to a minimum precision of 0.1°C. The thermometers are kept with the bulb immersed in liquid. Each day of use, the temperatures of the refrigerators are recorded to insure that the refrigerators are within the required designated range. Samples are stored separately from the standards to reduce the risk of contamination.

See the current Catastrophic Failure SOP for the procedure regarding how to handle failed refrigerators or freezers.

Ovens

The ovens contain thermometers graduated by 1° C. The ovens are calibrated quarterly against NIST thermometers and checked each day of use as required and in whatever way is dictated by or appropriate for the method in use.

Analytical and Table Top Balances

The table top balances are capable of weighing to a minimum precision of 0.01 grams. The analytical balances are capable of weighing to a minimum precision of 0.0001 grams. Records are kept of daily calibration checks for the balances in use. Working weights are used in these checks. The balances are annually certified by an outside source and the certifications are on file with the QA/QCO.

Balances, unless otherwise indicated by method specific SOPs, will be checked each day of use with at least two weights that will bracket the working range of the balance for the day. Daily balance checks will be done using working weights that are calibrated annually against Class S weights. Class S weights are calibrated by an external provider as required. The Class S weights are used once a year, or more frequently if required, to assign values to the Working Weights. During the daily balance checks, the working weights are compared to their assigned values and must page in order to validate the calibration of the balance. The assigned values, as well as the daily checks, for the working weights are recorded in the balance logbook for each balance.

Instrument Calibration

An instrument calibration is the relationship between the known concentrations of a set of calibration standards introduced into an analytical instrument and the measured response they produce. Calibration curve standards are a prepared series of aliquots at various known concentration levels from a parmary source reference standard. Specific mathematical types of calibration techniques are outlined in SW-846 8000B and/or 8000C. The entire initial calibration must be performed prior to sample analyses.

The lowest standard in the calibration curve must be at or below the required reporting limit.

Refer to the current SOP to determine the minimum requirement for calibration points.

Most compounds tend to be linear and a linear approach should be favored when linearity is suggested by the calibration data. Non-linear calibration should be considered only when a linear approach cannot be applied. It is not acceptable to use an alternate calibration procedure when a compound fails to perform in the usual manner. When this occurs, it is indicative of instrument issues or operator error.

If a non-linear calibration curve fit is employed, a minimum of six calibration levels must be used for second-order (quadratic) curves.

When more than 5 levels of standards are analyzed in anticipation of using second-order calibration curves, all calibration points MUST be used regardless of the calibration option employed. The highest or lowest calibration point may be excluded for the purpose of narrowing the calibration range and meeting the requirements for a specific calibration option. Otherwise, unjustified exclusion of calibration data is expressly forbidden.

Analytical methods vary in QC acceptance criteria. HEAL follows the method specific guidelines for QC acceptance. The specific acceptance criteria are outlined in the analytical methods and their corresponding SOPs.

pH Meter

The pH meter measures to a precision of 0.01 pH units. The pH calibration logbook contains the calibration before each use, or each day of use, if used more than once per day. It is calibrated using a minimum of 3 certified buffers. Also available with the pH meter is a magnetic stirrer with a temperature sensor. See the current pH SOP (SM4500 H+ B) for specific details regarding calibration of the pH probe.

Other Analytical Instrumentation and Equipment

The conductivity probe is calibrated as needed and checked daily when in use.

Eppendorf (or equivalent brands) pipettes are checked avimetrically prior to use.

Standards

All of the source reference standards used are ordered from a reliable commercial vendor. A Certificate of Analysis (CoA), which verifies the quality of the standard, accompanies the standards from the vendor. The Certificates of Analysis are dated and stored on file by the Technical Directors or their designee. These standards are traceable to the National Institute of Standards (NIST). When salts are purchased and used as standards the certificate of purity must be obtained from the vendor and filed with the CoAs.

All standard solutions, calibration curve preparations, and all other quality control solutions are labeled in a manner that can be traced back to the original source reference standard. All source reference standards are entered into the LIMS with an appropriate description of the standard. Dilutions of the source reference standard (or any mixes of the source standards) are fully tracked in the LIMS. Standards are labeled with the date opened for use and with an expiration date.

As part of the quality assurance procedures at HEAL, analysts strictly adhere to manufacturer recommendations for storage times/expiration dates and policies of analytical standards and quality control solutions.

Reagents

HEAL ensures that the reagents used are of acceptable quality for their intended purpose. This is accomplished by ordering high quality reagents and adhering to good laboratory practices so as to minimize contamination or chemical degradation. All reagents must meet any specifications noted in the analytical method. Refer to the current Purchase of Consumables SOP for details on how this is accomplished and documented.

Upon receipt, all reagents are assigned a separate ID number, and logged into the LIMS. All reagents shall be labeled with the date received into the laboratory and again with the date opened for use. Recommended shelf life, as defined by the manufacturer, shall be documented and controlled. Dilutions or solutions prepared shall be clearly labeled, dated, and initialed. These solutions are traceable back to their primary reagents and do not extend beyond the expiration date listed for the primary reagent.

All gases used with an instrument shall meet specifications of the manufacturer. All safety requirements that relate to maximum and/or minimum allowed pressure, fitting types, and leak test frequency, shall be followed. When a new tank of gas is placed in use, it shall be checked for leaks and the date put in use will be written in the instrument maintenance logbook.

HEAL continuously monitors the quality of the reagent water and provides the necessary indicators for maintenance of the purification systems in order to assure that the quality of laboratory reagent water meets established criteria or all analytical methods. The majority of HEAL methods utilize medium quality deionized reagent water maintained at a resistivity greater than $1M\Omega$ in accordance with SM1080.

Reagent blank samples are also analyzed to ensure that no contamination is present at detectable levels. The frequency of reagent blank analysis is typically the same as calibration verification samples. Refrigerator corage blanks are stored in the volatiles refrigerator for a period of one week and analyzed and replaced once a week.

8.0 Maintenance

Maintenance logbooks are kept for each major instrument and all support equipment in order to document all repair and maintenance. In the front of the logbook, the following information is included:

Unique Name of the Item or Equipment
Manufacturer
Type of Instrument
Model Number
Serial Number
Date Received and Date Placed into Service
Location of Instrument
Condition of Instrument Upon Receipt

For routine maintenance, the following information shall be included in the log:

Maintenance Date
Maintenance Description
Maintenance Performed by Initials

A manufacturer service agreement (or equivalent) covers most major instrumentation to assure prompt and reliable response to maintenant peeds beyond HEAL instrument operator capabilities.

Refer to the current Maintenance and Troubleshooting SOP for each section in the laboratory for further information.

9.0 Data Integrity

For HEAL's policy on ethics and data integrity, see section 3.0 of this document. Upon being hired, and annually thereafter, all employees at HEAL undergo documented data integrity training. All new employees sign an Ethics and Data Integrity Agreement, documenting their understanding of the high standards of integrity required at HEAL and outlining their responsibilities in regards to ethics and data integrity. See the current Document Control Logbook for a copy of this agreement.

In instances of ethical concern, analysts are required to report the known or suspected concern to their Technical Director, the Laboratory Manager, or the QA/QCO. This will be done in a confidential and receptive environment, allowing all employees to privately discuss ethical issues or report items of ethical concern.

Once reported and documented, the ethical concern will be immediately elevated to the Laboratory Manager and the need for an investigation, analyst remediation, or termination will be determined on a case-by-case basis.

All reported instances of ethical concern will be thoroughly descripented and handled in a manner sufficient to rectify any breaches in data integrity with an emphasis on preventing similar incidences from happening in the future.

10.0 Quality Control

Internal Quality Control Checks

HEAL utilizes various internal quality control checks, including duplicates, matrix spikes, matrix spike duplicates, method blanks, laboratory control spikes, laboratory control spike duplicates, surrogates, internal standards, calibration standards, quality control charts, proficiency tests and calculated measurement uncertainty.

Refer to the current method SOP to determine the frequency and requirements of all quality controls. In the event that the frequency of analysis is not indicated in the method specific SOP, duplicate samples, laboratory control spikes (LCS), Method Blanks (MB), and matrix spikes and matrix spike duplicates (MS/MSD) are analyzed for every batch of twenty samples.

When sample volume is limited on a test that requires an MS/MSD an LCSD shall be analyzed to demonstrate precision and accuracy and when possible a sample duplicate will be analyzed.

Duplicates are identical tests repeated for the same sample or matrix spike in order to determine the precision of the test method. A Relative Percent Difference (RPD) is calculated as a measure of this precision. Unless indicated in the SOP, the default acceptance limit is </= 20%.

Matrix Spikes and Matrix Spike Duplicates are spiked samples (MS/MSD) that are evaluated with a known added quantity of a target compound. This is to help determine the accuracy of the analyses and to determine the matrix effects on analyte recovery. A percent recovery is calculated to assess the quality of the accuracy. In the event that the acceptance criteria is not outlined in the SOP, a default limit of 70 130% will be utilized. When an MSD is employed an RPD is calculated and when not indicated in the SOP shall be acceptable at

In an effort to evaluate all received matricies, MS/MSD samples are chosen randomly. Notable exceptions to this policy are when a client requests the MS/MSD be analyzed utilizing their sample or in the event the matrix requires such a significant dilution that utilizing it as an MS/MSD is impractical.

When appropriate for the method, a Method Blank should be analyzed with each batch of samples processed to assess contamination levels in the laboratory. MBs consist of all the reagents measured and treated as they are with samples, except without the samples. This enables the laboratory to ensure clean reagents and procedures. Guidelines should be in place for accepting or rejecting data based on the level of contamination in the blank. In the event that these guidelines are not dictated by the SOP or in client specific work plans, the MB should be less than the MDL reported for the analyte being reported.

It is important to note that the LIMS qualifies samples for Method Blank failures when the amount in the blank is greater than the sample's listed PQL.

A Laboratory Control Spike and Laboratory Control Spike Duplicate (LCS/LCSD) are reagent blanks, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. It is generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system. Guidelines are outlined in each SOP for the frequency and pass fail requirements for LCS and LCSDs. These limits can be set utilizing control charts as discussed below.

Surrogates are utilized when dictated by method and are substances with properties that mimic the analytes of interest. The surrogate is an analyte that is unlikely to be found in environmental samples. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for surrogates.

Internal Standards are utilized when dictated by the method and are known amounts of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for Internal Standards.

Proficiency Test (PT) Samples are samples provided by an unbiased third party. They are typically analyzed twice a year, between five and seven months apart, or at any other interval as defined in the method SOP. They contain a pre-determined concentration of the target compound, which is unknown to HEAL. HEAL's hanagement and all analysts shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates and other procedures as used when analyzing routine samples. PT results are reported as normal samples, within the working range of the associated calibration curve. In the event at analyte concentration is less than the PQL, the result shall be reported as less than the PQL.

With regards to analyzing PT Samples HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seek accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall not attempt to obtain the assigned value of any PT sample from the PT Provider.

Upon receiving a Not Acceptable PT result for any analyte, a root cause analysis is conducted and the cause of the failure determined and corrected. As defined by TNI, two

out of the past three PTs must be acceptable to maintain accreditation for any given analyte. If this requirement is not met, a successful history will be reestablished by the analysis of an additional PT sample. For accredited tests, the PT provider will be notified, when the PT is for corrective action purposes. The analysis dates of successive PT samples for the same TNI accredited analyte shall be at least fifteen days apart.

Calibration standards are standards run to calibrate. Once the calibration is established the same standards can be analyzed as Continuing Calibration Verifications (CCV), used to confirm the consistency of the instrumentation. Calibration standards can be utilized at the beginning and end of each batch, or more frequently as required. Typically Continuing Calibration Blanks (CCB) are run in conjunction with CCVs. Refer to the current method SOP for frequency and pass/fail requirements of CCVs and CCBs.

Control Limits are limits of acceptable ranges of the values of quality control checks. The control limits approximate a 99% confidence interval around the mean recovery. Any matrix spike, surrogate, or LCS results outside of the control limits require further evaluation and assessment. This should begin with the comparison of the results from the samples or matrix spike with the LCS results. If the recoveries of the analytes in the LCS are outside of the control limits, then the problem may lie with the application of the extraction, with cleanup procedures, or with the chromatographic procedure. The problem has been identified and addressed, corrective action may include reanalysis of samples or reextraction followed by reanalysis. When the LCS results are within the control limits, the issue may be related to the sample matrix or to the use of an inappropriate extraction, cleanup, and/or determinative method for the matex. If the results are to be used for regulatory compliance monitoring, then steps must be taken to demonstrate that the analytes of concern can be determined in the sample matrix at the levels of interest. Data generated with laboratory control samples that fall outside of the established control limits are judged to be generated during an "out of-control" situation. These data are considered suspect and shall be repeated or reported with qualifiers.

Control limits are to be updated only by Technical Directors, Section Supervisors or the Quality Assurance Officer. Control limits should be established and updated according to the requirements of the method being utilized. When the method does not specify, and control limits are to be generated or updated for a test, the following guidelines shall be utilized.

Limits should typically be generated utilizing the most recent 20-40 data values. In order to obtain an even distribution across multiple instruments and to include more than a single day's worth of data, surrogate limits should be generated using around 100 data values. The data values used shall not reuse values that were included in the previous Control Limit update. The data values shall also be reviewed by the LIMS for any Grubbs Outliers, and if identified, the outliers must be removed prior to generating new limits. The results used to update control limits should meet all other QC criteria associated with the determinative method. For example, MS/MSD recoveries from a GC/MS procedure should be generated from samples analyzed after a valid tune and a valid initial calibration that includes all

analytes of interest. Additionally, no analyte should be reported when it is beyond the working range of the calibration currently in use. MS/MSD and surrogate limits should be generated using the same set of extraction, cleanup, and analysis procedures.

All generated limits should be evaluated for appropriateness. Where limits have been established for MS/MSD samples, the LCS/LCSD limits should fall within those limits, as the LCS/LCSD are prepared in a clean matrix. Surrogate limits should be updated using all sample types and should be evaluated to ensure that all instruments as well as a reasonable dispersion across days are represented by the data. LCS/LCSD recovery limits should be evaluated to verify that they are neither inappropriately wide nor unreasonably tight. The default LCS/LCSD acceptance limits of 70-130% and RPD of 20% (or those limits specified by the method for LCS/LCSD and/or CCV acceptability), should be used to help make this evaluation. Technical directors may choose to use warning limits when they feel their generated limits are too wide, or default LCS limits when they feel their limits have become arbitrarily tight.

Once new Control Limits have been established and updated in the LIMS, the Control Charts shall be printed and reviewed by the appropriate section supervisor and primary analyst performing the analysis for possible trends and compared to the previous Control Charts. The technical director initials the control charts, including that they have been reviewed and that the updated Limits have been determined to be accurate and appropriate. Any manual alterations to the limits will be documented and justified on the printed control chart. These initialed charts are then filed in the QA/QCO office.

Once established, control limits should be reviewed after every 20-30 data values and updated at least every six months, provided that there are sufficient points to do so. The limits used to evaluate results shall be those in place at the time that the sample was analyzed. Once limits are updated, those limits apply to all subsequent analyses.

When updating surrogate control limits, all that regardless of sample/QC type, shall be updated together and assigned one set of limits for the same method/matrix.

In the event that there are insufficient data points to update limits that are over a year old, the default limits, as established in the method or SOP, shall be re-instated. Refer to the requirements in SW-846 method 3000B and 8000C for further guidance on generating control limits.

Calculated Measurement Uncertainty is calculated annually using LCSs in order to determine the laboratory specific uncertainty associated with each test method. These uncertainty values are available to our clients upon request and are utilized as a trending tool internally to determine the effectiveness of new variables introduced into the procedure over time.

Client Requested QC

Occasionally certain clients will require QC that is not defined by or covered in the SOPs. These special requests will be issued to all analysts and data reviewers in writing and the analysts and data reviewers will be provided with guidance on how to properly document the client requested deviation/QC in their preparation and analytical batches.

Precision, Accuracy, Detection Levels

Precision

The laboratory uses sample duplicates, laboratory control spike duplicates, and matrix spike duplicates to assess precision in terms of relative percent difference (RPD). HEAL requires the RPD to fall within the 99% confidence interval of established control charts or an RPD of less than 20% if control charts are not available. RPD's greater than these limits are considered out-of-control and require an appropriate response.

RPD = 2 x (Sample Result – Duplicate Result) X 100 4
(Sample Result + Duplicate Result)

Accuracy

The accuracy of an analysis refers to the difference between the calculated value and the actual value of a measurement. The accuracy of a laboratory result is evaluated by comparing the measured arount of QC reference material recovered from a sample and the known amount added. Control limits can be established for each analytical method and sample patrix. Recoveries are assessed to determine the method efficiency and/or the matrix effect.

Analytical accuracy is expressed as the Percent Recovery (%R) of an analyte or parameter. A known amount of analyte is added to an environmental sample before the sample is prepared and subsequently analyzed. The equation used to calculate percent recovery is:

%Recovery = {(concentration* recovered)/(concentration* added)} X 100

HEAL requires that the Percent Recovery to fall within the 99 % confidence interval of established control limits. A value that falls outside of the confidence interval requires a warning and process evaluation. The confidence intervals are calculated by determining the mean and sample standard deviation. If control limits are not available, the range of 80 to 120% is used unless the specific method dictates

^{*}or amount

otherwise. Percent Recoveries outside of this range mandate additional action such as analyses by Method of Standard Additions, additional sample preparation(s) where applicable, method changes, and out-of-control action or data qualification.

Detection Limit

Current practices at HEAL define the Detection Limit (DL) as the smallest amount that can be detected above the baseline noise in a procedure within a stated confidence level.

HEAL presently utilizes an Instrument Detection Limit (IDL), a Method Detection Limit (MDL), and a Practical Quantitation Limit (PQL). The relationship between these levels is approximately

IDL: MDL: PQL = 1:5:5.

The IDL is a measure of the sensitivity of an analytical instrument. The IDL is the amount which, when injected, produces a detectable signal in 99% of the analyses at that concentration. An IDL can be considered the minimum level of analyte concentration that is detectable above random baseline noise.

The MDL is a measure of the sensitivity of an analytical method. MDL studies are required annually for each quality system matrix, technology and analyte, unless indicated otherwise in the referenced method. An MDL determination (as required in 40CFR part 136 Appendix B) consists of replicate spiked samples carried through all necessary preparation steps. The spike concentration is three times the standard deviation of three replicates of spikes. At least seven replicates are spiked and analyzed and their standard deviation (s) salculated. Routine variability is critical in passing the 10 times rule and is best achieved by running the MDLs over different days and when possible over several caloration events. Standard Methods and those methods used for drinking water analysis must have MDL studies that are performed over a period of at least three days in order to include day to day variations. The method detection limit (MDL) can be calculated using the standard deviation according to the formula

$$MDL = s * t (99\%),$$

where t (99%) is the Student's t-value for the 99% confidence interval. The t-value depends on the number of trials used in calculating the sample standard deviation, so choose the appropriate value according to the number of trials.

Number of Trials	t(99%)
6	3.36
7	3.14
8	3.00
9	2.90

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The calculated MDL must not be less than 10 times the spiked amount or the study must be performed again with a lower concentration.

Where there are multiple MDL values for the same test method in the LIMS the highest MDL value is utilized.

The PQL is significant because different laboratories can produce different MDLs although they may employ the same analytical procedures, instruments and sample matrices. The PQL is about two to five times the MDL and represents a practical, and routinely achievable, reporting level with a good certainty that the reported value is reliable. It is often determined by regulatory limits. The reported PQL for a sample is dependent on the dilution factor utilized during sample analysis.

In the event that an analyte will not be reported less than the PQL, an MDL study is not required and a PQL check shall be done, at least annually, in place of the MDL study. The PQL check shall consist of a QC sample spiked at or below the PQL. All sample-processing and analysis steps of the analytical method shall be included in the PQL check and shall be done for each quality system matrix, technology, and analyte. A successful check is one where the recovery of each analyte is within the established method acceptance criteria. When this criterion is not defined by the method or SOP, a default limit of +/-50% shall be utilized.

Quality Control Parameter Calculations

Mean

The sample mean is also known as the atthmetic average. It can be calculated by adding all of the appropriate values together, and dividing this sum by the number of values.

Average = $(\Sigma x_l) / n$

 x_l = the value x in the l^{th} trial n = the number of trials

Standard Deviation

The sample standard deviation, represented by s, is a measure of dispersion. The dispersion is considered to be the difference between the average and each of the

values x_i . The variance, s^2 , can be calculated by summing the squares of the differences and dividing by the number of differences. The sample standard deviation, s, can be found by taking the square root of the variance.

Standard deviation = s =
$$\left[\sum (x_1 - average)^2 / (n-1)\right]^{\frac{1}{2}}$$

Percent Recovery (LCS and LCSD)

Percent Recovery = (Spike Sample Result) X100 (Spike Added)

Percent Recovery (MS, MSD)

Percent Recovery = (Spike Sample Result – Sample Result) X100 (Spike Added)

Control Limits

Control Limits are calculated by the LIMS using the average percent recovery (x), and the standard deviation (s).

Upper Control Limit = x + 3sLower Control Limit = x - 3s

These control limits approximate a 95% confidence interval around the mean recovery.

Grubbs Outliers

Grubbs Outliers are calculated by the LIMS during the generation of control limits and uncertainties. An outlier is an observation that appears to deviate markedly from other observations in the sample set and are removed, unless documented otherwise.

Identify both the lowest and highest values in the sample set. Use the following equations to determine the T values.

$$T = \frac{x_{\text{max}} - x_{\text{mean}}}{\text{cfor the largest value}}$$

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$$T = \frac{x_{mean} - x_{min}}{sd}$$
 (for the smallest value)

Compare the T values to the Grubbs' critical value table. If either value of T is greater than the critical value (assuming a 5% risk) for the sample size, the point(s) must be dropped then the calculation repeated for both the lowest and highest value using the new mean and standard deviation.

The Grubbs test is repeated until there are no longer any outliers detected. Keep in mind you must have at least 20 data points available to generate your limits.

RPD (Relative Percent Difference)

Analytical precision is expressed as a percentage of the difference between the results of duplicate samples for a given analyst. Relative percent difference (RPD) is calculated as follows:

RPD = 2 x (Sample Result – Duplicate Result) X 100 (Sample Result + Duplicate Result)

Uncertainty Measurements

Uncertainty, as defined by ISO, is the parameter associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurement. Ultimately, uncertainty measurements are used to state how good a test result is and a allow the end user of the data to properly interpret their reported data. All procedures allow for some uncertainty. For most analyses, the components and estimates of uncertainty are reduced by following well-established test methods. To further reduce uncertainty, results generally are not reported below the lowest calibration point (PQL) or above the highest calibration point (UQL). Understanding that there are many influential quantities affecting a measurement result, so many in fact that it is impossible to identify all of them, HEAL calculates measurement uncertainty at least annually using LCSs. These estimations of measurement uncertainty are kept on file in the method folders in the QA/QC office.

Measurement Uncertainty contributors are those that may be determined statistically. These shall be generated by estimating the overall uncertainty in the entire analytical process by measuring the dispersion of values obtained from laboratory control samples over time. At least 20 of the most recent LCS data points are gathered. The standard deviation(s) is calculated using these LCS data points. Since it can be

assumed that the possible estimated values of the spikes are approximately normally distributed with approximate standard deviation(s), the unknown value of the spike is believed to lie in 95% confidence interval, corresponding to an uncertainty range of +/- 2(s).

Calculate standard deviation (s) and 95% confidence interval according to the following formulae:

$$s = \sqrt{\frac{\sum (x - \overline{x})^2}{(n-1)}}$$

Where: s = standard deviation x = number in series $\overline{x} = calculated$ mean of series n = number of samples taken

95% confidence = $2 \times s$

Example: Assuming that after gathering 20 of the most recent LCS and for Bromide, we have calculated the standard deviations of the values and achieved a result of 0.0326, our measurement of uncertainty for Bromide (at 95% confidence = $2 \times s$) is 0.0652.

Total Nitrogen

Total nitrogen is calculated as follows:

Total Nitrogen = TKN + NO₂ + NO₃

Langelier Saturation Index

The Langelier Saturation Index (USI) is calculated as follows:

Solids Factor (SF) =(Log10[TDS] - 1) / 10 Ca Hardness Factor (HF) = Log10([Ca] x 2.497) - 0.4 Alkalinity Factor (AF) = Log10[Alkalinity] Temp. Factor (TF) = -13.12 x Log10($^{\circ}$ C + 273) + 34.55 pHs (pH @ saturation) =(9.3 + SF + TF) - (HF + AF) LSI = pH - pH_s

Calibration Calculations

1. Response Factor or Calibration Factor:

$$RF = ((A_x)(C_{is}))/((A_{is})(C_x))$$

$$CF=(A_x)/(C_x)$$

a. Average RF or CF

$$RF_{AVE} = \sum RF_i / n$$

b. Standard Deviation

s = SQRT {
$$[\Sigma (RF_i - RF_{AVE})^2] / (n-1)$$
 }

c. Relative Standard Deviation

Where:

A_x = Area of the compound

 C_x = Concentration of the compound

Ais = Area of the internal standard

Cis = Concentration of the internal standard

n = number of pairs of data

RF_i = Response Factor (or other determined value)

RF_{AVE} = Average of all the response factors

 Σ = the sum of all the individual values

2. Linear Regression



a. Slope (m)

$$\mathbf{m} = (\mathbf{n} \Sigma \mathbf{x}_i \mathbf{y}_i - (\mathbf{n} \Sigma \mathbf{x}_i)^* (\mathbf{n} \Sigma \mathbf{y}_i)) / (\mathbf{n} \Sigma \mathbf{x}_i^2 - (\Sigma \mathbf{x}_i)^2)$$

b. Intercept (b)

$$b = y_{AVE} - m^*(x_{AVE})$$

c. Correlation Coefficient (cc)

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$$\begin{array}{l} \text{CC (r) = } \{ \ \Sigma((x_i \!\!-\! x_{ave})^*(y_i \!\!-\! y_{ave})) \ \} \ / \ \{ \ \text{SQRT}((\Sigma(x_i \!\!-\! x_{ave})^2)^*(\Sigma(y_i \!\!-\! y_{ave})^2)) \ \} \\ \text{Or} \\ \text{CC (r) = } [(\Sigma w \ ^* \Sigma wxy) - (\Sigma wx \ ^* \Sigma wy)] \ / \ (\text{sqrt}(\ (\ [(\Sigma w \ ^* \Sigma wx^2) - (\Sigma wx \ ^* \Sigma wx)] \ ^* \ [(\Sigma w \ ^* \Sigma wy^2) - (\Sigma wy \ ^* \Sigma wy)])))] \\ \end{array}$$

d. Coefficient of Determination

$$COD(r^2) = CC*CC$$

Where:

y = Response (Area) Ratio A_x/A_{is}

 $x = Concentration Ratio C_x/C_{is}$

m = slope

b = intercept

n = number of replicate x,y pairs

 x_i = individual values for independent variable

y_i = individual values for dependent variable

 Σ = the sum of all the individual values

 x_{ave} = average of the x values

 y_{ave} = average of the y values

w = weighting factor, for equal weighting w=1



3. Quadratic Regression

$$y = ax^2 + bx + c$$

a. Coefficient of Determination

COD (r²) =
$$(\Sigma(y_i - y_{ave})^2 - \{[(n-1)/(n-p)] * [\Sigma(y_i - Y_i)^2]\}) / \Sigma(y_i - y_{ave})^2$$

Where:

y = Response (Area) Ratio A_x/A_{is}

 $x = Concentration Ratio C_x/C_{is}$

 $a = x^2$ coefficient

b = x coefficient

c = intercept

y_i = individual values for each dependent variable

 x_i = individual values for each independent variable

 y_{ave} = average of the y values

n = number of pairs of data

p = number of parameters in the polynomial equation (I.e., 3 for third order, 2 for second order)

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$$Yi = ((2*a*(C_x/C_{is})^2)-b^2+b+(4*a*c))/(4a)$$

b. Coefficients (a,b,c) of a Quadratic Regression

$$a = S_{(x2y)}S_{(xx)} - S_{(xy)}S_{(xx2)} / S_{(xx)}S_{(x2x2)} - [S_{(xx2)}]^2$$

$$b = S_{(xy)}S_{(x2x2)} - S_{(x2y)}S_{(xx2)} / S_{(xx)}S_{(x2x2)} - [S_{(xx2)}]^{2}$$

$$c = [(\Sigma yw)/n] - b^*[(\Sigma xw)/n] - a^*[\Sigma(x^2w)/n]$$

Where:

n = number of replicate x,y pairs

x = x values

y = y values

 $w = S^{-2} / (\Sigma S^{-2}/n)$

 $S_{(xx)} = (\Sigma x^2 w) - [(\Sigma x w)^2 / n]$

 $S_{(xy)} = (\Sigma xyw) - [(\Sigma xw)^*(\Sigma yw) / n]$

 $S_{(xx2)} = (\Sigma x^3 w) - [(\Sigma x w)^* (\Sigma x^2 w) / n]$

 $S_{(x2y)} = (\Sigma x^2 yw) - [(\Sigma x^2 w)^*(\Sigma yw) / n]$

 $S_{(x2x2)} = (\Sigma x^4 w) - [(\Sigma x^2 w)^2 / n]$

Or If unweighted calibration, w=1

 $S(xx) = (Sx^2) - [(Sx)^2 / n]$

S(xy) = (Sxy) - [(Sx)*(Sy) / n]

S(xx2) = (Sx3) - [(Sx)*(Sx2) / n]

S(x2y) = (Sx2y) - [(Sx2)*(Sy) / n]

S(x2x2) = (Sx4) - [(Sx2)2 / n]

Weighting

Weighting of 1/x or $1/x^2$ is permissible for linear calibrations. Weighting shall not be employed for quadratic calibrations. When weighting, use the above equations by substituting x for 1/x or 1/x.

Concentration Calculations

On-Column Concentration for Average RRF Calibration using Internal Standard

On-Column Concentration $C_x = ((A_x)(C_{is}))/((A_{is})(RF_{AVE}))$

On-Column Concentration for Average CF Calibration using External Standard

On-Column Concentration $C_x = (A_x)/(CF_{AVF})$

On-Column Concentration for Linear Calibration

Page 48 of 59 Quality Assurance Plan 9.9 Effective August 13th, 2014 If determining an external standard, then exclude the A_{is} and C_{is} for internal standards On-Column Concentration $C_x = ((Absolute\{[(A_x)/(A_{is})] - b\})/m) * C_{is}$

Where: m = slope

b = intercept

 $A_x = Area of the Sample$

C_{is} = Concentration of the Internal Standard

A_{is} = Area of the Internal Standard

On-Column Concentration for Quadratic Calibration

If determining an external standard, then exclude the Ais and Cis for internal standards On-Column Concentration = $[(+SQRT(b^2-(4*a*(c-y)))-b)/(2*a)] * C_{is}$

Where: $a = x^2$ coefficient

b = x coefficient

c = intercept

 $y = Area Ratio = A_x/A_{is}$

C_{is} = Concentration of the Internal Standard

Final Concentration (Wet Weight)

Concentration for Extracted Samples = (On-Column Conc)(Diletion)(Final Volume) (Initial Amount)(Injection Volume)

Concentration for Purged Samples = (On-Column Conc)(Funger Amount)(Dilution)

(Purged Amount)

Dry Weight Concentration

Dry Weight Concentration = Final Concentration Wet Veight *100 % Solids

Percent Difference

% Difference= Absolute(Continuing Calibration RRF - Average RRF) * 100 rage R

Percent Drift

% Drift= Absolute(Calculated Concentration - Theoretical Concentration) Theoretical Concentration

Dilution Factor

Dilution Factor =(Volume of Solvent + Solute) / Volume of Solute

Relative Retention Time

RRT =RT of Compound / RT of ISTD

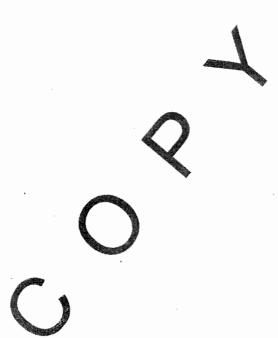
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Breakdown Percent

Breakdown = <u>Area of DDD + Area of DDE</u> Average (DDT, DDE and DDD)

-or-

<u>Area of Endrin Ketone + Area of Endrin Aldehyde</u> Average (Endrin, Endrin Ketone, Endrin Aldehyde)



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11.0 Data Reduction, Validation, Reporting, and Record Keeping

All data reported must be of the highest possible accuracy and quality. During the processes of data reduction, validation, and report generation, all work is thoroughly checked to insure that error is minimized.

Data Reduction

The analyst who generated the data usually performs the data reduction. The calculations include evaluation of surrogate recoveries (where applicable), and other miscellaneous calculations related to the sample quantitation.

If the results are computer generated, then the formulas must be confirmed by hand calculations, at minimum, one per batch.

See the current Data Validation SOP for details regarding data reduction.

Validation

A senior analyst, most often the section supervisor, validates the data. All data undergoes peer review. If an error is detected, it is brought to the analyst's attention so that he or she can rectify the error, and perform further checks to ensure that all data for that batch is sound. Previous and/or common mistakes are stangently monitored throughout the validation process. Data is reported using appropriate significant figure criteria. In most cases, two significant digits are utilized, but three significant digits can be used in QC calculations. Significant digits are not bundled until after the last step of a sample calculation. All final reports undergo a review by the laboratory manager, the project manager, or their designee, to provide a located review of all results before they are released to the client.

If data is to be manually transferred between media, the transcribed data is checked by a peer. This includes data typing complete data entry, chromatographic data transfer, data table inclusion to a cover letter, of when data results are combined with other data fields.

All hand-written data from run logs, analytical standard logbooks, hand-entered data logbooks, or on instrument-generated chromatograms, are systematically archived should the need for future retrieval arise.

See the current Data Validation SOP for details regarding data validation.

Reports and Records

All records at HEAL are retained and maintained through the procedures outlined in the most recent version of the Records Control SOP.

Sample reports are compiled by the Laboratory Information Management System (LIMS). Most data is transferred directly from the instruments to the LIMS. After being processed by the analyst and reviewed by a data reviewer, final reports are approved and signed by the senior laboratory management. A comparative analysis of the data is performed at this point. For example, if TKN and NH3 are analyzed on the same sample, the NH3 result should never be greater than the TKN result. Lab results and reports are released only to appropriately designated individuals. Release of the data can be by fax, email, electronic deliverables, or mailed hard copy.

When a project is completed, the final report, chain of custody, any relevant supporting data, and the quality assurance/control worksheets are scanned as a .pdf file onto the main server. Original client folders are kept on file and are arranged by project number. Additionally, all electronic data is backed up routinely on the IEAL main server. The backup includes raw data, chromatograms, and report documents. Hard copies of chromatograms are stored separately according to the instrument and the analysis date. All records and analytical data reports are retained in a secure location as permanent records for a minimum period of five years (unless specified otherwise in a client contract). Access to archived information shall be documental with an access log. Access to archived electronic reports and data will be password protected. In the event that HEAL transfers ownership or terminates business practices, complete records will be maintained or transferred according to the client's instructions.

After issuance, the original report shall rehain anchanged. If a correction to the report is necessary, then an additional document shall be issued. This document shall have a title of "Addendum to Test Report or Correction to Original Report", or equivalent. Demonstration of original report integrity comes in two forms. First, the report date is included on each page of the final report. Second, each page is numbered in sequential order, making the addition or omission of any data page(s) readily detectable.

12.0 Corrective Action

Refer to the most recent version of the Data Validation SOP for the procedure utilized in filling out a Corrective Action Report. A blank copy of the corrective action report is available in the current Document Control Logbook.

The limits that have been defined for data acceptability also form the basis for corrective action initiation. Initiation of corrective action occurs when the data generated from continuing calibration standard, sample surrogate recovery, laboratory control spike, matrix spike, or sample duplicates exceed acceptance criteria. If corrective action is necessary, the analyst or the section supervisor will coordinate to take the following guidelines into consideration in order to determine and correct the measurement system deficiency:

Check all calculations and data measurements systems (Calibrations, reagents, instrument performance checks, etc.).

Assure that proper procedures were followed.

Unforeseen problems that arise during sample preparation and/or sample analysis that lead to treating a sample differently from documented procedures shall be documented with a corrective action report. The section supervisor and laboratory manager shall be made aware of the problem at the time of the occurrence. See the appropriate SOP regarding departures from documented procedures.

Continuing calibration standards below acceptance orieria cannot be used for reporting analytical data unless method specific criteria states otherwise.

Continuing calibration standards above acceptance criteria can be used to report data as long as the failure is isolated to a single standard and the corresponding samples are non-detect for the failing analyte.

Samples with non-compliant surrogate recoveries should be reanalyzed, unless deemed unnecessary by the supervisor for matrix, historical data, or other analysis-related anomalies.

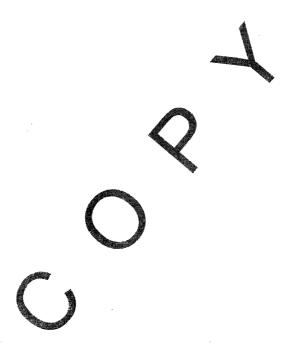
Laboratory and Matrix Spike acceptance criteria vary significantly depending on method and matrix. Analysts and supervisors meet and discuss appropriate corrective action measures as spike failures occur.

In the event that results must be reported with associated QC failures, the data must be qualified appropriately to notify the end user of the QC failure.

Sample duplicates with RPD values outside control limits require supervisor evaluation and possible reanalysis.

A second mechanism for initiation of corrective action is that resulting from Quality Assurance performance audits, system audits, inter- and intra-laboratory comparison studies. Corrective Actions initiated through this mechanism will be monitored and coordinated by the laboratory QA/QCO.

All corrective action forms are entered in the LIMS and included with the raw data for peer review, signed by the technical director of the section and included in the case narrative to the client whose samples were affected. All Corrective action forms in the LIMS are reviewed by the QA/QCO.



13.0 Quality Assurance Audits, Reports and Complaints

Internal/External Systems' Audits, Performance Evaluations, and Complaints

Several procedures are used to assess the effectiveness of the quality control system. One of these methods includes internal performance evaluations, which are conducted by the use of control samples, replicate measurements, and control charts. External performance audits, which are conducted by the use of inter-laboratory checks, such as participation in laboratory evaluation programs and performance evaluation samples available from a NELAC-accredited Proficiency Standard Vendor, are another method.

Proficiency samples will be obtained twice per year from an appropriate vendor for all tests and matrices for which we are accredited and for which PTs are available. HEAL participates in soil, waste water, drinking water, and underground storage tank PT studies. Copies of results are available upon request. HEAL's management and all analysts shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities, and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates, and other procedures as used when analyzing routine samples.

With regards to analyzing PT Samples, HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seek accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall not attempt to obtain the assigned value of any PT sample from the PT Provider.

Internal Audits are performed annually by the QA/QCO in accordance with the current Internal Audit SOP. The system audit consists of a qualitative inspection of the QA system in the laboratory and an assessment of the adequacy of the physical facilities for sampling, calibration, and measurement. This audit includes a careful evaluation and review of laboratory quality control procedures. Internal audits are performed using the guidelines outlined below, which include, but are not limited to:

- Review of staff qualifications, demonstration of capability, and personnel training programs
- 2. Storage and handling of reagents, standards, and samples
- 3. Standard preparation logbook and LIMS procedures
- 4. Extraction logbooks
- 5. Raw data logbooks
- 6. Analytical logbooks or batch printouts and instrument maintenance logbooks

- 7. Data review procedures
- 8. Corrective action procedures
- Review of data packages, which is performed regularly by the lab manager/QA Officer.

The QA/QCO will conduct these audits on an annual basis.

Management Reviews

HEAL management shall periodically, and at least annually, conduct a review of the laboratory's quality system and environmental testing activities to ensure their continuing suitability and effectiveness, and to introduce necessary changes or improvements. The review shall take account of:

- 1. the suitability and implementation of policies and procedures
- 2. reports from managerial and supervisory personnel
- 3. the outcome of recent internal audits
- 4. corrective and preventive actions
- 5. assessments by external bodies
- 6. the results of inter-laboratory comparisons or proficiency tests
- 7. changes in volume and type of work
- 8. client feed back
- 9. complaints
- 10. other relevant factors, such as laboratory health and safety, QC activities, resources, and staff training.

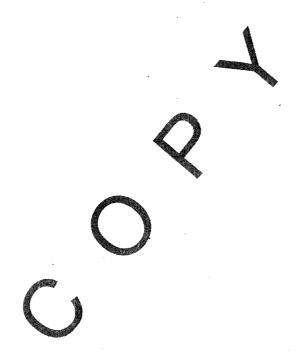
Findings from management reviews and the actions that arise from them shall be recorded and any corrective actions that arise shall be completed in an appropriate and agreed upon timescale.

Complaints

Complaints from clients are documented and given to the laboratory manager. The lab manager shall review the information and contact the client. If doubt is raised concerning the laboratory's policies or procedures, then an audit of the section or sections may be performed. All records of complaints and subsequent actions shall be maintained in the client compliant logbook for five years unless otherwise stated.

Internal and External Reports

The QA/QCO is responsible for preparation and submission of quality assurance reports to the appropriate management personnel as problems and issues arise. These reports include the assessment of measurement systems, data precision and accuracy, and the results of performance and system audits. Additionally, they include significant QA problems, corrective actions, and recommended resolution measures. Reports of these Quality Assurance Audits describe the particular activities audited, procedures utilized in the examination and evaluation of laboratory records, and data validation procedures. Finally, there are procedures for evaluating the performance of Quality Control and Quality Assurance activities, and laboratory deficiencies and the implementation of corrective actions with the review requirements.



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January 16, 2015

Carl Chavez New Mexico Oil Conservation Division Environmental Bureau 1220 South St. Francis Dr Santa Fe, NM 87505

UPS Tracking #: 12 801 839 03 6418 9271

RE: Western Refining Southwest, Inc. - Bloomfield Terminal 2014 Annual Class I Well Report Non-Hazardous Injection Well Permit # - UIC-CL-009 API # - 30- 45-29002

Mr. Chavez,

Western Refining Southwest, Inc. – Bloomfield Terminal ("Western") is submitting the 2014 Annual Class I Well Report documenting the operations of the facility's Class I non-hazardous injection well during 2014. The well is located in the NE/4, SE/4 of Section 27, Township 29 North, Range 11West, NMPM, San Juan County, New Mexico and is operated by Western Refining Southwest, Inc.

If you need more information, please contact me at (505) 632-8013.

For Weave

Ron Weaver

Regional Terminals Manager Western Refining Southwest, Inc.

Cc: Brandon Powell (NMOCD Aztec District Office) Randy Schmaltz (WNR – Bloomfield) Allen Hains – Western Refining (WNR - El Paso)

ANNUAL CLASS I WELL REPORT

Waste Disposal Well #1 January – December 2014



Western Refining Southwest, Inc.
Bloomfield Terminal
Bloomfield, New Mexico
Permit # - UIC-CL1-009
API # - 30-45-29002

Submitted January 16, 2015



January 16, 2015

Carl Chavez
New Mexico Oil Conservation Division
Environmental Bureau
1220 South St. Francis Dr
Santa Fe, NM 87505

UPS Tracking #: 12 881 839 03 6418 9271

RE: Western Refining Southwest, Inc. - Bloomfield Terminal 2014 Annual Class I Well Report
Non-Hazardous Injection Well
Permit # - UIC-CL-009
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If you need more information, please contact me at (505) 632-8013.

Sincerely,

Ron Weaver

Regional Terminals Manager Western Refining Southwest, Inc.

Cc: Brandon Powell (NMOCD Aztec District Office) Randy Schmaltz (WNR – Bloomfield) Allen Hains – Western Refining (WNR - El Paso)

Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Ron Weaver

Regional Terminals Manager

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EXECUTIVE SUMMARY

This report provides a summary of activities conducted in 2014 on Waste Disposal Well #1 (WDW-#1) at the Western Refining Bloomfield ("Western") facility. The following is a summary of well operations and well testing activities performed in 2014.

Operational Summary

Injection Volume - The volume injected into the disposal well during 2014 was 10,090,472 gallons. Western suspended refining operations at the Bloomfield Refinery on November 23, 2009. The facility currently operates as a Bulk Terminal. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation.

Sampling and Chemical Analyses - Injection fluids samples were collected on a quarterly basis for chemical analysis, with the following exception. A quarterly sample was not collected during the second quarter of 2014 due to the fact that the injection well was not in operation from March through June 2014. Quarterly samples were collected during the 1st, 3rd, and 4th quarters of 2014. Analytical results did not exhibit characteristics of being a hazardous waste.

Maintenance Operations - No down-hole maintenance activities were conducted in 2014. However, the above-ground valve tree was replaced in July 2014. New Mexico Oil Conservation Division (NMOCD) was notified and a representative observed the field work performed. The field work included temporarily installing a bridge plug down-hole at approximately 3,221 feet below grade surface in order to depressive the injection well above ground piping. The bridge plug was removed the same day.

Mechanical Integrity Tests - The 2014 well testing program was witnessed by a representative of the New Mexico Oil Conservation Division (NMOCD) and included a High-Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test. Results of these tests prove that the operational integrity of the well is sound.

Area of Review (AOR) - No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

Recommendations

Western will continue the routine monitoring, maintenance, and testing programs which include quarterly chemical analysis of injection fluids, mechanical integrity testing, and Bradenhead testing. Western will continue to utilize the maximum operating injection pressure at the wellhead as permitted by Discharge Permit GW-130.

1.0 INTRODUCTION

This report provides a summary of activities conducted during 2014 on Waste Disposal Well #1 (WDW #1). The disposal well is part of the Western Bloomfield Terminal facility operations. The facility is located south of Bloomfield, New Mexico in San Juan County. The well location is depicted in Figure 1. The physical address of the facility is as follows:

Bloomfield Terminal

#50 County Road 4990 Bloomfield, NM 87413

The Bloomfield Terminal is located on approximately 263 acres. Bordering the facility is a combination of federal and private properties. Public property managed by the Bureau of Land Management lies to the south. The majority of undeveloped land in the vicinity of the facility is used extensively for oil and gas production and, in some instances, grazing, U.S. Highway 550 is located approximately one-half mile west of the facility. The topography of the main portion of the site is generally flat with steep bluffs to the north.

WDW #1 is owned by San Juan Refining Company, a New Mexico corporation. It is operated by Western Refining Southwest, Inc. formerly known as Giant Industries Arizona, Inc. an Arizona corporation.

Well Information 1.1

Well Name & Number:

OCD UIC:

OCD Discharge Plan Permit Number:

Well Classification:

API Number:

Legal Location:

Physical Address:

Waste Disposal Well #1

UIC-CL1-009

GW-130

Class I Non-hazardous

30-045-29002

1250 FEL, 2442FSL, I Sec 27 T298 R11P #50 Road 4990, Bloomfield, NM 87413

2.0 SUMMARY OF ACTIVITIES

The following list of activities was conducted in 2014 on WDW #1 located at the Bloomfield facility:

•	01/23/14	1st Quarter 2014 Sampling Event
•	07/14/14	Replaced Valves on Injection Well
•	07/28/14	3rd Quarter 2014 Sampling Event
•	09/18/14	Bradenhead Test
•	09/18/14	High-Pressure Shut-Down Test
•	09/18/14	Mechanical Integrity Test
•	10/02/14	4th Quarter 2014 Sampling Event

An analytical sample was not collected during the second quarter of 2014 due to the fact that the injection well was not operational for the quarter. Quarterly samples collected for laboratory analysis were submitted to Hall Environmental Laboratories located in Albuquerque, New Mexico. Copies of the analytical reports are provided in Appendix B. A summary of the analytical results is provided in Table 3.

The valve tree assembly located at the top of the injection well was replaced as a routine maintenance activity. NMOCD was contacted and an associated C-103 Sundry Report was submitted to document the event. A representative of the NMOCD was on-site to witness the field activities. Replacement of the above-ground valves required that the injection well be temporarily plugged using an appropriately sized bridge plug. The plug was place at approximately 3,221 feet below ground surface. The bridge plug was removed the same-day once the replacement valve assembly was installed. Copies of the respective C-103 Reports and corresponding correspondence between Western and NMOCD is provided in Appendix A.

A representative of New Mexico Oil Conservation Division (NMOCD) was on-site to witness the Bradenhead Test, High-Pressure Shut-Down Test, and Mechanical Integrity Test on September 18, 2014. A copy of the test reports is provided in Appendix A.

The Annual Pressure Fall-Off Test was not conducted in 2014. In an e-mail to Western from NMOCD dated August 2, 2012, it states that Fall-Off Test frequency requirements

are being evaluated by NMOCD and operators will be notified by NMOCD when a Fall-Off Test is required. Western did not receive notification from NMOCD that a Fall-Off Test was required for 2014.

3.0 INJECTION VOLUME

The Monthly Injection Well Report summarizing injection volumes and well performance parameters is presented as Table 1.

3.1 Injection Volume

The volume injected into the disposal well during 2014 was 10,090,472 gallons. Throughout 2014 the injection well operated within the operational limits of less than 1,150 psi.

3.2 Injection Well Down-Time

The injection well was down approximately 5,010 hours in 2014. Decreased volume of facility produced water during 2014 resulted in extended periods in which the injection well was not operational. General maintenance activities on the injection well equipment up-stream of the injection well also contributed to the injection well down-time during 2014.

4.0 SAMPLING AND CHEMICAL ANALYSIS

Samples were collected of the injection water on a quarterly basis and analyzed for the following per Item #9 of the Bloomfield Refinery Class I (Non-Hazardous) Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal dated March 23, 2004:

- Volatile Organic Compounds (VOCs);
- Semi-Volatile Organic Compounds (SVOCs);
- General Chemistry Parameters (included calcium, potassium, magnesium, sodium, bicarbonate, carbonate, chloride, sulfate, total dissolved solids, pH, and conductivity);
- RCRA 8 Metals; and
- RCRA Characteristics for Ignitability, Corrosivity, and Reactivity.

Second quarter samples were not collected due to the well not being operational during that time. First quarter samples were collected January 23, 2014. Third quarter samples were collected July 28, 2014. Fourth quarter samples were collected October 1, 2014. A summary of the analytical results is provided in Table 3.

All quarterly samples collected for laboratory analysis were submitted to Hall Environmental Analysis Laboratory located in Albuquerque, NM. The analytical results conclude that the injected water did not exhibit characteristics of hazardous waste. The respective quarterly analytical reports and Laboratory Quality Assurance Plan are provided in Appendices B and C, respectively.

5.0 TESTING AND MAINTENANCE ACTIVITIES

In addition to the conducting general preventative maintenance activities on the injection well equipment, the following testing and well maintenance activities were conducted during 2014:

- Mechanical Integrity Testing (including high-pressure shutdown and Bradenhead Testing).
- Valve Tree Replacement

All activities were conducted following NMOCD approval, and such documentation is provided in Appendix A. The following is a brief summary of the testing and well maintenance activities conducted in 2014.

5.1 Mechanical Integrity Testing

A representative of New Mexico Oil Conservation Division (NMOCD) was on-site to witness a High Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test (MIT) on September 18, 2014. All tests were witnessed by Monica Kuehling of NMOCD-Aztec. The MIT held at 638 psi for 30 minutes, therefore confirming the integrity of the well. A copy of the Test Reports is provided in Appendix A.

5.2 Valve Tree Replacement

Western replaced in-kind the valve tree assembly located at the injection wellhead. Western contracted Phoenix Services to place a temporary bridge plug at 3,221 ft down in the well to seal-off the well properly prior to removing the valve tree assembly. WSI was contracted and performed the valve tree replacement. Once the Valve Tree was replaced Phoenix Services retrieved the bridge plug.

6.0 WELL EVALUATION

6.1 Well Evaluation

In 2014, the injection well operated normally and within the operation limit of 1,150 psi. The down-time of well operations is mostly contributed to the decrease in produced water at the Bloomfield facility.

6.2 Area of Review (AOR)

The Area of Review data was updated in the 2011 Annual Bottom hole Pressure Surveys and Pressure Fall-Off Tests for Waste Disposal Well #1Report (Cobb & Associates, 2011). At that time, no new wells were found in the one-mile radius.

Fifty-eight wells were found within a one-mile radius of WDW #1, which injects water into the Mesaverde formation. The wells and status are spotted on an area map, Figure 3, with a well number listed with the well data in Table 2. Of these wells, 15 have been plugged and abandoned. Four wells are classified as dry holes and are believed to be plugged and abandoned. Twenty-four wells produce petroleum from shallow zones. One well is an Entrada injection well. Fourteen wells produce petroleum from the Dakota and Gallup zones, which are deeper than the Mesaverde interval used for injection purposes. No wells are producing from the injection interval within a one-mile radius of WDW #1.

Twenty-four of the 59 wells have penetrated the injection zone. Of these, three have been plugged. Five wells are currently producing from shallow zones and 14 wells produce from deep zones. There are two injection wells including WDW #1 and Ashcroft SWD #1 well.

No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The following is a summary of well operations and well testing activities performed in 2014.

7.1 Conclusions

Injection Volume - The volume injected into the disposal well during 2014 was 10,090,472 gallons. Western suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation.

Sampling and Chemical Analyses - Injection fluids samples were collected for chemical analysis on a quarterly basis when the well was operational. Analytical results did not exhibit characteristics of hazardous waste.

Maintenance Operations - No down-hole maintenance activities were conducted in 2014. The above-ground valves were preplaced as part of general preventative maintenance activities for the injection well.

Mechanical Integrity Tests - The 2014 well testing program witnessed by a representative of OCD included a High-Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test. Results of these tests prove that the operational integrity of the well is sound.

Well Evaluation – The injection well operated normally within the operational limit of 1,150 psi throughout 2014.

Area of Review (AOR) - No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

7.2 Recommendations

Western will continue the routine monitoring, maintenance, and testing programs which include quarterly chemical analysis of injection fluids, high-pressure shut-down testing, mechanical integrity testing, and Bradenhead testing in 2014. Western will continue to utilize the maximum operating injection pressure at the wellhead as permitted by Discharge Permit GW-130.

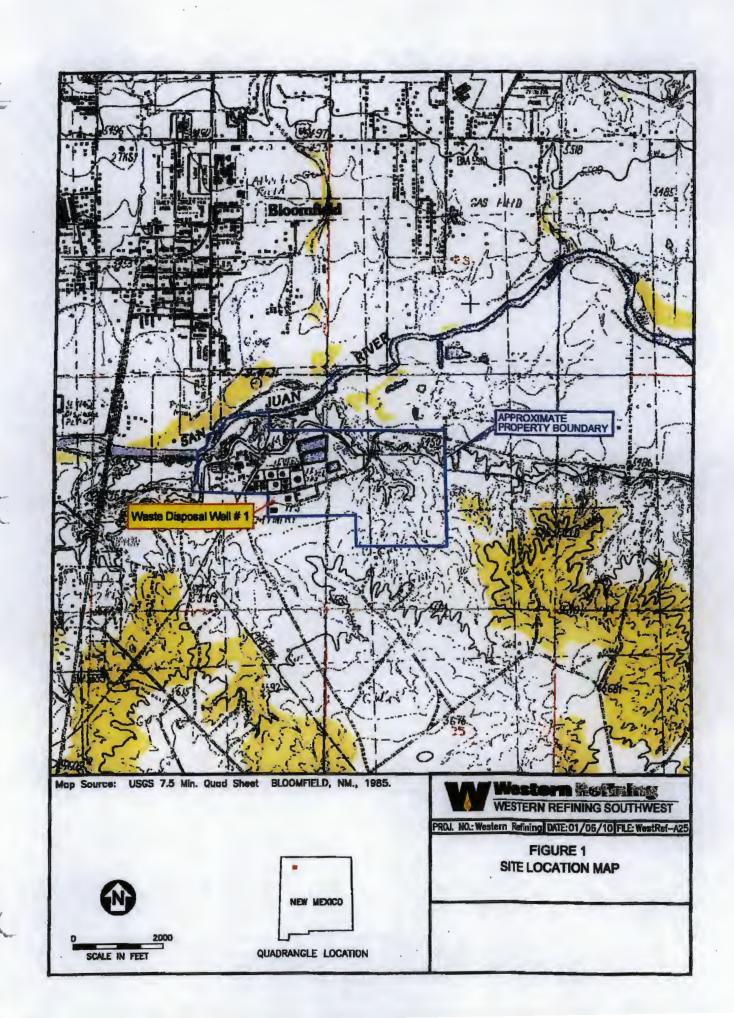
8.0 REFERENCES

Cobb & Associates, 2009a, Evaluation of Disposal Well #1 Bloomfield Refinery, August 26, 2009.

Cobb & Associates, 2011, 2011 Annual Bottom hole Pressure Surveys and Pressure Fall-Off Tests for Waste Disposal Well #1Report December 21, 2011.

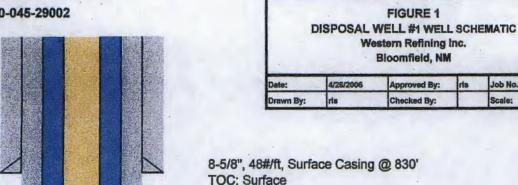
Bloomfield Refinery Class I (Non-Hazardous) Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal dated March 23, 2004.

FIGURES



WESTERN REFINING DISPOSAL WELL #1 NW, SW SECTION 26, T29N, R11W

NO.: 30-045-29002



SUBSURFACE HOUSTON, TX SOUTH BRID, IN BATON ROUGE, LA

Job No.: 70F5830

NA

Tubing: 2-7/8", Acid Resistant Fluoroline Cement Lined Wt of Tubing: 6.5 #/ft

Wt of Tubing Lined: 7.55 #/ft

Hole Size: 11.0"

Tubing ID: 2.128" Tubing Drift ID: 2.000"

Minimum ID @ Packer: ~1.87" estimated

Packer: Unknown Packer Type @ 3221' Could be a Guiberson or similar model Uni-6

Perforations: 3276' - 3408' 4JSPF 0.5 EHD Top of the Cliff House Formation: 3276'

Fill was cleaned out of well on 4/20/06 Fill was orginally tagged at 3325'

Perforations: 3435' - 3460' 4JSPF 0.5 EHD Top of the Menefee Formation: 3400'

RBP: 3520'

5-1/2", 15.5#/ft, Production Casing @3600'

TOC: Surface Hole Size: 7-7/8"

Figure 3

TABLES

TABLE 1

WESTERN REFINING SOUTHWEST, INC. - BLOOMFIELD TERMINAL P.O. BOX 159

BLOOMFIELD, NEW MEXICO 87413

MONTHLY INJECTION WELL REPORT DISCHARGE PLAN GW-130 NE1/4 SE1/4 SECTION 27, T29N, R11W NMPM, SAN JUAN COUNTY, NEW MEXICO

TO SOLAR AMOUNT DOWN- INIECTION PRESSIRE ANNILAR PRESSURE ANAX	FROM RATES TO SQLAR AMMOUNT DOWN- INJECTION PRESSURE AMILIADA PRESSURE AMILIADA PRESSURE FILOM RATE (FROM RATE) FIROM RATE (FRO		AMOUNT	AMOUNT	TOTALIZER	_								ON-LINE	
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2,885,553 1,308,447 26 981 928 214 109 168 37 0 0 2,146,832 70.5 1124 843 1035 181 130 164 65 0 0 2,102,489 0 1113 908 1057 208 139 161 58 15 1,296,879 242,121 355 1028 850 879 271 147 218 42 0	2,885,553 1,308,447 26 981 928 214 109 168 37 0 0 2,146,832 70.5 1124 843 1035 181 130 164 65 0 0 2,102,489 0 1113 908 1057 208 139 161 58 15 1,296,879 242,121 355 1028 850 879 271 147 218 42 0	AUG	0	0	1,990,938	130	1081	809	947	203	132	164	80	0	43
0 2,146,832 70.5 1124 843 1035 181 130 164 65 0 0 0 2,102,489 0 1113 908 1057 208 139 161 58 15 15 1028 850 879 271 147 218 42 0 0	0 2,146,832 70.5 1124 843 1035 181 130 164 65 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	SEP	0	2,855,553	1,308,447	26	981	854	928	214	109	168	37	0	30.4
0 2,146,832 70.5 1124 843 1035 181 130 164 65 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 2,146,832 70.5 1124 843 1035 181 130 164 65 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0														
0 2,102,489 0 1113 908 1057 208 139 161 58 15 15 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 2,102,489 0 1113 908 1057 208 139 161 58 15	ОСТ	0	0	2,146,832	70.5	1124	843	1035	181	130	164	65	0	48
1,296,879 242,121 355 1028 850 879 271 147 218 42 0 0	1,296,879 242,121 355 1028 850 879 271 147 218 42 0	NOV	0	0	2,102,489	0	1113	806	1057	208	139	161	58	15	47
10,090,472	10,090,472 gallons	DEC	2,058	1,296,879	242,121	355	1028	850	879	271	147	218	42	0	5.3
		otal amour	nt injected in 2014 is:		10,090,472	gallons									

Pen. Zone	Yes	Yes	8	Yes	8	2	2	2	Yes	Yes	2	Yes	Yes	Š	Yes	ž	Yes	Yes	Yes	£	ę	2	2	Yes
Status	Z	P&A	Shallow	Deep	P&A	CBM	CBM	P&A	Shallow	Shallow	Shallow	Deep	Deep	Shallow	CBM	P&A	CBM	Deep	Deep	CBM	Shallow	Shallow	P&A	Deep
RESERVOIR	MESAVERDE	DAKOTA	CHACRA	GALLUP	PICTURED CLIFFS	FRUITLAND COAL	FRUITLAND COAL		CHACRA	PICTURED CLIFFS	FRUITLAND SAND	DAKOTA	DAKOTA	CHACRA	FRUITLAND COAL		FRUITLAND COAL	DAKOTA	GALLUP	FRUITLAND COAL	CHACRA	CHACRA	PICTURED CLIFFS	GALLUP
OPERATOR	WESTERN REFINING	BP AMERICA	XTO ENERGY, INC	XTO ENERGY, INC	Pre-Ongard	HOLCOMB O&G	H-27-29N-11W HOLCOMB O&G	Pre-Ongard	H-27-29N-11W XTO ENERGY, INC	Burlington	F-27-29N-11W MANANA GAS INC	Burlington	Burlington	F-27-29N-11W MANANA GAS INC	Burlington	Pre-Ongard	F-26-29N-11W HOLCOMB O&G	F-26-29N-11W XTO ENERGY, INC	Burlington	Burlington	Burlington	ENERGEN	Pre-Ongard	ENERGEN
ULSTR	I-27-29N-11W	I-27-29N-11W	I-27-29N-11W	I-27-29N-11W	I-27-29N-11W	I-27-29N-11W	H-27-29N-11W	H-27-29N-11W	H-27-29N-11W	K-27-29N-11W	F-27-29N-11W	F-27-29N-11W Burlington	M-26-29N-11W Burlington	F-27-29N-11W	L-27-29N-11W	C-27-29N-11W Pre-Ongard	F-26-29N-11W	F-26-29N-11W	A-34-29N-11W	N-26-29N-11W	A-34-29N-11W	N-26-29N-11W ENERGEN	M-27-29N-11W Pre-Ongard	C-34-29N-11W ENERGEN
P&A Date		19-Jan-94			18-Oct-82			18-Aug-55								09-Nov-78							27-Jun-75	
<u>Total</u> Depth	3514	6298	2839	6177	1717	1714	1689	1800	6262	5808	1354	6160	6348	2710	6214	800	4030	6242	6148	1760	2857	2869	1747	5970
Perf	3514	6298	2839	5646		1714	1689		2810	1770	1354	6160	6348	2710	1661		1645	6242	6148	1760	2857	2869	1747	5970
Perf	3276	6157	2827	5314		1543	1483		2701	1680	1326	6024	6176	2578	1388		1462	9809	9809	1468	2747	2746	1664	5326
APINO	30-045-29002	30-045-07825	30-045-23554	30-045-30833	30-045-07812	30-045-34463	30-045-34409	30-045-07883	30-045-24084	30-045-25673	30-045-27361	30-045-24673	30-045-12003	30-045-27365	30-045-07835	30-045-07896	30-045-25329	30-045-24083	30-045-25657	100 30-045-31118	30-045-24574	30-045-24572	30-045-07903	30-045-25707
##	-	-	-	#	-	-	7	8	Ħ	8	-	Ħ	-	-	~	-	-	1	16	100	6	6	-	15
. WELLNAME	DISPOSAL	DAVIS GAS COM F	DAVIS GAS COM G	DAVIS GAS COM F	Davis Pooled Unit	JACQUE	JACQUE	Davis PU/FB Umbarger	DAVIS GAS COM F	CONGRESS	LAUREN KELLY	MANGUM	CALVIN	MARIAN S	MANGUM	Black Diamond	DAVIS GAS COM J	SULLIVAN GAS COM D	CONGRESS	CALVIN	SUMMIT	CONGRESS	Garland "B"	SUMMIT
Miles to DW1	0.00	0.11	0.12	0.15	0.16	0.18	0.23	0.23	0.24	0.41	0.49	0.49	0.51	0.52	0.55	0.56	0.57	0.58	09.0	0.64	0.64	0.64	0.64	0.65
Map Seq.	-	8	က	4	Ŋ	9	7	œ	6	10	=	12	13	4	15	16	17	18	19	20	21	22	23	24

Pen. Zone	Š	Yes	Š	Š	2	Yes	8	Š	8 8	Yes	Š	8	8	Yes	Yes	8	Yes	₽.	Yes	Yes	Yes	2	Yes	2
Status	Shallow	Deep	Shallow	Shallow	P&A	P&A	P&A	Shallow	CBM	Deep	Shallow	Shallow	DRY	Deep	Deep	Shallow	Deep	DRY	Shallow	Deep	2	P&A	Deep	DRY
RESERVOIR	CHACRA	GALLUP	PICTURED CLIFFS	CHACRA	FRUITLAND SAND	DAKOTA	(N/A)	CHACRA	FRUITLAND COAL	DAKOTA	FRUITLAND SAND	PICTURED CLIFFS	FARMINGTON	DAKOTA	DAKOTA	FARMINGTON, NORTH Shallow	DAKOTA	FARMINGTON	CHACRA (GALLUP	MORRISON BLUFF EN	PICTURED CLIFFS	DAKOTA	
OPERATOR	ENERGEN	Burlington	Burlington	P-22-29N-11W MANANA GAS INC	O-22-29N-11W JOHN C PICKETT	P-22-29N-11W MANANA GAS INC	Pre-Ongard	N-22-29N-11W MANANA GAS INC	CHAPARRAL O&G	Pre-Ongard	Burlington	B-26-29N-11W XTO ENERGY, INC	D-34-29N-11W MCELVAIN O&G	Burlington	Pre-Ongard	Burlington	Burlington	B-26-29N-11W XTO ENERGY, INC	CHAPARRAL O&G	Burlington	Pre-Ongard			
ULSTR	M-27-29N-11W ENERGEN	K-26-29N-11W	M-27-29N-11W Burlington	P-22-29N-11W		P-22-29N-11W	M-26-29N-11W Pre-Ongard	N-22-29N-11W	N-22-29N-11W	N-22-29N-11W	N-22-29N-11W	G-34-29N-11W	M-23-29N-11W Pre-Ongard	J-26-29N-11W	B-26-29N-11W	D-34-29N-11W	F-34-29N-11W	O-23-29N-11W Pre-Ongard	E-35-29N-11W	C-35-29N-11W	B-26-29N-11W	E-35-29N-11W	G-34-29N-11W Burlington	P-28-29N-11W Pre-Ongard
P&A Date					02-Mar-00	14-Jun-99	11-Nov-58															18-Dec-99		
Total Depth	2790	5870	1678	2754	1466	6274	1917	2732	1608	6226	1410	1736	2335	6430	6160	1525	6347	2015	6328	5943	7382	1790	6340	870
Perf. Bottom	2790	5870	1678	2754	1466	6274		2732	1608	6226	1410	1736		6430	6160	1064	6347		2906	5943	7070	1790	6340	
Pert	2668	5295	1648	2627	1380	6072		2622	1440	6052	1390	1726		6172	6047	1060	6202		2784	5369	6952	1776	6171	
APINO	30-045-24573	30-045-25612	30-045-21732	30-045-26721	30-045-07959	30-045-07961	30-045-07776	30-045-26731	30-045-34312	30-045-07940	30-045-13089	30-045-20755	30-545-02123	30-045-33093	30-045-07733	30-045-24834	30-045-24835	30-545-02124	30-045-24837	30-045-25675	30-045-30788	30-045-20752	30-045-07672	30-045-07751
#1	က	က	쓨	7	-	-	-	-	-	-	2	7	က	Ħ	-	11	7E	4	4	15	-	-	သ	-
WELLNAME	0.65 GARLAND	CALVIN	GARLAND B	NANCY HARTMAN	GRACE PEARCE	HARTMAN	Davis	MARY JANE	ROYAL FLUSH	COOK	COOK	SHELLY	HARE	CALVIN	SULLIVAN GAS COM D	ELLEDGE FEDERAL 34	CONGRESS	HARE	CONGRESS	CONGRESS	ASHCROFT SWD	LEA ANN	CONGRESS	0.94 Viles EE
Map Miles to Seq. DW1	0.65	0.67	0.68	0.70	0.71	0.72	0.73	0.75	92.0	0.79	0.79	0.82	0.82	0.84	0.85	0.85	0.89	0.90	0.90	0.90	0.90	0.90	0.94	0.94
Map Seq.	25	56	27	78	59	30	31	32	33	34	35	36	37	38	39	40	4	45	43	4	45	46	47	48

Pen. Ini. Zone	2	2	<u>0</u>	Yes	2	2	2	2	Yes	2	8
Status	P&A	P&A	P&A	Deep	P&A	P&A	Shallow	CBM	P&A	Shallow	DRY
RESERVOIR	PICTURED CLIFFS	PICTURED CLIFFS		DAKOTA	PICTURED CLIFFS	PICTURED CLIFFS	CHACRA	FRUITLAND COAL	DAKOTA	PICTURED CLIFFS	FRUITLAND SAND
OPERATOR	Pre-Ongard	Pre-Ongard	Pre-Ongard	A-28-29N-11W XTO ENERGY, INC	Pre-Ongard	Pre-Ongard	B-26-29N-11W XTO ENERGY, INC	K-23-29N-11W HOLCOMB O&G	BP AMERICA	E-34-29N-11W CHAPARRAL 0&G	Pre-Ongard
ULSTR	G-26-29N-11W Pre-Ongard	05-May-78 A-28-29N-11W Pre-Ongard	A-28-29N-11W Pre-Ongard	A-28-29N-11W	31-Aug-53 G-26-29N-11W Pre-Ongard	30-Oct-53 J-34-29N-11W Pre-Ongard	B-26-29N-11W	K-23-29N-11W	K-23-29N-11W BP AMERICA	E-34-29N-11W	-34-29N-11W
P&A Date	23-Jun-55	05-May-78	05-Jun-78		31-Aug-53	30-Oct-53			10-Mar-97		
Perf Total Bottom Depth	006	1600	009	6125	1420	8	2761	2761	6182	1731	FrtInd
Perf Bottom				6125			2761	1648	6182	1731	
Perf				6023			2750	1470	6154	1712	
APINO	30-045-29107	30-045-07895	30-045-07762	30-045-07894	30-045-07870	30-045-07674	30-045-23163 2750	30-045-23550 1470	30-045-07985	30-045-20609	30-545-02151
#1	¥	7	က	-	-	-	-	-	-	-	7
WELLNAME	Suliivan	Madsen Selby Pooled Unit	Masden-Selby	MASDEN GAS COM	Sullivan	CONGRESS	EARL B SULLIVAN	STATE GAS COM BS	PEARCE GAS COM	CHAPARRAL	CONGRESS
Miles to DW1	0.95	0.97 N	0.97 N	0.97 N	0.97	0.98	0.98 E	0.99	0.99 F	0.99	0.99
Map Seq.	49	20	51	52	53	54	55	26	22	28	29

Pen Inj. Zone	윙	12	4	0	2	44	0	35
Pen In	Yes	ო	0	7	7	က	4	24
Total	Wells	15	4	7	7	11	14	29
	Status	P&A	Dry	<u>2</u>	CBM	Shallow	Deep	Total

Injection Well 2014 Quarterly Analytical Summary

	Toxicity	10	2-10	2-10	44b O
Volatile Organic Compounds (ug/L)	Characteristics	1/23/2014	2nd Quarter	3rd Quarter 7/28/2014	4th Quarter 10/1/2014
1,1,1,2-Tetrachloroethane	· · · · · · · · · · · · · · · · · · ·	< 10	na	< 2.0	< 5.0
1,1,1-Trichloroethane	TOTAL TALK A SERVICE AND A SER	< 10	па	< 2.0	< 5.0
1,1,2,2-Tetrachloroethane	THE THE PARTY AND THE PARTY AN	< 20	па	< 4.0	< 10
1,1,2-Trichloroethane	**************************************	< 10	na	< 2.0	< 5.0
1,1-Dichloroethane		< 10	na	< 2.0	< 5.0
1,1-Dichloroethene	CONTROL OF THE REAL PROPERTY AND ADDRESS OF THE PARTY AND ADDRESS OF TH	< 10	na	< 2.0	< 5.0
1,1-Dichloropropene	100 C	< 10	na	< 2.0	< 5.0
1,2,3-Trichlorobenzene	**************************************	< 10	na	< 2.0	< 5.0
1,2,3-Trichloropropane		< 20	na na	< 4.0	< 10
1,2,4-Trichlorobenzene 1,2,4-Trimethylbenzene	Water the transfer of the state	< 10 < 10	na	< 2.0 < 2.0	< 5.0 < 5.0
1,2-Dibromo-3-chloropropane	eraperonen er	< 20	na na	< 4.0	< 10
1,2-Dibromoethane (EDB)		< 10	na	< 2.0	< 5.0
1,2-Dichlorobenzene	A Contraction of the Contraction	< 10	na	< 2.0	< 5.0
1,2-Dichloroethane (EDC)	500	< 10	na	< 2.0	< 5.0
1,2-Dichloropropane	a month of the second second second second	< 10	па	< 2.0	< 5.0
1,3,5-Trimethylbenzene	THE PART ASSESSMENT OF THE PART OF THE PAR	< 10	na	< 2.0	< 5.0
1,3-Dichlorobenzene		< 10	na	< 2.0	< 5.0
1,3-Dichloropropane		< 10	na	< 2.0	< 5.0
1,4-Dichlorobenzene	7500	< 10	na	< 2.0	< 5.0
1-Methylnaphthalene		< 40	na	< 8.0	< 20
2,2-Dichloropropane		< 20	na na	< 4.0	< 10
2-Butanone		200	na	< 20	< 50
2-Chlorotoluene	and an an an assessment and a state of the state of	< 10	na	< 2.0 < 20	< 5.0 < 50
2-Hexanone 2-Methylnaphthalene	error arrows were as a second region from a second	< 100	na na	< 8.0	< 20
4-Chlorotoluene		< 10	na na	< 2.0	< 5.0
4-Isopropyltoluene		< 10	na	< 2.0	< 5.0
4-Methyl-2-pentanone	THE STATE OF THE STATE OF THE STATE OF	< 100	na	< 20	< 50
Acetone	6181 MAC	1400	na	85	120
Benzene	500	< 10	na	< 2.0	< 5.0
Bromobenzene		< 10	na	< 2.0	< 5.0
Bromodichloromethane		< 10	na	< 2.0	< 5.0
Bromoform		< 10	па	< 2.0	< 5.0
Bromomethane		< 30	na	< 6.0	< 15
Carbon disulfide		< 100	na	< 20	< 50
Carbon Tetrachloride	500	< 10	na	< 2.0	< 5.0 < 5.0
Chlorobenzene	100000	< 10	na	<2.0 <4.0	< 10
Chloroethane Chloroform	6000	< 10	na na	< 2.0	< 5.0
Chloromethane	0000	< 30	na	< 6.0	< 15
cis-1,2-DCE		< 10	na na	< 2.0	< 5.0
cis-1,3-Dichloropropene		< 10	na	< 2.0	< 5.0
Dibromochloromethane		< 10	па	< 2.0	< 5.0
Dibromomethane		< 10	na	< 2.0	< 5.0
Dichlorodifluoromethane		< 10	па	< 2.0	< 5.0
Ethylbenzene		< 10	na	< 2.0	< 5.0
Hexachlorobutadiene	500	< 10	na	< 2.0	< 5.0
Isopropylbenzene		< 10	па	< 2.0	< 5.0
Methyl tert-butyl ether (MTBE)		< 10	na	< 2.0	< 5.0
Methylene Chloride		< 30	na	< 6.0	< 15
Naphthalene n-Butylbenzene		< 30 < 10	na na	< 4.0 < 6.0	< 10 < 15
n-Propylbenzene		< 20	na na	< 2.0	< 5.0
sec-Butylbenzene		< 10	na na	< 2.0	< 5.0
Styrene		< 10	па	< 2.0	< 5.0
tert-Butylbenzene		< 10	na	< 2.0	< 5.0
Tetrachloroethene (PCE)		< 10	na	< 2.0	< 5.0
Toluene		< 10	na	< 2.0	< 5.0
trans-1,2-DCE		< 10	na	< 2.0	< 5.0
trans-1,3-Dichloropropene		< 10	na	< 2.0	< 5.0
Trichloroethene (TCE)		< 10	na	< 2.0	< 5.0
Trichlorofluoromethane		< 10	na	< 2.0	< 5.0
Vinyl chloride	200	< 10	na	< 2.0	< 5.0
Xylenes, Total		< 15	na	< 3.0	< 7.5

Injection Well
2014 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
emi-Volatile Organic Compounds (ug/L)				Land Salas	974 IŞMI
1,2,4-Trichlorobenzene		< 50	na	< 100	< 10
1,2-Dichlorobenzene		< 50	na	< 100	< 10
1,3-Dichlorobenzene	7500	< 50 < 50	na	< 100 < 100	< 10 < 10
1,4-Dichlorobenzene	/300	< 50	na	< 100	< 10
1-Methylnaphthalene 2,4,5-Trichlorophenol	A CONTRACTOR AND A STREET,	< 50	na па	< 100	< 10
2,4,5-11ichlorophenol	2000	< 50	MANAGEMENT OF THE PROPERTY OF THE PARTY OF T	< 100	< 10
2,4-Dichlorophenol	2000	< 100	na na	< 200	< 20
2,4-Dientorophenol		< 50	па	< 100	< 10
2,4-Dimtrophenol		< 100	ла	< 200	< 20
2,4-Dinitrotoluene	130	< 50	na na	< 100	< 10
2,6-Dinitrotoluene		< 50	па	< 100	< 10
2-Chloronaphthalene	ar illustrate about total control of the control of	< 50	na	< 100	< 10
2-Chlorophenol	NACH CANCEL SALE METERS - LONGSON	< 50	na	< 100	< 10
2-Methylnaphthalene		< 50	na	< 100	< 10
2-Methylphenol		< 50	na	< 200	< 20
2-Nitroaniline	AND AND A THE PROPERTY OF THE	< 50	na	< 100	< 10
2-Nitrophenol		< 50	па	< 100	< 10
3,3'-Dichlorobenzidine	entretter 181 ft. 116 de brakeliet i erre inging	< 50	па	210	< 10
3+4-Methylphenol	man and the first property of the second second	< 50	na	< 100	< 10
3-Nitroaniline		< 50	na	< 100	< 10
4,6-Dinitro-2-inethylphenol		< 100	na	< 200	< 20
4-Bromophenyl phenyl ether	we come to the one of the con-	< 50	na	< 100	< 10
4-Chloro-3-methylphenol		< 50	na	< 100	< 10
4-Chloroaniline		< 50	na	< 100	< 10
4-Chlorophenyl phenyl ether	**** *** * *** *** *** *** ***	< 50	na	< 100	< 10
4-Nitroaniline	a managama	< 50	na	< 100	< 10
4-Nitrophenol	THE RESERVE OF THE PERSON	< 50	na	< 100	< 10
Acenaphthene	and the depletion of the second	< 50	na	< 100	< 10
Acenaphthylene	wa.w	< 50	na	< 100	< 10
Aniline		< 50	na	< 100	< 10
Anthracene		< 50	па	< 100	< 10
Azobenzene		< 50	na	< 100	< 10
Benz(a)anthracene	P	< 50	na	< 100	< 10
Benzo(a)pyrene		< 50	na	< 100	< 10
Benzo(b)fluoranthene		< 50	na	< 100	< 10
Benzo(g,h,i)perylene		< 50	na	< 100	< 10
Benzo(k)fluoranthene		< 50	па	< 100	< 10
Benzoic acid		< 100	na	< 200	< 40
Benzyl alcohol		< 50	na	< 100	< 10
Bis(2-chloroethoxy)methane		< 50	na	< 100	< 10
Bis(2-chloroethyl)ether		< 50	na	< 100	< 10
Bis(2-chloroisopropyl)ether		< 50	na	< 100	< 10
Bis(2-ethylhexyl)phthalate		< 50	na	< 100	< 10
Butyl benzyl phthalate		< 50	na	< 100	< 10
Carbazole		< 50	па	< 100	< 10
Chrysene		< 50	па	< 100	< 10
Dibenz(a,h)anthracene		< 50	na	< 100	< 10
Dibenzofuran		< 50	na	< 100	< 10
Diethyl phthalate		< 50	na	< 100	< 10
Dimethyl phthalate		< 50	na	< 100	< 10
Di-n-butyl phthalate		< 50	па	< 100	< 10
Di-n-octyl phthalate		< 50	na	< 100	< 20
Fluoranthene		< 50	na	< 100	< 10
Fluorene		< 50	na	< 100	< 10
Hexachlorobenzene	130	< 50	na	< 100	< 10
Hexachlorobutadiene	500	< 50	na	< 100	< 10
Hexachlorocyclopentadiene		< 50	па	< 100	< 10
Hexachloroethane	3000	< 50	па	< 100	< 10
Indeno(1,2,3-cd)pyrene		< 50	na	< 100	< 10
Isophorone		< 50	na	< 100	< 10
Naphthalene		< 50	па	< 100	< 10
Nitrobenzene	2000	< 50	na	< 100	< 10
N-Nitrosodimethylamine		< 50	na	< 100	< 10
N-Nitrosodi-n-propylamine		< 50	na	< 100	< 10
N-Nitrosodiphenylamine		< 50	na	< 100	< 10
Pentachlorophenol	100000	< 100	na	< 200	< 20
Phenanthrene		< 50	na	< 100	< 10
Phenol		< 50	na	< 100	< 10
Pyrene	was a title of the second	< 50	na	< 100	< 10
Pyridine	5000	< 50	na	< 100	< 10

Injection Well 2014 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
eneral Chemistry (mg/L unless otherwi	se stated)				
Specific Conductance (umhos/cm)		7100	na	1900	1100
Chloride		2400	na	510	220
Sulfate	Andrew Control Management Control of the Control of	35	na	41	26
Total Dissolved Solids	THE RESERVE THE PARTY OF THE PA	5240	na	1380	742
pH (pH Units)		6.25	na	7.10	7.08
Bicarbonate (As CaCO3)		380	na	220	150
Carbonate (As CaCO3)	k	<2.0	na	<2.0	<2.0
Calcium	William Street Commence of the Control of the Contr	490	na	480	110
Magnesium	MARINE SECTION AND A REAL PROPERTY AND	75	na	99	23
Potassium	1,000,000,000,000,000,000,000,000,000,0	37	na	36	8.2
Sodium		1000	na	1100	220
Total Alkalinity (as CaCO3)		380	na	220	150
otal Metals (mg/L)					
Arsenic	5.0	< 0.020	na	< 0.020	< 0.020
Barium	100.0	0.56	na	0.63	0.20
Cadmium	1.0	< 0.0020	na	< 0.0020	< 0.0020
Chromium	5.0	< 0.0060	na	< 0.0060	< 0.0060
Lead	5	< 0.0050	na	< 0.0050	< 0.0050
Selenium	1	< 0.050	na	< 0.050	< 0.050
Silver	5	< 0.0050	na	< 0.0050	< 0.0050
Mercury	0.2	< 0.0010	na	< 0.00020	< 0.00020
gnitability, Corrosivity, and Reactivity					
Reactive Cyanide (mg/L)		<1.0	na	<1.0	<1.0
Reactive Sulfide (mg/kg)	The second section of the second section of the second section of the second section s	1.6	na	<1.0	3.0
Ignitability (°F)	< 140° F	>200	na	>200	>200
Corrosivity (ph Units)	< 2 or ≥ 12.5	6.25	na	7.44	6.82

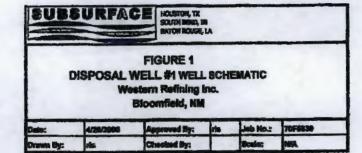
Notes: na = A water sample was not collected during the 2nd quarter of 2014 because the well was not operational.

APPENDIX A

Submit 1 Copy To Appropriate District	State of New Me	xico		Form C-103
Office <u>District I</u> – (575) 393-6161	Energy, Minerals and Natu	ral Resources		Revised July 18, 2013
1625 N. French Dr., Hobbs, NM 88240			WELL API NO.	
<u>District II</u> - (575) 748-1283 811 S. First St., Artesia, NM 88210	OIL CONSERVATION	DIVISION	30-045-29002-00	
District III - (505) 334-6178	1220 South St. Fran		5. Indicate Type of	
1000 Rio Brazos Rd., Aztec, NM 87410	Santa Fe, NM 87		STATE 6. State Oil & Ga	FEE
<u>District IV</u> - (505) 476-3460 1220 S. St. Francis Dr., Santa Fe, NM	Santa 1'0, 14141 07	303	o. State Off & Gas	s Lease No.
87505				
SUNDRY NOTI (DO NOT USE THIS FORM FOR PROPOS DIFFERENT RESERVOIR. USE "APPLIC PROPOSALS.)	CES AND REPORTS ON WELLS SALS TO DRILL OR TO DEEPEN OR PLI CATION FOR PERMIT" (FORM C-101) FO	JG BACK TO A		Unit Agreement Name
1. Type of Well: Oil Well	Gas Well 🛛 Other		8. Well Number #	001
2. Name of Operator			9. OGRID Numbe	er 037218
Western Refining Southwest, Inc	Bloomfield Terminal			
 Address of Operator County Road 4990, Bloomfield, 	NM 87401		10. Pool name or	Wildcat
4. Well Location				
I .	42 feet from the South	line and 12	250 feet from the	East line
		Range 11	NMPM	County: San Juan
Section 27	11. Elevation (Show whether DR,			County. Sair Juan
	11. Elevation (Show whether DA,	RKD, KI, OK, etc.)	**************************************	
				And the second s
12 Charle A	ppropriate Box to Indicate N	nture of Notice I	Denort or Other	Data
12. Check A	appropriate Box to indicate is	ature of Nonce, i	Report of Other	Jaia
NOTICE OF IN	TENTION TO:	SUBS	SEQUENT REF	PORT OF:
PERFORM REMEDIAL WORK	PLUG AND ABANDON	REMEDIAL WORK		ALTERING CASING
TEMPORARILY ABANDON	CHANGE PLANS	COMMENCE DRIL	LING OPNS.	P AND A
PULL OR ALTER CASING	MULTIPLE COMPL	CASING/CEMENT	JOB 🔲	•
DOWNHOLE COMMINGLE				
CLOSED-LOOP SYSTEM				_
OTHER: Replace wellhead		OTHER:		
	eted operations. (Clearly state all p rk). SEE RULE 19.15.7.14 NMAC ompletion.			
Western is requesting permission to re Western will have to place a temporal assembly. Phoenix Services has been perform the valve tree replacement.	ry bridge plug down in the well to a contracted by Western to perform	seal-off the well pro the down hole wire	perly prior to remove line work. WSI has	ring the valve tree s been contracted to
Phoenix Services will run fu	bing gauges down hole to verify the	e exact size of the tu	hing.	
	plug will selected and place at app		•	
	ocked-in, WSI will commence repla			
	l, Phoenix Services will retrieve the			
 The well will then return to: 	normal operations.			
Pending OCD approval, Western wor questions regarding this project, please			e week of June 30 th ,	2014. If you have any
Spud Date:	Rig Release Da	te-		
Spud Date.	Tag Kolouso Bu			1
I hereby certify that the information a	hove is true and complete to the he	et of my knowledge	and belief	
Thereby certify that the information a	bove is true and complete to the be	st of tily knowledge	and belief.	
	TITLE ENV			
Type or print name Kelly Robin	ASov E-mail address:	Kelly, robinson	<u>@war.cou</u> PHO	DNE: 505 - 632-4161
A PART OF THE TAX	ALIANA IN		75.47	יפוי
APPROVED BY:	TITLE		DAT	E
Conditions of Approval (if any):				

WESTERN REFINING DISPOSAL WELL #1 NESE SECTION 27, T29N, R11W API No. 30-045-29002





8-5/8", 48#/ft, Surface Casing @ 830"

TOC: Surface Hole Size: 11.0"

Tubing: 2-7/8", Acid Resistant Fluoroline Cement Lined

Wt of Tubing: 6.5 #/ft Wt of Tubing Lined: 7.55 #/ft

Tubing ID: 2.128"
Tubing Drift ID: 2.000"

Minimum ID @ Packer: ~1,87" estimated

Packer: Unknown Packer Type @ 3221'
Could be a Gulberson or similar model Uni-6

Perforations: 3276' - 3408' 4JSPF 0.5 EHD Top of the Cliff House Formation: 3276'

Fill was cleaned out of well on 4/20/06 Fill was orginally tagged at 3325'

Perforations: 3435' - 3460' 4JSPF 0.5 EHD Top of the Menefee Formation: 3400'

RBP: 3520'

5-1/2", 15.5#/ft, Production Casing @3600"

TOC: Surface Hole Size: 7-7/8*

Robinson, Kelly

From:

Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]

Sent:

Wednesday, July 09, 2014 9:06 AM

To:

Robinson, Kelly

Subject:

RE: (UICI-009) Preliminary Notification of C-103 UIC Class I (NH) Injection Well Valve

Replacement Project - Western Refining Bloomfield Facility (GW-130) - Reschedule

Received. Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Department Oil Conservation Division, Environmental Bureau 1220 South St. Francis Drive, Santa Fe, New Mexico 87505

O: (505) 476-3490

E-mail: <u>CarlJ.Chavez@State.NM.US</u>
Web: <u>http://www.emnrd.state.nm.us/ocd/</u>

"Why Not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward With the Rest of

the Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at

http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental



From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Wednesday, July 09, 2014 9:04 AM

To: Perrin, Charlie, EMNRD

Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Chavez, Carl J, EMNRD; Schmaltz, Randy; Krakow, Matt;

Krakow, Bob (CTR); Hawkins, Larry; Weaver, Ron

Subject: RE: (UICI-009) Preliminary Notification of C-103 UIC Class I (NH) Injection Well Valve Replacement Project -

Western Refining Bloomfield Facility (GW-130)

Good Morning Sir,

We were just notified this morning that Phoenix Services was called to perform an emergency job at a different location. Therefore, they had to re-schedule the work to be done at the Western Refining Bloomfield facility for Monday, July 14th, 2014. They expect to be on-site by 7am Monday to perform a safety orientation prior to commencement of field activities.

Our apologies for any inconvenience this rescheduling may have caused. If you have any guestions, please let me know.

Thank you, Sir!

Kelly R. Robinson | Environmental Supervisor

Western Refining | 111 County Road 4990 | Bloomfield, NM87413 (o) 505-632-4166 | (c) 505-801-5616 | (e) kelly.robinson@wnr.com From: Robinson, Kelly

Sent: Tuesday, July 08, 2014 1:09 PM

To: 'Perrin, Charlie, EMNRD'

Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Chavez, Carl J, EMNRD; Schmaltz, Randy; Krakow, Matt;

Krakow, Bob (CTR); Hawkins, Larry; Weaver, Ron

Subject: RE: (UICI-009) Preliminary Notification of C-103 UIC Class I (NH) Injection Well Valve Replacement Project -

Western Refining Bloomfield Facility (GW-130)

Good Afternoon Sir.

We just received confirmation this afternoon that Phoenix Services will be on-site Friday morning (July 11, 2014) starting at 7am to install the bridge plug at the Bloomfield facility injection well. If you have any questions, please feel free to contact me anytime.

Thank you and have a great day!

Kelly R. Robinson | Environmental Supervisor

Western Refining | 111 County Road 4990 | Bloomfield, NM87413 (o) 505-632-4166 | (c) 505-801-5616 | (e) kelly.robinson@wnr.com

From: Perrin, Charlie, EMNRD [mailto:charlie.perrin@state.nm.us]

Sent: Wednesday, July 02, 2014 3:35 PM

To: Robinson, Kelly

Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Chavez, Carl J, EMNRD

Subject: RE: (UICI-009) Preliminary Notification of C-103 UIC Class I (NH) Injection Well Valve Replacement Project -

Western Refining Bloomfield Facility (GW-130)

Thank you ma'am.

From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Wednesday, July 02, 2014 3:15 PM

To: Perrin, Charlie, EMNRD

Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Chavez, Carl J, EMNRD

Subject: RE: (UICI-009) Preliminary Notification of C-103 UIC Class I (NH) Injection Well Valve Replacement Project -

Western Refining Bloomfield Facility (GW-130)

Good Afternoon Sir!

My apologies on the incorrect information included in the initial submittal. Attached is a revised C-103 that includes the respective corrections to both the well long and the C-103 form. I did verify with the contractor that the valve tree replacement will not disturb the annulus seal. I will notify OCD a minimum of 24 hours prior to the commencement of field activities. We are in-contact with the contractor currently to try and set a permanent schedule.

I appreciate your time and feedback on the information provided.

If you have any questions, please don't hesitate to contact me at your convenience.

I will be in-touch once the contractor provides their availability to do the field work.

Thanks Sir!

Kelly R. Robinson

Environmental Supervisor

Western Refining

111 County Road 4990

Bloomfield, NM87413

- (o) 505-632-4166
- (c) 505-801-5616
- (f) 505-632-4024
- (e) kelly.robinson@wnr.com

From: Perrin, Charlie, EMNRD [mailto:charlie.perrin@state.nm.us]

Sent: Wednesday, July 02, 2014 1:04 PM

To: Robinson, Kelly

Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Chavez, Carl J, EMNRD

Subject: FW: (UICI-009) Preliminary Notification of C-103 UIC Class I (NH) Injection Well Valve Replacement Project -

Western Refining Bloomfield Facility (GW-130)

Ms. Robinson,

Greetings:

A review of your submissions indicate incorrect information on both forms.

C-103 reports:

API # 30-045-290002, This is incorrect

Section 24, This is incorrect

The wellbore schematic reports:

Section 26, This is incorrect

Please correct the information and resubmit the forms.

You indicate replacement of the "valve tree", If the annulus seal is broken by removal of the wellhead a Mechanical Integrity Test will be required before the well is returned to use.

Please provide us a minimum of 24 hour notice prior to moving on the well to conduct the work.

If you have any questions please feel free to give me a call @ 505-334-6178 ext 111.

Thanks Charlie

From: Chavez, Carl J, EMNRD

Sent: Wednesday, July 02, 2014 10:39 AM

To: Perrin, Charlie, EMNRD; Powell, Brandon, EMNRD

Cc: Kuehling, Monica, EMNRD

Subject: FW: (UICI-009) Preliminary Notification of C-103 UIC Class I (NH) Injection Well Valve Replacement Project -

Western Refining Bloomfield Facility (GW-130)

Charlie, et. al:

FYI: For your review and approval. Thanks.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Department

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Drive, Santa Fe, New Mexico 87505

O: (505) 476-3490

E-mail: <u>CarlJ.Chavez@State.NM.US</u>
Web: <u>http://www.emnrd.state.nm.us/ocd/</u>

"Why Not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward With the Rest of

the Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at

http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental



From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Tuesday, July 01, 2014 3:29 PM

To: Chavez, Carl J, EMNRD

Cc: Kuehling, Monica, EMNRD; Schmaltz, Randy; Krakow, Matt; Hains, Allen

Subject: FW: Preliminary Notification of Injection Well Valve Replacement Project - Western Refining Bloomfield Facility

(GW-130)

Good Afternoon sir,

Attached is a completed C-103 Form requesting permission to replace the valve tree at the well head of the Class I Injection Well located at the Western Refining Bloomfield Facility. Pending OCD's approval, Western would like to schedule this work as soon as possible so that Western can resume normal operation of the well.

If you have any questions or would like to discuss this topic in more detail, please feel free to contact me at your convenience.

Thank you, Sir, for your time. Have a great evening!

Kelly R. Robinson

Environmental Supervisor

Western Refining

111 County Road 4990 Bloomfield, NM87413

- (o) 505-632-4166
- (c) 505-801-5616
- (f) 505-632-4024
- (e) kelly.robinson@wnr.com

From: Robinson, Kelly

Sent: Thursday, June 19, 2014 12:28 PM **To:** 'Carl Chavez (<u>carlJ.Chavez@state.nm.us</u>)'

Cc: Kuehling'; 'Brandon Powell (brandon.powell@state.nm.us)'; Schmaltz, Randy; Krakow, Matt

Subject: Preliminary Notification of Injection Well Valve Replacement Project - Western Refining Bloomfield Facility (GW-

130)

Good Afternoon Sir!

I appreciate you taking the time to talk with me earlier this morning. As we had discussed this morning, Western is developing a Project to replace in-kind the valve tree at the well head of the Class I Injection Well located at the Western Refining Bloomfield facility. This project will not involve any down-hole work in the well; however we will be required to temporarily plug the well in order to replace the entire valve tree, which includes replacing the main shut-off valve at the top of the well casing. Once the valve replacement is completed, the well will be returned to normal operations.

We are currently finalizing a contract with the contractor who will perform this work. Based on our conversation this morning, Western will submit a Sundry Notice (C-103) to NMOCD outlining in-detail what the project entails, and the anticipated schedule for completion of the work. This completed form will be submitted directly to the NMOCD District 3 office, as well as a copy will be sent to your attention.

If you have any questions or concerns until such time that the C-103 is submitted for OCD's review, please do not hesitate to contact me.

Sincerely,

Kelly R. Robinson

Environmental Supervisor

Western Refining

111 County Road 4990 Bloomfield, NM87413

- (o) 505-632-4166
- (c) 505-801-5616
- (f) 505-632-4024
- (e) kelly.robinson@wnr.com

Submit 1 Copy To Appropriate District Office	State of New Me	xico	Form C-103
<u>District I</u> – (575) 393-6161	Encrgy, Minerals and Natur	ral Resources	Revised August 1, 2011
1625 N. French Dr., Hobbs, NM 88240			WELL API NO.
<u>District II</u> – (575) 748-1283 811 S. Iärst St., Artesia, NM 88210	OIL CONSERVATION	DIVISION	30-045-29002-00
District III - (505) 334-6178	1220 South St. Fran	cis Dr.	5. Indicate Type of Lease STATE FEE FEE
1000 Rio Brazos Rd., Aztec, NM 87410 <u>District IV</u> – (505) 476-3460	Santa Fe, NM 87		6. State Oil & Gas Lease No.
1220 S. St. Francis Dr., Santa Fe, NM	54		N/A
87505			
(DO NOT USE THIS FORM FOR PROPO	ICES AND REPORTS ON WELLS SALS TO DRILL OR TO DEEPEN OR PLL CATION FOR PERMIT" (FORM C-101) FO	JG BACK TO A	7. Lease Name or Unit Agreement Name Disposal
1. Type of Well: Oil Well	Gas Well Other - (Disposal W	Vell)	8. Well Number: #001
	efining Co. / Western Refining South		9. OGRID Number: 037218
Bloomfield Refinery	Timing Co. 7 W Oslow Morning Court	Troot, moi	J. GOME Hamosi Spiels
3. Address of Operator			10. Pool name or Wildcat:
#50 Road 4990, Bloomfield, NM,	87413		Blanco/Mesa Verde
4. Well Location			
	feet from the south	line and 125	50 feet from the East line
Section 27		Range 11 W	NMPM County San Juan
Section 27	11. Elevation (Show whether DR,		
	11. Elevation (Show whether DK,	KKD, K1, OK, etc.)	
gradienski po i stori og se stori postete i 1911. ki i 14 godinski i konstjenski 191			
12. Check	Appropriate Box to Indicate Na	ature of Notice,	Report or Other Data
NOTICE OF IN	NTENTION TO:	SHR	SEQUENT REPORT OF:
PERFORM REMEDIAL WORK □	PLUG AND ABANDON	REMEDIAL WOR	
TEMPORARILY ABANDON	CHANGE PLANS	COMMENCE DRI	
PULL OR ALTER CASING		CASING/CEMENT	
DOWNHOLE COMMINGLE	_		_
OTHER: Annual MIT, Bradenhead		OTHER:	
Describe proposed or comp	oleted operations. (Clearly state all p	ertinent details, and	d give pertinent dates, including estimated date
of starting any proposed w	ork). SEE RULE 19.15.7.14 NMAC	C. For Multiple Cor	mpletions: Attach wellbore diagram of
proposed completion or rec	completion.		
Western Refining Southwest Inc -	Bloomfield Terminal requests norm	ission to parform th	e annual MIT and Bradenhead test on the
Class Liniection well referenced abo	ove The tests will be performed on	Thursday Septemb	per 18 th , 2014. Monica Kuehling has agreed to
be here to monitor the tests.	770. The lesis will be performed on	rimisony, ocpicini	oci 10 , 2014. Monica Ruching has agreed to
Spud Date:	Rig Release Da	te:	
I hereby certify that the information	above is true and complete to the be	st of my knowledge	e and belief.
2	n		
SIGNATURE Not (1	Mr. TITLE CO.	vironmental Coordi	natorDATE_9-3-14
SIGNATURE 2 VICE V 10	TITLE En	vironmental Coordi	nator DATE / 3 / 7
Type or print nameMatthew Kr	akow F-mail address	· matt krakow@	wnr.com PHONE: 505-632-4169
For State Use Only	D-man address	·IIIdit.AI dAUW(U	WIII.COM 111014B. <u>303-032-4103</u>
	·		
APPROVED BY:	TITLE		DATE
Conditions of Approval (if any):			

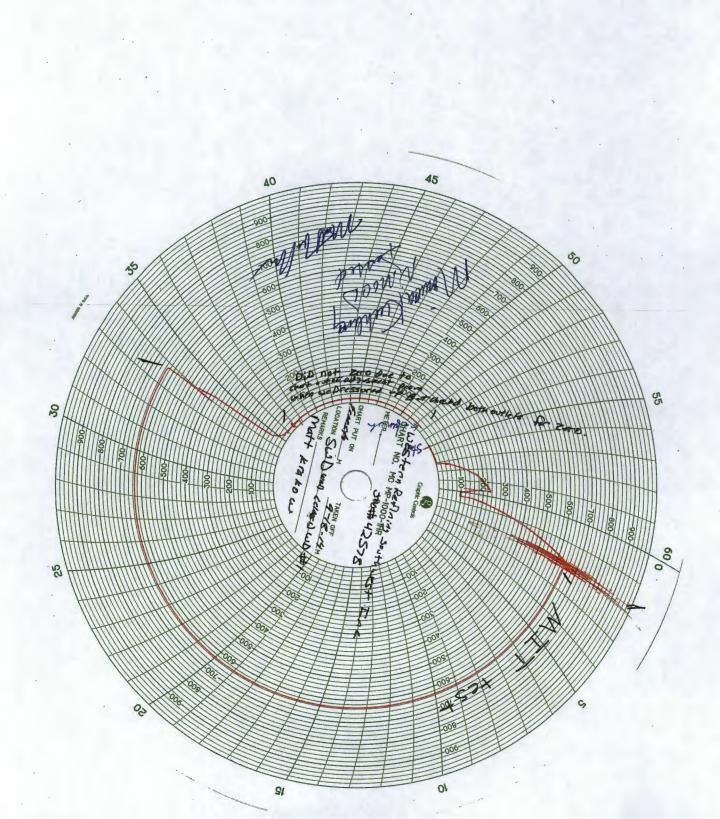
OIL CONSERVATION DIVISION AZTEC DISTRICT OFFICE 1000 RIO BRAZOS ROAD AZTEC NM 87410

(505) 334-6178 FAX: (505) 334-6170 http://emnrd.state.nm.us/ocd/District III/3distric.htm

BRADENHEAD TEST REPORT

(submit 1 copy to above address)

Date o	f Test	9	18-1	4	_Operator	Sanjun	CAPI	[#30-0	
Proper	ty Nar	ne_5	WS.	We	ell No	Location: U	Unit I Section	1#30-0n	ange <u></u> [[
Well S	status(Shut-In	or Produ	icing) Initia	al PSI: Tu	bing 890 Interr	nediate //	Casing 200 Bradenhe	ad Z
OPE	N BRA	ADENH	EAD AN	D INTERM	EDIATE 7	TO ATMOSPHE	RE INDIVIDUA	ALLY FOR 15 MINUTE	S EACH
Testing	ВН	Braden Int	PRESSU head Csg	RE INTERI Int	M Csg			HARACTERISTICS D INTERMEDIATE	
TIME 5 min_	0		198		Csg	Steady Flow			
10 min_	0		198			Surges			
15 min_	0		194			Down to Nothin	ng /		
20 min_						Nothing			
25 min_						Gas			
_ 30 min_						Gas & Water			_
*4						Water			
If brade	nhead i	lowed w	ater, chec	k all of the	description	s that apply below	<u>:</u>		
	CLEAR	\	FRESH_	SA	ĹTY	SULFUR	_BLACK		
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REMAR	KS: B	H-d	own	to me	thin	9 in 4 4	conds	- ofened =	Slow
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	(Positio	n)							
E-mail ad	dress								





NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

MECHANICAL INTEGRITY TEST REPORT

(TA OR UIC)

	A E /		•	
Date of Test_	9-18-14	Operator		API # 30-0
Property Name	e Swo	Well#_	Loc	cation: Unit <u>I Sec 27</u> Twn <u>29</u> Rge //
Land Type:			Well Type:	
	State		71	Water Injection
	ederal		Sal	lt Water Disposal
	rivate			Gas Injection
	ndian		P	roducing Oil/Gas
				essure obervation
Tamananila, A	handanad Wall (W	$\overline{\mathcal{C}}$	TA Erminos	
Temporarity A	bandoned Well (Y		_ TA Expires:_	
Casing Pres.	Ω	The CI Dre	es	Max. Inj. Pres.
Bradenhead Pro	es ()		res	Wax. Hij. 1 les
Tubing Pres.	<u> (480 </u>	10g. III. 11	V3	
Int. Casing Pres				
int. Casing 110	S. — (P)			
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	145 up 10	, <u>o</u> poi: 101		1 oso pussous surrou
REMARKS:				
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×	ray Cococc	im just		
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(-)		,	(2,1,2,1,2,0)	
(Positio	on)			
(1 031110	,,,,			Revised 02-11-02

APPENDIX B



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

February 13, 2014

Kelly Robinson

Western Refining Southwest, Inc.

#50 CR 4990

Bloomfield, NM 87413

TEL: (505) 632-4135 FAX (505) 632-3911

RE: Injection Well 1-23-2014

OrderNo.: 1401A07

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 1/24/2014 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

Analytical Report Lab Order 1401A07

Date Reported: 2/13/2014

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

Project: Injection Well 1-23-2014 Collection Date: 1/23/2014 8:35:00 AM

Lab ID: 1401A07-001 Matrix: AQUEOUS Received Date: 1/24/2014 10:15:00 AM

Analyses	Result	RL Qu	ıal Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analyst	: JRR
Chloride	2400	100	mg/L	200	1/27/2014 7:14:18 PM	R16337
Sulfate "	35	5.0	mg/L	10	1/24/2014 8:01:43 PM	R16313
EPA METHOD 7470: MERCURY					Analyst	: DBD
Mercury	ND	0.0010	mg/L	5	1/30/2014 1:52:43 PM	11463
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst	: ELS
Arsenic	ND	0.020	mg/L	1	1/29/2014 11:20:46 AM	11432
Barium	0.56	0.020	mg/L	1	1/29/2014 11:20:46 AM	
Cadmium	ND	0.0020	mg/L	1	1/29/2014 11:20:46 AM	
Calcium	490	5.0	mg/L	5	1/29/2014 11:22:17 AM	
Chromium	ND	0.0060	mg/L	1	1/29/2014 11:20:46 AM	
Lead	ND	0.0050	mg/L	1	1/29/2014 11:20:46 AM	
Magnesium	75	1.0	mg/L	1	1/29/2014 11:20:46 AM	
Potassium	37	1.0	mg/L	1	1/29/2014 11:20:46 AM	
Selenium	ND	0.050	mg/L	1	1/29/2014 11:20:46 AM	
Silver	ND	0.0050	mg/L	1	1/29/2014 11:20:46 AM	
Sodium	1000	20	mg/L	20	1/29/2014 11:50:27 AM	
EPA METHOD 8270C: SEMIVOLATIL			3-		Analyst	
Acenaphthene	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
Acenaphthylene	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
Aniline	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
Anthracene	ND	50	μg/L μg/L	1	1/30/2014 7:14:30 PM	11420
Azobenzene	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
	ND ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
Benz(a)anthracene Benzo(a)pyrene	ND ND	50		1		11420
Benzo(b)fluoranthene	ND ND	50 50	μg/L.	1	1/30/2014 7:14:30 PM 1/30/2014 7:14:30 PM	11420
Benzo(g,h,i)perylene	ND ND	50	μg/L μg/L	1	1/30/2014 7:14:30 PM	11420
Benzo(k)fluoranthene	ND ND	50 50	μg/L μg/L	1	1/30/2014 7:14:30 PM	11420
Benzoic acid	ND ND	100	μg/L	1	1/30/2014 7:14:30 PM	11420
Benzyl alcohol	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
Bis(2-chloroethoxy)methane	ND ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
Bis(2-chloroethyl)ether	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
Bis(2-chloroisopropyl)ether	ND	50 50	μg/L	1	1/30/2014 7:14:30 PM	11420
Bis(2-ethylhexyl)phthalate	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
4-Bromophenyl phenyl ether	ND ND	50 50	μg/L	1	1/30/2014 7:14:30 PM	11420
Butyl benzyl phthalate	ND	50 50	μg/L μg/L	1	1/30/2014 7:14:30 PM	11420
Carbazole	ND ND	50 50		1	1/30/2014 7:14:30 PM	11420
,	ND ND	50 50	μg/L	1		11420
4-Chloro-3-methylphenol 4-Chloroaniline	ND ND		μg/L	1	1/30/2014 7:14:30 PM	
4-Chloroaniine	ND	50	μg/L	7	1/30/2014 7:14:30 PM	11420

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 1 of 17

- P Sample pH greater than 2.
- RL Reporting Detection Limit

Analytical Report

Lab Order 1401A07

Date Reported: 2/13/2014

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 1-23-2014

Lab ID: 1401A07-001

Matrix: AQUEOUS

Collection Date: 1/23/2014 8:35:00 AM

Client Sample ID: Injection Well

Received Date: 1/24/2014 10:15:00 AM

Analyses	Result	RL Qu	al Units	DF D	ate Analyzed	Batch
EPA METHOD 8270C: SEMIVOLA	TILES				Analyst	: DAM
2-Chloronaphthalene	ND	50	μg/L	1 1.	/30/2014 7:14:30 PM	11420
2-Chlorophenol	ND	50	μg/L	1 1.	/30/2014 7:14:30 PM	11420
4-Chlorophenyl phenyl ether	ND	50	μg/L	1 1.	/30/2014 7:14:30 PM	11420
Chrysene	ND	50	μg/L	1 1	/30/2014 7:14:30 PM	11420
Di-n-butyl phthalate	ND	50	μg/L	1 1,	30/2014 7:14:30 PM	11420
Di-n-octyl phthalate	ND	50	μg/L	1 1	/30/2014 7:14:30 PM	11420
Dibenz(a,h)anthracene	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
Dibenzofuran	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
1,2-Dichlorobenzene	, ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
1,3-Dichlorobenzene	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
1,4-Dichlorobenzene	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
3,3'-Dichlorobenzidine	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
Diethyl phthalate	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
Dimethyl phthalate	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
2,4-Dichlorophenol	ND	100	μg/L	1 1/	30/2014 7:14:30 PM	11420
2,4-Dimethylphenol	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
4,6-Dinitro-2-methylphenol	ND	100	μg/L	1 1/	30/2014 7:14:30 PM	11420
2,4-Dinitrophenol	ND	100	μg/L		30/2014 7:14:30 PM	11420
2,4-Dinitrotoluene	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
2,6-Dinitrotoluene	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
Fluoranthene	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
Fluorene	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
Hexachlorobenzene	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
Hexachiorobutadiene	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
Hexachlorocyclopentadiene	ND	50	μg/L	1 1/	30/2014 7:14:30 PM	11420
Hexachloroethane	€ND	50	μg/L		30/2014 7:14:30 PM	11420
Indeno(1,2,3-cd)pyrene	ND	50	μg/L	1 1/3	30/2014 7:14:30 PM	11420
Isophorone	ND	50	μg/L	1 1/3	30/2014 7:14:30 PM	11420
1-Methylnaphthalene	ND	50	μg/L	1 1/3	30/2014 7:14:30 PM	11420
2-Methylnaphthalene	ND	50	μg/L	1 1/3	30/2014 7:14:30 PM	11420
2-Methylphenol	ND	50	μg/L	1 1/3	30/2014 7:14:30 PM	11420
3+4-Methylphenol	ND	50	μg/L	1 1/3	30/2014 7:14:30 PM	11420
N-Nitrosodi-n-propylamine	ND	50	μg/L	1 1/3	30/2014 7:14:30 PM	11420
N-Nitrosodimethylamine	ND	50	μg/L	1 1/3	30/2014 7:14:30 PM	11420
N-Nitrosodiphenylamine	ND	50	μg/L	1 1/3	30/2014 7:14:30 PM	11420
Naphthalene	ND	50	μg/L	1 1/3	30/2014 7:14:30 PM	11420
2-Nitroaniline	ND	50	μg/L	1 1/3	30/2014 7:14:30 PM	11420
3-Nitroaniline	ND	50	μg/L	1 1/3	30/2014 7:14:30 PM	11420
4-Nitroaniline	ND	50	μg/L	1 1/3	30/2014 7:14:30 PM	11420

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 2 of 17

- P Sample pH greater than 2.
- RL Reporting Detection Limit

Analytical Report

Lab Order 1401A07

Date Reported: 2/13/2014

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Injection Well 1-23-2014

Lab ID: 1401A07-001

Project:

Client Sample ID: Injection Well

Collection Date: 1/23/2014 8:35:00 AM

Received Date: 1/24/2014 10:15:00 AM

Analyses	Result	RL Q	ual Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLA	TILES				Analyst	: DAM
Nitrobenzene	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
2-Nitrophenol	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
4-Nitrophenol	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
Pentachlorophenol	ND	100	μg/L	1	1/30/2014 7:14:30 PM	11420
Phenanthrene	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
Phenol	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
Pyrene	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
Pyridine	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
1,2,4-Trichlorobenzene	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
2,4,5-Trichlorophenol	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
2,4,6-Trichlorophenol	ND	50	μg/L	1	1/30/2014 7:14:30 PM	11420
Surr: 2-Fluorophenol	66.2	22.7-98	%REC	1	1/30/2014 7:14:30 PM	11420
Surr: Phenol-d5	54.5	23.4-74.9	%REC	1	1/30/2014 7:14:30 PM	11420
Surr: 2,4,6-Tribromophenol	97.6	23.3-111	%REC	1	1/30/2014 7:14:30 PM	11420
Surr: Nitrobenzene-d5	86.5	36.8-111	%REC	1	1/30/2014 7:14:30 PM	11420
Surr: 2-Fluorobiphenyl	86.4	38.3-110	%REC	1	1/30/2014 7:14:30 PM	11420
Surr: 4-Terphenyl-d14	73.7	52.1-116	%REC	1	1/30/2014 7:14:30 PM	11420
EPA METHOD 8260B: VOLATILES	6				Analyst	: DJF
Benzene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
Toluene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
Ethylbenzene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
1,2,4-Trimethylbenzene	ND	10	µg/∟	10	1/31/2014 3:25:28 PM	R16441
1,3,5-Trimethylbenzene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
1,2-Dichloroethane (EDC)	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
1,2-Dibromoethane (EDB)	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
Naphthalene	ND	20	μg/L	10	1/31/2014 3:25:28 PM	R16441
1-Methylnaphthalene	ND	40	μg/L	10	1/31/2014 3:25:28 PM	R16441
2-Methylnaphthalene	ND	40	μg/L	10	1/31/2014 3:25:28 PM	R16441
Acetone	1400	100	μg/L	10	1/31/2014 3:25:28 PM	R16441
Bromobenzene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
Bromodichloromethane	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
Bromoform	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
Bromomethane	ND	30	μg/L	10	1/31/2014 3:25:28 PM	R16441
2-Butanone	200	100	μg/L	10	1/31/2014 3:25:28 PM	R16441
Carbon disulfide	ND	100	μg/L	10	1/31/2014 3:25:28 PM	R16441
Carbon Tetrachloride	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
Chlorobenzene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
Chloroethane	ND	20	μg/L	10	1/31/2014 3:25:28 PM	R16441

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 3 of 17

- P Sample pH greater than 2.
- RL Reporting Detection Limit

Analytical Report

Lab Order 1401A07

Date Reported: 2/13/2014

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. Client Sample ID: Injection Well

Project: Injection Well 1-23-2014

Collection Date: 1/23/2014 8:35:00 AM Lab ID: 1401A07-001 Matrix: AQUEOUS Received Date: 1/24/2014 10:15:00 AM

Analyses	Result	RL (Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst	: DJF
Chloroform	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R1644
Chloromethane	ND	30	μg/L	10	1/31/2014 3:25:28 PM	R1644
2-Chlorotoluene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R1644
4-Chlorotoluene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R1644
cis-1,2-DCE	ND	10	μ g /L	10	1/31/2014 3:25:28 PM	R1644
cis-1,3-Dichloropropene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R1644
1,2-Dibromo-3-chloropropane	ND	20	μg/L	10	1/31/2014 3:25:28 PM	R1644
Dibromochloromethane	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R1644
Dibromomethane	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R1644
1,2-Dichlorobenzene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R1644
1,3-Dichlorobenzene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R1644
1,4-Dichlorobenzene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R1644
Dichlorodifluoromethane	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R1644
1,1-Dichloroethane	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
1,1-Dichloroethene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R1644
1,2-Dichloropropane	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R1644
1,3-Dichloropropane	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R1644
2,2-Dichloropropane	ND	20	μg/L	10	1/31/2014 3:25:28 PM	R1644
1,1-Dichloropropene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
Hexachlorobutadiene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
2-Hexanone	ND	100	μg/L	10	1/31/2014 3:25:28 PM	R16441
Isopropyibenzene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
4-Isopropyltoluene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
4-Methyl-2-pentanone	ND	100	μg/L	10	1/31/2014 3:25:28 PM	R16441
Methylene Chloride	ND	30	μg/L	10	1/31/2014 3:25:28 PM	R16441
n-Butylbenzene	ND	30	μg/L	10	1/31/2014 3:25:28 PM	R16441
n-Propylbenzene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
sec-Butylbenzene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
Styrene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
tert-Butylbenzene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
1,1,1,2-Tetrachloroethane	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
1,1,2,2-Tetrachloroethane	ND	20	μg/L	10	1/31/2014 3:25:28 PM	R16441
Tetrachloroethene (PCE)	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
trans-1,2-DCE	ND	10	μg/L	. 10	1/31/2014 3:25:28 PM	R16441
trans-1,3-Dichloropropene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
1,2,3-Trichlorobenzene	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
1,2,4-Trichlorobenzene	ND	10	μ g/ L	10	1/31/2014 3:25:28 PM	R16441
1,1,1-Trichloroethane	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441
1,1,2-Trichloroethane	ND	10	μg/L	10	1/31/2014 3:25:28 PM	R16441

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 4 of 17

- P Sample pH greater than 2.
- RL Reporting Detection Limit

Analytical Report Lab Order 1401A07

Date Reported: 2/13/2014

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

 Project:
 Injection Well 1-23-2014
 Collection Date: 1/23/2014 8:35:00 AM

 Lab ID:
 1401A07-001
 Matrix: AQUEOUS
 Received Date: 1/24/2014 10:15:00 AM

Analyses	Result	RL (Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst	: DJF
Trichloroethene (TCE)	ND	10		μ g/L	10	1/31/2014 3:25:28 PM	R16441
Trichlorofluoromethane	ND	10		μg/L	10	1/31/2014 3:25:28 PM	R16441
1,2,3-Trichloropropane	ND	20		μg/L	10	1/31/2014 3:25:28 PM	R16441
Vinyl chloride	ND	10		μg/L	10	1/31/2014 3:25:28 PM	R16441
Xylenes, Total	ND	15		μg/L	10	1/31/2014 3:25:28 PM	R16441
Surr: 1,2-Dichloroethane-d4	100	70-130		%REC	10	1/31/2014 3:25:28 PM	R16441
Surr: 4-Bromofluorobenzene	86.4	70-130		%REC	10	1/31/2014 3:25:28 PM	R16441
Surr: Dibromofluoromethane	98.8	70-130		%REC	10	1/31/2014 3:25:28 PM	R16441
Surr: Toluene-d8	101	70-130		%REC	10	1/31/2014 3:25:28 PM	R16441
SM2510B: SPECIFIC CONDUCTANO	E					Analyst	: SRM
Conductivity	7100	0.010		µmhos/cm	1	1/24/2014 5:53:17 PM	R16304
SM4500-H+B: PH						Analyst	: SRM
pН	6.25	1.68	Н	pH units	1	1/24/2014 5:53:17 PM	R16304
SM2320B: ALKALINITY						Analyst	: SRM
Bicarbonate (As CaCO3)	380	20		mg/L CaCO3	1	1/24/2014 5:53:17 PM	R16304
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	1/24/2014 5:53:17 PM	R16304
Total Alkalinity (as CaCO3)	380	20		mg/L CaCO3	1	1/24/2014 5:53:17 PM	R16304
SM2540C MOD: TOTAL DISSOLVED	SOLIDS					Analyst	KS
Total Dissolved Solids	5240	100	*	mg/L	1	1/28/2014 5:33:00 PM	11406

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit Page
- P Sample pH greater than 2.
- Page 5 of 17
- RL Reporting Detection Limit

Anatek Labs, Inc.

1282 Aituras Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

140128036

Address:

4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109 Project Name:

1401A07

Attn:

ANDY FREEMAN

Analytical Results Report

Sample Number

140128036-001

Sampling Date 1/23/2014

Date/Time Received 1/28/2014 12:18 PM

Client Sample ID

1401A07-001E / INJECTION WELL

Sampling Time 8:35 AM

. ._...

Matrix

Water

Sample Location

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	1	2/12/2014	CRW	SW846 CH7	
Flashpoint	>200	°F		2/4/2014	KFG	EPA 1010	
pН	5,89	ph Units		1/31/2014	AJT	EPA 150.1	
Reactive sulfide	1.57	mg/L	1	1/29/2014	AJT	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL

EPA's Maximum Contaminant Level

ND

Not Detected

NOT Detected

PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated.

Soil/solid results are reported on a dry-weight basis unless otherwise noted.

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#:

1401A07

13-Feb-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1-23-2014

Sample ID	MB
-----------	----

SampType: MBLK

TestCode: EPA Method 300.0: Anions

TestCode: EPA Method 300.0: Anions

Client ID: PBW

Batch ID: R16313

PQL

RunNo: 16313

%REC LowLimit

Prep Date: Analyte

Analysis Date: 1/24/2014

Result

SeqNo: 470380

Units: mg/L HighLimit

%RPD **RPDLimit**

Quai

Sulfate

ND 0.50

Sample ID LCS Client ID: LCSW

SampType: LCS

RunNo: 16313

Batch ID: R16313

Units: mg/L

Prep Date: Analyte

Analysis Date: 1/24/2014

SeqNo: 470381

%RPD

Result **PQL** SPK value SPK Ref Val %REC

SPK value SPK Ref Val

LowLimit 96.0

HighLimit 110 **RPDLimit**

Qual

Sulfate

Sample ID MB

9.6 0.50 10.00 0

TestCode: EPA Method 300.0: Anions

Client ID: Prep Date:

SampType: MBLK Batch ID: R16337 Analysis Date: 1/27/2014

PQL

RunNo: 16337 SeqNo: 471000

Units: mg/L

Analyte

0.50 ND

Result

SPK value SPK Ref Val %REC LowLimit HighLimit

%RPD **RPDLimit** Qual

Chloride

SampType: LCS

TestCode: EPA Method 300.0: Anions

Client ID:

Sample ID LCS

LCSW

Batch ID: R16337

0.50

RunNo: 16337

92.6

110

Prep Date:

Analysis Date: 1/27/2014

SegNo: 471001

Units: mg/L

Page 6 of 17

Qual

Analyte Chloride

Result PQL

4.6

SPK value SPK Ref Val

5.000

%REC LowLimit

HighLimit

90

%RPD

RPDLimit

Qualifiers:

Value exceeds Maximum Contaminant Level.

Ε Value above quantitation range

Analyte detected below quantitation limits

0 RSD is greater than RSDlimit

R RPD outside accepted recovery limits Spike Recovery outside accepted recovery limits

Analyte detected in the associated Method Blank В

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Sample pH greater than 2.

RLReporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#:

1401A07

13-Feb-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1-23-2014

Sample ID 5ml rb	SampT	npType: MBLK TestCode: EPA Method 82					nod 8260B: VOLATILES					
Client ID: PBW	Batch	ID: R16441	F	RunNo: 16441								
Prep Date:	Analysis D	ate: 1/31/2014	5	SeqNo: 474209			Units: µg/L					
Analyte	Result	PQL SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual			
Benzene	ND	1.0										
Toluene	ND	1.0										
Ethylbenzene	ND	1.0										
Methyl tert-butyl ether (MTBE)	ND	1.0										
1,2,4-Trimethylbenzene	ND	1.0										
1,3,5-Trimethylbenzene	ND	1.0										
1,2-Dichloroethane (EDC)	ND	1.0										
1,2-Dibromoethane (EDB)	ND	1.0										
Naphthalene	ND	2.0										
1-Methylnaphthalene	ND	4.0										
2-Methylnaphthalene	ND	4.0										
Асетопе	ND	10										
Bromobenzene	ND	1.0										
Bromodichloromethane	ND	1.0										
Bromoform	ND	1.0										
Bromomethane	ND	3.0										
2-Butanone	ND	10	,									
Carbon disulfide	ND	10										
Carbon Tetrachloride	ND	1.0										
Chlorobenzene	ND	1.0										
Chloroethane	ND	2.0										
Chloroform	ND	1.0										
Chloromethane	ND	3.0										
2-Chlorotoluene	ND	1.0										
4-Chlorotoluene	ND	1.0										
cis-1,2-DCE	ND	1.0										
cis-1,3-Dichloropropene	ND	1.0										
1,2-Dibromo-3-chloropropane	ND	2.0										
Dibromochloromethane	ND	1.0										
Dibromomethane	ND	1.0										
1,2-Dichlorobenzene	ND	1.0										
1,3-Dichlorobenzene	ND	1.0										
1,4-Dichlorobenzene	ND	1.0										
Dichlorodifluoromethane	ND	1.0										
1,1-Dichloroethane	ND	1.0										
1,1-Dichloroethene	ND	1.0										
1,2-Dichloropropane	ND	1.0										
1,3-Dichloropropane	ND	1.0										
2,2-Dichloropropane	ND	2.0										
Z,Z Distilotopiopario	110	2,0										

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Page 7 of 17

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#:

1401A07

13-Feb-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1-23-2014

Sample ID 5ml rb	SampT	SampType: MBLK TestCode: EPA Metho					8260B: VOL	ATILES		
Client ID: PBW	Batch	Batch ID: R16441			tunNo: 10	6441				
Prep Date:	Analysis D	ate: 1/31/2	014	S	SeqNo: 474209		Units: µg/L			
Analyte	Result	PQL SP	K value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloropropene	· ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	10		10.00		101	70	130			
Surr: 4-Bromofluorobenzene	8.4		10.00		84.4	70	130			
Surr: Dibromofluoromethane	9.3		10.00		93.4	70	130			
Surr: Toluene-d8	9.3		10.00		93.0	70	130			

Sample ID 100ng Ics	SampT	ype: LC	S	Tes	TestCode: EPA Method 8260B: VOLATILES					
Client ID: LCSW	Batch ID: R16441			F	RunNo: 16441					
Prep Date:	Analysis D	ate: 1/	31/2014	SeqNo: 474213			Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	. 0	107	70	130			
Toluene	20	1.0	20.00	0	101	82.2	124			
Chlorobenzene	18	1.0	20.00	0	92.5	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- D Court IV and the O
- P Sample pH greater than 2. RL Reporting Detection Limit

Page 8 of 17

Hall Environmental Analysis Laboratory, Inc.

WO#:

1401A07 13-Feb-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1-23-2014

Sample ID 100ng Ics	SampT	ype: LC	s	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: LCSW	Batch	ID: R1	6441	F	RunNo: 1	6441				
Prep Date:	Analysis D	Analysis Date: 1/31/2014			SeqNo: 4	74213	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethene	24	1.0	20.00	0 119 83.5			155			
Trichloroethene (TCE)	19	1.0	20.00	0	93.4	7 0	130			
Surr: 1,2-Dichloroethane-d4	10		10.00		100	70	130			
Surr: 4-Bromofluorobenzene	8.8		10.00		88.1	70	130			
Surr: Dibromofluoromethane	8.1 10.00		80.7 70		130					
Surr: Toluene-d8 10 10.0			10.00) 101 70 130						

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Page 9 of 17

Hall Environmental Analysis Laboratory, Inc.

WO#:

1401A07

13-Feb-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1-23-2014

Sample ID mb-11420	SampTy	/pe: MBLK	Tes	tCode: EPA Met	hod 8270C: Semi	volatiles		
Client ID: PBW	Batch	ID: 11420	I	RunNo: 16402				
Prep Date: 1/27/2014	Analysis Da	ate: 1/30/201	14	SeqNo: 473422	Units: µg/L			
Analyte	Result	PQL SPK	value SPK Ref Val	%REC LowLi	mit HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10						
Acenaphthylene	ND	10						
Aniline	ND	10						
Anthracene	ND	10						
Azobenzene	ND	10						
Benz(a)anthracene	ND	10						
Benzo(a)pyrene	ND	10						
Benzo(b)fluoranthene	ND	10						
Benzo(g,h,i)perylene	ND	10						
Benzo(k)fluoranthene	ND	10						
Benzoic acid	ND	20						
Benzyl alcohol	ND	10						
Bis(2-chloroethoxy)methane	ND	10						
Bis(2-chloroethyl)ether	ND	10						
Bis(2-chloroisopropyl)ether	ND	10						
Bis(2-ethylhexyl)phthalate	ND	10						
4-Bromophenyl phenyl ether	ND	10						
Butyl benzyl phthalate	ND	10						
Carbazole	ND	10						
4-Chloro-3-methylphenol	ND	10						
4-Chloroaniline	ND	10						
2-Chioronaphthalene	ND T	10						
2-Chlorophenol	ND	10						
4-Chlorophenyl phenyl ether	ND	10						
Chrysene	ND	10						
Di-n-butyl phthalate	ND	10						
Di-n-octyl phthalate	ND	10						
Dibenz(a,h)anthracene	ND	10						
Dibenzofuran	ND	10						
1,2-Dichlorobenzene	ND	10						
1,3-Dichlorobenzene	ND	10						
1,4-Dichlorobenzene	ND	10						
3,3'-Dichlorobenzidine	ND	10						
Diethyl phthalate	ND	10						
Dimethyl phthalate	ND	10						
2,4-Dichlorophenol	ND	20						
2,4-Dimethylphenol	ND	10						
4,6-Dinitro-2-methylphenol	ND	20						
2,4-Dinitrophenol	ND	20						

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range Е
- Analyte detected below quantitation limits
- RSD is greater than RSDlimit 0
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded H
- ND Not Detected at the Reporting Limit

Reporting Detection Limit

- Sample pH greater than 2. P
- Page 10 of 17

Hall Environmental Analysis Laboratory, Inc.

WO#:

1401A07 13-Feb-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1-23-2014

Sample ID mb-11420	SampTy	pe: MBLK	Test	Code: EPA Method	8270C: Semi	volatiles		
Client ID: PBW		ID: 11420		unNo: 16402				
Prep Date: 1/27/2014		te: 1/30/2014		eqNo: 473422	Units: µg/L			
Analyte	Result	PQL SPK value	SPK Ref Val	%REC LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	ND	10						
2,6-Dinitrotoluene	ND	10	•					
Fluoranthene	ND	10						
Fluorene	ND	10						
Hexachlorobenzene	ND	10						
Hexachlorobutadiene	ND	10						
Hexachlorocyclopentadiene	ND	10						
Hexachloroethane	ND	10						
Indeno(1,2,3-cd)pyrene	ND	10						
Isophorone	ND	10						
1-Methylnaphthalene	ND	10						
2-Methylnaphthalene	ND	10						
2-Methylphenol	ND	10						
3+4-Methylphenol	ND	10						
N-Nitrosodi-n-propylamine	ND	10						
N-Nitrosodimethylamine	ND	10						
N-Nitrosodiphenylamine	ND	10		,				
Naphthalene	ND	10						
2-Nitroaniline	ND	10						
3-Nitroaniline	ND	10						
4-Nitroaniline	ND	10						
Nitrobenzene	ND	10						
2-Nitrophenol	ND	10						
4-Nitrophenol	ND	10						
Pentachlorophenol	ND	20						
Phenanthrene	ND	10						
Phenol	ND	10						
Pyrene	ND	10						
Pyridine	ND	10						
1,2,4-Trichlorobenzene	ND	10						
2,4,5-Trichlorophenol	ND	10						
2,4,6-Trichlorophenol	ND .	10						
Surr: 2-Fluorophenol	120	200.0		60.4 22.7	98			
Surr: Phenol-d5	91	200.0		45.4 23.4	74.9			
Surr: 2,4,6-Tribromophenol	150	200.0		74.9 23.3	111			
Surr: Nitrobenzene-d5	81	100.0		80.7 36.8	111			
Surr: 2-Fluorobiphenyl	77	100.0		76.6 38.3	110			
Surr: 4-Terphenyl-d14	74	100.0		73.9 52.1	116			
	• •	100.0		. 0.0	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Page 11 of 17

Hall Environmental Analysis Laboratory, Inc.

WO#:

1401A07

13-Feb-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1-23-2014

Sample ID Ics-11420	SampT	ype: LC	s	Test	Code: El	PA Method	8270C: Semi	volatiles		
Client ID: LCSW	Batch	ı ID: 114	1 20	R	unNo: 10	6402				
Prep Date: 1/27/2014	Analysis D	ate: 1/	30/2014	S	eqNo: 4	73423	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	72	10	100.0	0	72.4	48	101			
4-Chloro-3-methylphenol	130	10	200.0	0	67.2	47.9	109			
2-Chlorophenol	70	10	200.0	0	35.0	40	105			S
1,4-Dichlorobenzene	60	10	100.0	0	60.3	40.8	94.3			
2,4-Dinitrotoluene	63	10	100.0	0	63.2	28.3	131			
N-Nitrosodi-n-propylamine	80	10	100.0	0	79.7	46.2	119			
-Nitrophenol	16	10	200.0	0	8.02	10.5	67.9			S
Pentachiorophenol	31	20	200.0	0	15.5	22.4	81.1			S
Phenol	67	10	200.0	0	33.4	21.4	72.9			
Ругепе	66	10	100.0	0	65.9	46.9	109			
,2,4-Trichlorobenzene	68	10	100.0	0	67.8	43.1	98.4			
Surr: 2-Fluorophenol	36		200.0		18.0	22.7	98			S
Surr: Phenol-d5	65		200.0		32.3	23.4	74.9			
Surr: 2,4,6-Tribromophenol	72		200.0		36.2	23.3	111			
Surr: Nitrobenzene-d5	74		100.0		73.5	36.8	111			
Surr: 2-Fluorobiphenyl	74		100.0		73.9	38.3	110			
Surr: 4-Terphenyl-d14	80		100.0		80.0	52.1	116			
Sample ID mb-11513	SampT	ype: MB	LK	Test	Code: EF	PA Method	8270C: Semi	volatiles		
Client ID: PBW	Batch	ID: 115	513	R	unNo: 16	6496				
Prep Date: 1/31/2014	Analysis D	ate: 2/3	3/2014	S	eqNo: 47	75097	Units: %REC			
•	Analysis D Result	ate: 2/ 3		S SPK Ref Val	eqNo: 4 7	75097 LowLimit	Units: %REG	%RPD	RPDLimit	Qual
•	-				•				RPDLimit	Qual
Analyte	Result		SPK value		%REC	LowLimit	HighLimit		RPDLimit	Qual
Analyte Surr: 2-Fluorophenol	Result 110		SPK value 200.0		%REC 54.9	LowLimit 22.7	HighLimit 98		RPDLimit	Qual
Analyte Surr: 2-Fluorophenol Surr: Phenol-d5	Result 110 93		SPK value 200.0 200.0		%REC 54.9 46.5	LowLimit 22.7 23.4	HighLimit 98 74.9		RPDLimit	Qual
Analyte Surr: 2-Fluorophenol Surr: Phenol-d5 Surr: 2,4,6-Tribromophenol	Result 110 93 130		SPK value 200.0 200.0 200.0		%REC 54.9 46.5 65.6	22.7 23.4 23.3	HighLimit 98 74.9 111		RPDLimit	Qual
Analyte Surr: 2-Fluorophenol Surr: Phenol-d5 Surr: 2,4,6-Tribromophenol Surr: Nitrobenzene-d5	Result 110 93 130 77		SPK value 200.0 200.0 200.0 100.0		%REC 54.9 46.5 65.6 77.3	22.7 23.4 23.3 36.8	HighLimit 98 74.9 111 111		RPDLimit	Qual
Analyte Surr: 2-Fluorophenol Surr: Phenol-d5 Surr: 2,4,6-Tribromophenol Surr: Nitrobenzene-d5 Surr: 2-Fluorobiphenyl	Result 110 93 130 77 71 72		SPK value 200.0 200.0 200.0 100.0 100.0	SPK Ref Val	%REC 54.9 46.5 65.6 77.3 70.6 71.6	22.7 23.4 23.3 36.8 38.3 52.1	98 74.9 111 111 110	%RPD	RPDLimit	Qual
Analyte Surr: 2-Fluorophenol Surr: Phenol-d5 Surr: 2,4,6-Tribromophenol Surr: Nitrobenzene-d5 Surr: 2-Fluorobiphenyl Surr: 4-Terphenyl-d14	Result 110 93 130 77 71 72 SampT	PQL	SPK value 200.0 200.0 200.0 100.0 100.0 100.0	SPK Ref Val	%REC 54.9 46.5 65.6 77.3 70.6 71.6	22.7 23.4 23.3 36.8 38.3 52.1	HighLimit 98 74.9 111 111 110 116	%RPD	RPDLimit	Qual
Analyte Surr: 2-Fluorophenol Surr: Phenol-d5 Surr: 2,4,6-Tribromophenol Surr: Nitrobenzene-d5 Surr: 2-Fluorobiphenyl Surr: 4-Terphenyl-d14 Sample ID Ics-11513	Result 110 93 130 77 71 72 SampT	PQL ype: LC:	SPK value 200.0 200.0 200.0 100.0 100.0 58	SPK Ref Val	%REC 54.9 46.5 65.6 77.3 70.6 71.6	22.7 23.4 23.3 36.8 38.3 52.1	HighLimit 98 74.9 111 111 110 116	%RPD	RPDLimit	Qual
Analyte Surr: 2-Fluorophenol Surr: Phenol-d5 Surr: 2,4,6-Tribromophenol Surr: Nitrobenzene-d5 Surr: 2-Fluorobiphenyl Surr: 4-Terphenyl-d14 Sample ID Ics-11513 Client ID: LCSW	Result 110 93 130 77 71 72 SampT Batch	PQL ype: LC:	SPK value 200.0 200.0 200.0 100.0 100.0 100.0 \$ \$513 3/2014	SPK Ref Val	%REC 54.9 46.5 65.6 77.3 70.6 71.6 Code: EF	22.7 23.4 23.3 36.8 38.3 52.1	HighLimit 98 74.9 111 111 110 116 8270C: Semin	%RPD	RPDLimit RPDLimit	Qual
Analyte Sur: 2-Fluorophenol Surr: Phenol-d5 Surr: 2,4,6-Tribromophenol Surr: Nitrobenzene-d5 Surr: 2-Fluorobiphenyl Surr: 4-Terphenyl-d14 Sample ID Ics-11513 Client ID: LCSW Prep Date: 1/31/2014	Result 110 93 130 77 71 72 SampT Batch Analysis D	ype: LC:	SPK value 200.0 200.0 200.0 100.0 100.0 100.0 \$ \$513 3/2014	SPK Ref Val Test R	%REC 54.9 46.5 65.6 77.3 70.6 71.6 Code: EF unNo: 18	22.7 23.4 23.3 36.8 38.3 52.1 PA Method 6496 75098	HighLimit 98 74.9 111 111 110 116 8270C: Semin	%RPD		
Analyte Surr: 2-Fluorophenol Surr: Phenol-d5 Surr: 2,4,6-Tribromophenol Surr: Nitrobenzene-d5 Surr: 2-Fluorobiphenyl Surr: 4-Terphenyl-d14 Sample ID Ics-11513 Client ID: LCSW Prep Date: 1/31/2014 Analyte	Result 110 93 130 77 71 72 SampT Batch Analysis D Result	ype: LC:	SPK value 200.0 200.0 200.0 100.0 100.0 5 513 8/2014 SPK value	SPK Ref Val Test R	%REC 54.9 46.5 65.6 77.3 70.6 71.6 Code: EF unNo: 16 eqNo: 47	LowLimit 22.7 23.4 23.3 36.8 38.3 52.1 PA Method 6496 75098 LowLimit	HighLimit 98 74.9 111 111 110 116 8270C: Semin	%RPD		
Analyte Surr: 2-Fluorophenol Surr: Phenol-d5 Surr: 2,4,6-Tribromophenol Surr: Nitrobenzene-d5 Surr: 2-Fluorobiphenyl Surr: 4-Terphenyl-d14 Sample ID Ics-11513 Client ID: LCSW Prep Date: 1/31/2014 Analyte Surr: 2-Fluorophenol	Result 110 93 130 77 71 72 SampT Batch Analysis D Result 100	ype: LC:	SPK value 200.0 200.0 200.0 100.0 100.0 100.0 S 513 3/2014 SPK value 200.0	SPK Ref Val Test R	%REC 54.9 46.5 65.6 77.3 70.6 71.6 Code: EF unNo: 18 eqNo: 47 %REC 49.8	LowLimit 22.7 23.4 23.3 36.8 38.3 52.1 PA Method 6496 75098 LowLimit 22.7	HighLimit 98 74.9 111 111 110 116 8270C: Semin Units: %REC	%RPD		
Analyte Surr: 2-Fluorophenol Surr: Phenol-d5 Surr: 2,4,6-Tribromophenol Surr: Nitrobenzene-d5 Surr: 2-Fluorobiphenyl Surr: 4-Terphenyl-d14 Sample ID Ics-11513 Client ID: LCSW Prep Date: 1/31/2014 Analyte Surr: 2-Fluorophenol Surr: Phenol-d5	Result 110 93 130 77 71 72 SampT Batch Analysis D Result 100 85	ype: LC:	SPK value 200.0 200.0 200.0 100.0 100.0 5 3/2014 SPK value 200.0 200.0	SPK Ref Val Test R	%REC 54.9 46.5 65.6 77.3 70.6 71.6 Code: EF unNo: 16 eqNo: 47 %REC 49.8 42.3	22.7 23.4 23.3 36.8 38.3 52.1 2A Method 6496 75098 LowLimit 22.7 23.4	HighLimit 98 74.9 111 110 116 8270C: Semiv Units: %REC HighLimit 98 74.9	%RPD		

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range E
- Analyte detected below quantitation limits
- RSD is greater than RSDlimit O
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded H
- Not Detected at the Reporting Limit ND

Reporting Detection Limit

- Sample pH greater than 2.

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1401A07

13-Feb-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1-23-2014

Sample ID Ics-11513

SampType: LCS

TestCode: EPA Method 8270C: Semivolatiles

Client ID: LCSW

Prep Date: 1/31/2014

RunNo: 16496

Batch ID: 11513

Units: %REC

HighLimit

Analyte

Analysis Date: 2/3/2014 SPK value SPK Ref Val

SampType: LCSD

SeqNo: 475098

RPDLimit

Qual

Surr: 4-Terphenyl-d14

Result

100.0

52.1

116

%RPD

61

%REC 61.4

TestCode: EPA Method 8270C: Semivolatiles

LowLimit

Sample ID	lcsd-11513
Client ID:	LCSS02
n	

Batch ID: 11513

RunNo: 16496

Prep Date: 1/31/2014	Analysis D	ate: 2/	3/2014	S	SeqNo: 4	75099	Units: %RE	C		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	110		200.0	*****	54.1	22.7	98	0	0	
Surr: Phenol-d5	90		200.0		44.9	23.4	74.9	0	0	
Surr: 2,4,6-Tribromophenol	160		200.0		79.0	23.3	111	0	0	
Surr: Nitrobenzene-d5	89		100.0		88.8	36.8	111	0	0	
Surr: 2-Fluorobiphenyl	83		100.0		83.1	38.3	110	0	0	
Surr: 4-Terphenyl-d14	70		100.0		70.1	52.1	116	0	0	

Qualifiers:

Value exceeds Maximum Contaminant Level.

Value above quantitation range Ε

Analyte detected below quantitation limits

0 RSD is greater than RSDlimit

R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

В Analyte detected in the associated Method Blank

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Page 13 of 17

Sample pH greater than 2. Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

WO#:

1401A07

13-Feb-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1-23-2014

Sample ID MB-11463

SampType: MBLK

TestCode: EPA Method 7470: Mercury

Client ID: PBW Batch ID: 11463

RunNo: 16401

SPK value SPK Ref Val %REC LowLimit

Units: mg/L

Prep Date: Analyte

Client ID:

Client ID:

Prep Date:

Client ID:

Prep Date: 1/29/2014

Analysis Date: 1/30/2014 **PQL**

SegNo: 473049

HighLimit

%RPD RPDLimit

Qual

Mercury

ND 0.00020

Sample ID LCS-11463

Prep Date: 1/29/2014

LCSW

SampType: LCS

Batch ID: 11463 Analysis Date: 1/30/2014

RunNo: 16401 SeqNo: 473050

Units: mg/L

Analyte

PQL

0.0047

Result

0.0046

0.0045

SPK value SPK Ref Val %REC

94.3

LowLimit

TestCode: EPA Method 7470: Mercury

HighLimit 120 %RPD **RPDLimit**

Qual

Mercury

Sample ID 1401A07-001CMS

1/29/2014

SampType: MS

TestCode: EPA Method 7470: Mercury

Injection Well 1/29/2014

Batch ID: 11463

PQL

0.0010

Batch ID: 11463

Analysis Date: 1/30/2014

0.00020

RunNo: 16401

Analyte

Analysis Date: 1/30/2014

0.005000

0.005000

0.005000

SeqNo: 473069 %REC

Units: mg/L HighLimit

RPDLimit %RPD

Qual

Mercury

Sample 1D 1401A07-001CMSD

Injection Well

SampType: MSD

TestCode: EPA Method 7470: Mercury

SPK value SPK Ref Val

RunNo: 16401

90.1

LowLimit

Units: mg/L

125

RPDLimit Qual

Analyte Mercury

PQL SPK value SPK Ref Val 0.0010

%REC

SeqNo: 473070

LowLimit HighLimit

%RPD

1.02

20

Qualifiers:

S

Value exceeds Maximum Contaminant Level.

Value above quantitation range Ε

Analyte detected below quantitation limits

RSD is greater than RSDlimit 0

R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

Analyte detected in the associated Method Blank

Holding times for preparation or analysis exceeded Η

ND Not Detected at the Reporting Limit

Sample pH greater than 2. P

Reporting Detection Limit

Page 14 of 17

Hall Environmental Analysis Laboratory, Inc.

WO#:

1401A07

13-Feb-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1-23-2014

Sample ID MB-11432	Samp	Туре: М	BLK	Tes	tCode: E	PA 6010B:	Total Recove	rable Met	als			
Client ID: PBW	Bato	ch ID: 11	432	F	RunNo: 1	6372						
Prep Date: 1/28/2014	Analysis	Date: 1/	29/2014	8	SeqNo: 4	72096	Units: mg/L					
Analyte	Result	PQL.	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Arsenic	ND	0.020		-,								
Barium	ND	0.020										
Cadmium	ND	0.0020										
Calcium	ND	1.0										
Chromium	ND	0.0060										
Lead	ND	0.0050										
Magnesium	ND	1.0										
Potassium	ND	1.0										
Selenium	ND	0.050										
Silver	ND	0.0050										
Sodium	ND	1.0										

Sample ID LCS-11432	SampT	Type: LC	S	Tes	Code: El	PA 6010B:	Total Recover	able Meta	als	
Client ID: LCSW	Batch	h ID: 114	432	F	tunNo: 1	6372				
Prep Date: 1/28/2014	Analysis D	Date: 1/	29/2014	S	eqNo: 4	72097	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.43	0.020	0.5000	0	85.6	80	120			
Barium	0.43	0.020	0.5000	0	85.5	80	120			
Cadmium	0.42	0.0020	0.5000	0	84.3	80	120			
Calcium	45	1.0	50.00	0	89.1	80	120			
Chromium	0.43	0.0060	0.5000	0	85.3	80	120			
Lead	0.42	0.0050	0.5000	0	84.4	80	120			
Magnesium	45	1.0	50.00	0	90.0	80	120			
Potassium	44	1.0	50.00	0	88.6	80	120			
Selenium	0.42	0.050	0.5000	0	83.4	80	120			
Silver	0.089	0.0050	0.1000	0	88.7	80	120			
Sodium	45	1.0	50.00	0	89.3	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Page 15 of 17

Hall Environmental Analysis Laboratory, Inc.

WO#:

1401A07 13-Feb-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1-23-2014

Sample ID mb-1

SampType: MBLK

TestCode: SM2320B: Alkalinity

Client ID: PBW

Batch ID: R16304

PQL

PQL

RunNo: 16304

HighLimit

Units: mg/L CaCO3

Prep Date:

Result

Analysis Date: 1/24/2014

SeqNo: 470197

%RPD

RPDLimit Qual

Analyte Total Alkalinity (as CaCO3)

20

Sample ID Ics-1 Client ID: LCSW SampType: LCS Batch ID: R16304

TestCode: SM2320B: Alkalinity

RunNo: 16304

Prep Date:

Analysis Date: 1/24/2014

SeqNo: 470198

Units: mg/L CaCO3

Analyte

RPDLimit Qual

Result 82

20

0

103

%RPD

Total Alkalinity (as CaCO3)

80.00

SPK value SPK Ref Val %REC LowLimit

LowLimit

HighLimit

SPK value SPK Ref Val %REC

110

Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

Analyte detected below quantitation limits J

RSD is greater than RSDlimit 0

RPD outside accepted recovery limits R

Spike Recovery outside accepted recovery limits

В Analyte detected in the associated Method Blank

Holding times for preparation or analysis exceeded Η

Not Detected at the Reporting Limit ND

Sample pH greater than 2.

Reporting Detection Limit

Page 16 of 17

Hall Environmental Analysis Laboratory, Inc.

WO#:

1401A07 13-Feb-14

Client:

Western Refining Southwest, Inc.

Project:

Analyte

Injection Well 1-23-2014

Sample ID MB-11406

SampType: MBLK

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: PBW

Batch ID: 11406

Result

RunNo: 16349

Prep Date: 1/27/2014

Analysis Date: 1/28/2014

PQL

SeqNo: 471302

Units: mg/L HighLimit

%RPD **RPDLimit**

Qual

Total Dissolved Solids

ND 20.0

Sample ID LCS-11406

LCSW

SampType: LCS Batch ID: 11406

RunNo: 16349

Prep Date: 1/27/2014

Analysis Date: 1/28/2014

SeqNo: 471303 %REC

Units: mg/L

%RPD **RPDLimit**

Qual

Total Dissolved Solids

20.0

PQL

1000

SPK value SPK Ref Val

101

TestCode: SM2540C MOD: Total Dissolved Solids

LowLimit

120

Analyte

Client ID:

Result 1010

0

SPK value SPK Ref Val %REC LowLimit

HighLimit

Qualifiers:

Value exceeds Maximum Contaminant Level.

Spike Recovery outside accepted recovery limits

Value above quantitation range E

Analyte detected below quantitation limits

0 RSD is greater than RSDlimit

R RPD outside accepted recovery limits В Analyte detected in the associated Method Blank

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Sample pH greater than 2.

RLReporting Detection Limit Page 17 of 17



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: Western Refining Southw Work Order Nun	nber: 1401A07		RcptNo:	
Received by/date: LM GIQ4/14		• • •		
Logged By: Michelie Garcla 1/24/2014 10:15:0	O AM	Michael Gan	uie	
Completed By: Michelle Garcia 1/24/2014 12:54:4	9 PM	Mitall Gon		
Reviewed By: AT0//27/14		, , ,		
Chain of Custody				
1 Custody seals intact on sample bottles?	Yes i. i	No i	Not Present	
2. Is Chain of Custody complete?	Yes 🟏	No :	Not Present	
3. How was the sample delivered?	Courier			
Log In				
4. Was an attempt made to cool the samples?	Yes 🗹	No 🗆	na 🗆	
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes 🔽	No 🗆	na 🗆	
6. Sample(s) in proper container(s)?	Yes 🗹	No 🖂		
7. Sufficient sample volume for indicated test(s)?	Yes 🔀	No 🗔		
8. Are samples (except VOA and ONG) properly preserved?	Yes 🗹	No []		
9. Was preservative added to bottles?	Yes 🗌	No 🗹	na 🗆	
10.VOA vials have zero headspace?	Yes 🗹	No 🗆	No VOA Vials	
11. Were any sample containers received broken?	Yes	No 🗹	# of preserved	_
12. Does paperwork match bottle labels?	Yes 🗹	No 🗆	bottles checked for pH:	12 unless noted)
(Note discrepancies on chain of custody) 13. Are matrices correctly identified on Chain of Custody?	Yes 🗸	No 🗀	Adjusted	00
14. Is it clear what analyses were requested?	Yes 🗹	No 🗔		
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes 🗹	No 🗌	Checked by:	
Special Handling (If applicable)	_			
16. Was client notified of all discrepancies with this order?	Yes 🗌	No 🗆	NA 🗹	
Person Notified: Da	te:			
By Whom: Via	a: [ˈeMail [ˈ]F	hone [] Fax	in Person	
Regarding:		فمع معاملها مع إنها معاما		
Client Instructions:		······································	<u></u>	
17. Additional remarks:				
18. Cooler Information President Security Production President Security President Secu	اد التارات در روههودهیپرو را رز	المراضعاتون ووطيع		
Goder No Temp C Condition Seal Intact Seal No.	Seal Date	Signed By		

	ANALYSTS LABORATORY	www hallanvironmental com	4901 Hawkins NE - Albuquerque, NM 87109	Tel. 505-345-3975 Fax 505-345-4107	ınal	(*0	904,80 S) ack-up	H) B3 SIM3, Mg, IO ₂ , F II IO ₂ , F II IO ₂ , F II	270 Ca N ₁₆ (A) (A)	tals to the second of the seco	FPH (Metho FDB (Metho ACRA 8 Met Acra 68310 o ACRA 8 Met Acra 68310 o	X	×	×	×	×	×	×	×				•		if necessary, samples submitted to Hall Environmental may be subcontracted to other advertible aboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.
			301 Hav	el. 505			JW / O	PG	0	19)	83108 Hq1			×									.; ::		. Any sub
			4	μ.		_					ITM + X3T8 ITM + X3T8	-	\vdash	-	_		-				+	-	Remarks:		possibility
	48	n Well	4100						No.	1.7	HEAL No.	-001	1001	1001	180	1001	100	100-	·				Date Time 	ON CANATION	ories. This serves as nolice of this
Time:	□ Rush	: Injectic	1.23			ger:		76	N/es	erature:	Preservativ e Type	豆	Amber	Amber	Amber	H ₂ SO₄	FONH.	Na OH	Zn Acutate				c lace	. V	dredited laborat
Turn-Around Time:	X Standard	Project Name: Injection Well		Project #:		Project Manager:		Sampler (7)	On Ice:	Sample Temperature:	Container Type and #	5-VOA	1 - liter	1-500 ml	1-500 ml	1-250 ml	1-500 ml	1-500 ml	1-500 mt				Medical by	Received by:	ontracted to other ac
Chain-of-Custody Record	ning		50 CR 4990	Bloomfield, NM 87413	35		See A (Full Validation)				Sample Request ID	Injection Well	Injection Well	Injection Well	Injection Well				of Kralen	Mistry North	nitted to Hall Environmental may be subx				
of-Cu	n Refii		50 CF	field, N	32-41		L	J		,	Matrix	H ₂ 0	H ₂ 0	H ₂ 0	H ₂ 0				Notification by	Relinquished by: Mischary	rmples subr				
hain-	Nester		Mailing Address:	Bloom	Phone #: 505-632-4135	Fax#:	ackage:	3	(Type)		Time	8:35 H20							-			-1		T S	ecessary, st
.ਹ	Client: Western Refining		Mailing /		Phone #	email or Fax#:	QA/QC Package:	Other	X EDD (Type)		Date	1-33-4	-		-				-			\neg	-	1 23 14	<u>≠</u>



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

OrderNo.: 1407D12

August 15, 2014

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4166 FAX (505) 632-3911

RE: Injection Well 7-28-14 3rd QTR

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 7/29/2014 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

andyl

4901 Hawkins NE

Albuquerque, NM 87109

Lab Order 1407D12

Hall Environmental Analysis Laboratory, Inc. Date Reported: 8/15/2014

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

 Project:
 Injection Well 7-28-14 3rd QTR
 Collection Date: 7/28/2014 9:30:00 AM

 Lab ID:
 1407D12-001
 Matrix: AQUEOUS
 Received Date: 7/29/2014 7:55:00 AM

Analyses	Result	RL (Qual Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analyst	: LGP
Chloride	510	25	mg/L	50	8/4/2014 5:04:09 PM	R20363
Sulfate	41	2.5	mg/L	5	7/29/2014 4:17:43 PM	R20236
EPA METHOD 7470: MERCURY					Analyst	: MMD
Mercury	ND	0.00020	mg/L	1	8/4/2014 2:43:32 PM	14571
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst	: ELS
Arsenic	ND	0.020	mg/L	1	8/2/2014 2:09:02 PM	14549
Barium	0.63	0.020	mg/L	1	8/2/2014 2:09:02 PM	14549
Cadmium	ND	0.0020	mg/L	1	8/2/2014 2:09:02 PM	14549
Calcium	480	5.0	mg/L	5	8/2/2014 2:10:49 PM	14549
Chromium	ND	0.0060	mg/L	1	8/2/2014 2:09:02 PM	14549
Lead	ND	0.0050	mg/L	1	8/2/2014 2:09:02 PM	14549
Magnesium	99	1.0	mg/L	1	8/2/2014 2:09:02 PM	14549
Potassium	36	1.0	mg/L	1	8/2/2014 2:09:02 PM	14549
Selenium	ND	0.050	mg/L	1	8/2/2014 2:09:02 PM	14549
Silver	ND	0.0050	mg/L	1	8/2/2014 2:09:02 PM	14549
Sodium	1100	20	mg/L	20	8/2/2014 3:24:50 PM	14549
EPA METHOD 8270C: SEMIVOLATIL	.ES				Analyst	DAM
Acenaphthene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Acenaphthylene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Aniline	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Anthracene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Azobenzene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Benz(a)anthracene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Benzo(a)pyrene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Benzo(b)fluoranthene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Benzo(g,h,i)perylene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Benzo(k)fluoranthene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Benzoic acid	ND	200	μg/L	1	7/31/2014 8:37:47 PM	14520
Benzyl alcohol	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Bis(2-chloroethoxy)methane	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Bis(2-chloroethyl)ether	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Bis(2-chloroisopropyl)ether	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Bis(2-ethylhexyl)phthalate	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
4-Bromophenyl phenyl ether	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Butyl benzyl phthalate	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Carbazole	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
4-Chloro-3-methylphenol	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
4-Chloroaniline	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 1 of 20

- P Sample pH greater than 2.
- RL Reporting Detection Limit

Lab Order 1407D12

Date Reported: 8/15/2014

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

Project: Injection Well 7-28-14 3rd QTR Collection Date: 7/28/2014 9:30:00 AM

Lab ID: 1407D12-001 Matrix: AQUEOUS Received Date: 7/29/2014 7:55:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLA	ATILES		<u> </u>		Analyst	: DAM
2-Chloronaphthalene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
2-Chlorophenol	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
4-Chiorophenyl phenyl ether	ND	100	μg/L.	1	7/31/2014 8:37:47 PM	14520
Chrysene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Di-n-butyl phthalate	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Di-n-octyl phthalate	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Dibenz(a,h)anthracene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Dibenzofuran	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
1,2-Dichlorobenzene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
1,3-Dichlorobenzene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
1,4-Dichlorobenzene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
3,3'-Dichlorobenzidine	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Diethyl phthalate	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Dimethyl phthalate	ND	100	μg/L.	1	7/31/2014 8:37:47 PM	14520
2,4-Dichlorophenol	ND	200	μg/L.	1	7/31/2014 8:37:47 PM	14520
2,4-Dimethylphenol	ND	100	μg/L.	1	7/31/2014 8:37:47 PM	14520
4,6-Dinitro-2-methylphenol	ND	200	μg/L	1	7/31/2014 8:37:47 PM	14520
2,4-Dinitrophenol	ND	200	μg/L	1	7/31/2014 8:37:47 PM	14520
2,4-Dinitrotoluene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
2,6-Dinitrotoluene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Fluoranthene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Fluorene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Hexachlorobenzene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Hexachlorobutadiene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Hexachlorocyclopentadiene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Hexachloroethane	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Indeno(1,2,3-cd)pyrene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Isophorone	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
1-Methylnaphthalene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
2-Methylnaphthalene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
2-Methylphenol	ND	200	μg/L	1	7/31/2014 8:37:47 PM	14520
3+4-Methylphenol	210	100	μg/L	1	7/31/2014 8:37:47 PM	14520
N-Nitrosodi-n-propylamine	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
N-Nitrosodimethylamine	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
N-Nitrosodiphenylamine	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
Naphthalene	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
2-Nitroaniline	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
3-Nitroaniline	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520
4-Nitroaniline	ND	100	μg/L	1	7/31/2014 8:37:47 PM	14520

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 2 of 20

- P Sample pH greater than 2.
- RL Reporting Detection Limit

Lab Order 1407D12

Date Reported: 8/15/2014

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 7-28-14 3rd QTR

Lab ID: 1407D12-001

Client Sample ID: Injection Well

Collection Date: 7/28/2014 9:30:00 AM

Matrix: AQUEOUS Received Date: 7/29/2014 7:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLAT	ILES					Analyst	: DAM
Nitrobenzene	ND	100		μg/L	1	7/31/2014 8:37:47 PM	14520
2-Nitrophenol	ND	100		μg/L	1	7/31/2014 8:37:47 PM	14520
4-Nitrophenol	ND	100		μg/L	1	7/31/2014 8:37:47 PM	14520
Pentachlorophenol	ND	200		μg/L	1	7/31/2014 8:37:47 PM	14520
Phenanthrene	ND	100		μg/L	1	7/31/2014 8:37:47 PM	14520
Phenol	ND	100		μg/L	1	7/31/2014 8:37:47 PM	14520
Pyrene	ND	100		μg/L	1	7/31/2014 8:37:47 PM	14520
Pyridine	ND	100		μg/L	1	7/31/2014 8:37:47 PM	14520
1,2,4-Trichlorobenzene	ND	100		μg/L	1	7/31/2014 8:37:47 PM	14520
2,4,5-Trichlorophenol	ND	100		μg/L	1	7/31/2014 8:37:47 PM	14520
2,4,6-Trichiorophenol	ND	100		μg/L	1	7/31/2014 8:37:47 PM	14520
Surr: 2-Fluorophenol	0	12.1-85.8	s	%REC	1	7/31/2014 8:37:47 PM	14520
Surr: Phenol-d5	0	17.7-65.8	S	%REC	1	7/31/2014 8:37:47 PM	14520
Surr: 2,4,6-Tribromophenol	0	26-138	S	%REC	1	7/31/2014 8:37:47 PM	14520
Surr: Nitrobenzene-d5	0	47.5-119	S	%REC	1	7/31/2014 8:37:47 PM	14520
Surr: 2-Fluorobiphenyl	0	48.1-106	S	%REC	1	7/31/2014 8:37:47 PM	14520
Surr: 4-Terphenyl-d14	0	44-113	s	%REC	1	7/31/2014 8:37:47 PM	14520
EPA METHOD 8260B: VOLATILES						Analyst	DJF
Benzene	ND	2.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
Toluene	ND	2.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
Ethylbenzene	ND	2.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
Methyl tert-butyl ether (MTBE)	ND	2.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
1,2,4-Trimethylbenzene	ND	2.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
1,3,5-Trimethylbenzene	ND	2.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
1,2-Dichloroethane (EDC)	ND	2.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
1,2-Dibromoethane (EDB)	ND	2.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
Naphthalene	ND	4.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
1-Methylnaphthalene	ND	8.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
2-Methylnaphthalene	ND	8.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
Acetone	85	20		μg/L	2	7/31/2014 1:41:17 PM	R2029
Bromobenzene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R2029
Bromodichloromethane	ND	2:0		μg/L	2	7/31/2014 1:41:17 PM	R2029
Bromoform	ND	2.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
Bromomethane	ND	6.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
2-Butanone	ND	20		μg/L	2	7/31/2014 1:41:17 PM	R2029
Carbon disulfide	ND	20		μg/L	2	7/31/2014 1:41:17 PM	R2029
Carbon Tetrachloride	ND	2.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
Chlorobenzene	ND	2.0		μg/L	2	7/31/2014 1:41:17 PM	R2029
Chloroethane	ND	4.0		μg/L	2	7/31/2014 1:41:17 PM	R2029

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 3 of 20

- P Sample pH greater than 2.
- RL Reporting Detection Limit

Lab Order 1407D12

Date Reported: 8/15/2014

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. Client Sample ID: Injection Well

 Project:
 Injection Well 7-28-14 3rd QTR
 Collection Date: 7/28/2014 9:30:00 AM

 Lab ID:
 1407D12-001
 Matrix: AQUEOUS
 Received Date: 7/29/2014 7:55:00 AM

Result **RL Qual Units DF** Date Analyzed Batch Analyses **EPA METHOD 8260B: VOLATILES** Analyst: DJF Chloroform ND 2.0 μg/L 2 7/31/2014 1:41:17 PM R20298 2 7/31/2014 1:41:17 PM R20298 Chloromethane ND 6.0 μg/L 2-Chlorotoluene 2.0 2 7/31/2014 1:41:17 PM R20298 ND μg/L 2 7/31/2014 1:41:17 PM R20298 4-Chlorotoluene ND 2.0 μg/L 2 R20298 cis-1,2-DCE ND 2.0 7/31/2014 1:41:17 PM μg/L cis-1,3-Dichloropropene ND 2.0 μg/L 2 7/31/2014 1:41:17 PM R20298 μg/L 1,2-Dibromo-3-chloropropane ND 4.0 2 7/31/2014 1:41:17 PM R20298 Dibromochloromethane ND 2.0 μg/L 2 7/31/2014 1:41:17 PM R20298 Dibromomethane ND 2.0 μg/L 2 7/31/2014 1:41:17 PM R20298 1,2-Dichlorobenzene ND 2.0 2 7/31/2014 1:41:17 PM R20298 μg/L 1,3-Dichlorobenzene ND 2.0 2 7/31/2014 1:41:17 PM R20298 μg/L 1,4-Dichlorobenzene ND 2.0 2 7/31/2014 1:41:17 PM R20298 μg/L 2.0 2 7/31/2014 1:41:17 PM R20298 Dichlorodifluoromethane ND μg/L 1.1-Dichloroethane ND 2.0 μg/L 2 7/31/2014 1:41:17 PM R20298 2 1,1-Dichloroethene ND 2.0 μg/L 7/31/2014 1:41:17 PM R20298 1,2-Dichloropropane ND 2.0 μg/L 2 7/31/2014 1:41:17 PM R20298 1,3-Dichloropropane ND 2.0 μg/L 2 7/31/2014 1:41:17 PM R20298 2,2-Dichloropropane ND 4.0 μg/L 2 7/31/2014 1:41:17 PM R20298 1,1-Dichloropropene ND 2.0 2 7/31/2014 1:41:17 PM R20298 μg/L R20298 Hexachlorobutadiene ND 2.0 μg/L 2 7/31/2014 1:41:17 PM 2-Hexanone ND 20 μg/L 2 7/31/2014 1:41:17 PM R20298 2.0 2 7/31/2014 1:41:17 PM R20298 Isopropylbenzene ND μg/L 4-Isopropyltoluene ND 2.0 2 7/31/2014 1:41:17 PM R20298 μg/L ND 20 2 R20298 4-Methyl-2-pentanone μg/L 7/31/2014 1:41:17 PM Methylene Chloride ND 6.0 μg/L 2 7/31/2014 1:41:17 PM R20298 n-Butylbenzene ND 6.0 μg/L 2 7/31/2014 1:41:17 PM R20298 R20298 n-Propylbenzene ND 2.0 μg/L 2 7/31/2014 1:41:17 PM sec-Butylbenzene ND 2.0 μg/L 2 7/31/2014 1:41:17 PM R20298 Styrene ND 2.0 2 7/31/2014 1:41:17 PM R20298 µg/L tert-Butylbenzene ND 2.0 2 7/31/2014 1:41:17 PM R20298 μg/L 1.1.1.2-Tetrachloroethane ND 2.0 2 7/31/2014 1:41:17 PM R20298 μg/L 1,1,2,2-Tetrachloroethane ND 4.0 2 R20298 µg/L 7/31/2014 1:41:17 PM Tetrachloroethene (PCE) ND 2.0 μg/L 2 7/31/2014 1:41:17 PM R20298 μg/L trans-1,2-DCE ND 2.0 2 7/31/2014 1:41:17 PM R20298 trans-1,3-Dichloropropene ND 2.0 μg/L 2 7/31/2014 1:41:17 PM R20298 ND 1,2,3-Trichlorobenzene 2.0 μg/L 2 7/31/2014 1:41:17 PM R20298 1,2,4-Trichlorobenzene ND 2.0 µg/L 2 7/31/2014 1:41:17 PM R20298 1,1,1-Trichloroethane 7/31/2014 1:41:17 PM R20298 ND 2.0 μg/L 1,1,2-Trichloroethane ND 7/31/2014 1:41:17 PM R20298 2.0 μg/L

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 4 of 20

- P Sample pH greater than 2.
- RL Reporting Detection Limit

Analytical Report Lab Order 1407D12

Date Reported: 8/15/2014

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 7-28-14 3rd QTR

1407D12-001

Lab ID:

Matrix: AQUEOUS

Collection Date: 7/28/2014 9:30:00 AM Received Date: 7/29/2014 7:55:00 AM

Client Sample ID: Injection Well

Analyses	Result	RL (Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst	: DJF
Trichloroethene (TCE)	ND	2.0		μg/L	2	7/31/2014 1:41:17 PM	R20298
Trichlorofluoromethane	ND	2.0		μg/L	2	7/31/2014 1:41:17 PM	R20298
1,2,3-Trichloropropane	ND	4.0		μg/L	2	7/31/2014 1:41:17 PM	R20298
Vinyl chloride	ND	2.0		μ g/L	2	7/31/2014 1:41:17 PM	R20298
Xylenes, Total	ND	3.0		μg/L	2	7/31/2014 1:41:17 PM	R20298
Surr: 1,2-Dichloroethane-d4	92.4	70-130		%REC	2	7/31/2014 1:41:17 PM	R20298
Surr: 4-Bromofluorobenzene	95.4	70-130		%REC	2	7/31/2014 1:41:17 PM	R20298
Surr: Dibromofluoromethane	100	70-130		%REC	2	7/31/2014 1:41:17 PM	R20298
Surr: Toluene-d8	93.6	70-130		%REC	2	7/31/2014 1:41:17 PM	R20298
SM2510B: SPECIFIC CONDUCTANO	E					Analyst	: JRR
Conductivity	1900	0.010		µmhos/cm	1	7/29/2014 12:08:01 PM	R20245
SM4500-H+B: PH						Analyst	: JRR
pН	7.10	1.68	Н	pH units	1	7/29/2014 12:08:01 PM	R20245
SM2320B: ALKALINITY						Analyst	: JRR
Bicarbonate (As CaCO3)	220	20		mg/L CaCO3	1	7/29/2014 12:08:01 PM	R20245
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	7/29/2014 12:08:01 PM	R20245
Total Alkalinity (as CaCO3)	220	20		mg/L CaCO3	1	7/29/2014 12:08:01 PM	R20245
SM2540C MOD: TOTAL DISSOLVED	SOLIDS					Analyst	: KS
Total Dissolved Solids	1380	200	*	mg/L	1	7/30/2014 5:19:00 PM	14475

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit Page 5 of 20
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

140730036

Address:

4901 HAWKINS NE SUITE D

Project Name:

1407D12

ALBUQUERQUE, NM 87109

Attn:

ANDY FREEMAN

Analytical Results Report

Sample Number

140730036-001

Sampling Date 7/28/2014

Date/Time Received 7/30/2014 12:25 PM

1407D12-001E / INJECTION WELL

Client Sample ID Matrix

Sampling Time 9:30 AM

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	NĐ	mg/L	1	8/12/2014	CRW	SW846 CH7	
Flashpoint	>200	°F		8/5/2014	KFG	EPA 1010	
pН	7.44	ph Units		8/5/2014	АЛТ	SM 4500pH-B	
Reactive sulfide	ND	mg/L	1	8/1/2014	AJT	SW846 CH7	

Authorized Signature

MCL

EPA's Maximum Contaminant Level

ND

Not Detected

PQL

Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated.

Soll/solid results are reported on a dry-weight basis unless otherwise noted.

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

140730036

Address:

4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109 Project Name:

1407D12

Attn:

ANDY FREEMAN

Analytical Results Report Quality Control Data

Lab Control Sa	mple										
Parameter		LCS Resul	t Unit	s LC	S Spike	%Rec	AR	%Rec	Prep	Date	Analysis Date
Reactive sulfide		0.16	mg/l	<u>.</u>	0.2	80.0	76	0-130	8/1/	2014	8/1/2014
Cyanide (reactive)		0.505	mg/l		0.5	101.0	80	0-120	8/12	/2014	8/12/2014
Lab Control Sa	mple Duplicate									· · · · · · · · · · · · · · · · · · ·	
Parameter	- •	LCSD Result	Units	LCSD	%Rec	%RP		AR %RPD	Prep I	Data	Analysis Date
Reactive suifide	· · · · · · · · · · · · · · · · · · ·	0.18	mg/L	Spike 0.2	90.0	11.8	-	0-25	8/1/2		8/1/2014
Matrix Spike						<u> </u>				1.40.	
Sample Number	Parameter		Sample	MS	11_1		MS	0/ Pag	AR	Bass Bat	. Amelyain Date
140730036-001	Reactive sulfide		Result ND	Result 0.22	Unit	_	pike 0.2	%Rec 110.0	%Rec 70-130	Prep Dat 8/1/2014	•
140730036-001	Cyanide (reactive)		ND	0.919	mg/l	_	1	91.9	80-120		
Matrix Spike Du	uplicate										
•	•	. MSD		MSD				AR			
Parameter		Result	Units	Spike			RPD	%RPE		p Date	Analysis Date
Cyanide (reactive)		0.906	mg/L	1	90	.6	1.4	0-25	8/1	2/2014	8/12/2014
Method Blank											
Parameter			Re	sult	Ur	nits		PQL	Pr	ep Date	Analysis Date
Cyanide (reactive)			N	1D	m	g/L		1	8/1	2/2014	8/12/2014
Reactive sulfide			1	ND	m	g/L		1	8/	1/2014	8/1/2014

AR

Acceptable Range

ИD

Not Detected

PQL

Practical Quantitation Limit

RPD

Relative Percentage Difference

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatak Labs WA: EPA:WA00169; ID:WA00169; WA:C586; MT:Cert0095; FL(NELAP): E871099

Thursday, August 14, 2014

Page 1 of 1

Hall Environmental Analysis Laboratory, Inc.

WO#:

1407D12

15-Aug-14

Client: Project:		Western Refining Southwest, Inc. Injection Well 7-28-14 3rd QTR							
Sample ID	МВ	SampType: MBLK	TestCode: EPA	Method	300.0: Anions				
Client ID:	PBW	Batch ID: R20236	RunNo: 202	36					
Prep Date:		Analysis Date: 7/29/2014	SeqNo: 588	153	Units: mg/L				
Analyte		Result PQL SPK va	K Ref Val %REC L	owLimit	HighLimit	%RPD	RPDLimit	Qual	
Sulfate		ND 0.50							
Sample ID	LCS	SampType: LCS	TestCode: EPA	Method	300.0: Anions				
Client ID:	LCSW	Batch ID: R20236	RunNo: 202 3	36					
Prep Date:		Analysis Date: 7/29/2014	SeqNo: 588	154	Units: mg/L				
Analyte		Result PQL SPK va	K Ref Val %REC L	owLimit	HighLimit	%RPD	RPDLimit	Qual	
Sulfate		9.7 0.50 10.	0 97.4	90	110			-	
Sample ID	МВ	SampType: MBLK	TestCode: EPA	Method	300.0: Anions				
Client ID:	PBW	Batch ID: R20236	RunNo: 2023	36					
Prep Date:		Analysis Date: 7/29/2014	SeqNo: 588 2	211	Units: mg/L				
Analyte		Result PQL SPK val	K Ref Val %REC L	.owLimit	HighLimit	%RPD	RPDLimit	Qual	
Sulfate		ND 0.50							
Sample ID	LCS	SampType: LCS	TestCode: EPA	Method	300.0: Anions				
Client ID:	LCSW	Batch ID: R20236	RunNo: 2023	36					
Prep Date:		Analysis Date: 7/29/2014	SeqNo: 5882	212	Units: mg/L				
Analyte		Result PQL SPK val	K Ref Val %REC L	.owLimit	HighLimit	%RPD	RPDLimit	Qual	
Sulfate		9.6 0.50 10.	0 95.6	90	110				
Sample ID	MB	SampType: MBLK	TestCode: EPA	Method	300.0: Anions				
Client ID:	PBW	Batch ID: R20363	RunNo: 2036	63					
Prep Date:		Analysis Date: 8/4/2014	SeqNo: 592 1	146	Units: mg/L				
Analyte		Result PQL SPK val	K Ref Val %REC L	.owLimit	HighLimit	%RPD	RPDLimit	Qual	
Chloride		ND 0.50							
Sample ID	LCS	SampType: LCS	TestCode: EPA	Method	300.0: Anions				
Client ID:	LCSW	Batch ID: R20363	RunNo: 2036	63					
Prep Date:		Analysis Date: 8/4/2014	SeqNo: 5921	147	Units: mg/L				

Qualifiers:

Analyte

Chloride

Value exceeds Maximum Contaminant Level.

Result

4.7

PQL

0.50

SPK value SPK Ref Val

5.000

- Ε Value above quantitation range
- J Analyte detected below quantitation limits
- RSD is greater than RSDlimit 0
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank

%REC · LowLimit

94.2

HighLimit

110

%RPD

- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 6 of 20

RPDLimit

Qual

- P Sample pH greater than 2.
- Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

WO#:

1407D12

15-Aug-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-28-14 3rd QTR

Sample ID MB

SampType: MBLK

TestCode: EPA Method 300.0: Anions

TestCode: EPA Method 300.0: Anions

Client ID: PBW Batch ID: R20363

RunNo: 20363

Analysis Date: 8/5/2014

SeqNo: 592208

%REC LowLimit

Units: mg/L HighLimit

%RPD

RPDLimit Qual

Analyte Chloride

Prep Date:

Result PQL ND 0.50

Sample ID LCS

SampType: LCS

Client ID: LCSW

Batch ID: R20363

RunNo: 20363

Prep Date: Analyte

Analysis Date: 8/5/2014 **PQL**

SeqNo: 592209

Units: mg/L

SPK value SPK Ref Val %REC 0

93.8

LowLimit HighLimit %RPD

RPDLimit

5.000

Qual

Chloride

Result

SPK value SPK Ref Val

4.7

0.50

110

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Е Value above quantitation range
- Analyte detected below quantitation limits
- RSD is greater than RSDlimit 0
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Sample pH greater than 2. Reporting Detection Limit RL

Page 7 of 20

Hall Environmental Analysis Laboratory, Inc.

WO#:

1407D12 15-Aug-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-28-14 3rd QTR

Sample ID 5mL rb	SampT	уре: М	BLK	Tes	ATILES					
Client ID: PBW	Batch	ID: R2	20230	F	RunNo: 2	0230				
Prep Date:	Analysis D	ate: 7/	/29/2014	S	SeqNo: 587928 Units: %REC					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	9.1		10.00		91.3	70	130			
Surr: 4-Bromofluorobenzene	9.3		10.00		93.2	70	130			
Surr: Dibromofluoromethane	10		10.00		102	` 70	130			
Surr: Toluene-d8	9.7		10.00		96.7	70	130			

Sample ID 100ng Ics	SampT	SampType: LCS TestCode: EPA Method 8260B: VOLATILES								
Client ID: LCSW	Batch	ID: R2	20230	F	RunNo: 2	0230				
Prep Date:	Analysis D	ate: 7	/29/2014	S						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	9.9		10.00		98.6	70	130			
Surr. 4-Bromofluorobenzene	9.5		10.00		95.4	70	. 130			
Surr: Dibromofluoromethane	11		10.00		107	70	130			
Surr: Toluene-d8	9.4		10.00		94.3	. 70	130			

Sample ID 5ml rb	SampT	ype: Mi	BLK	TestCode: EPA Method 8260B: VOLATILES						
Client ID: PBW	Batch	ID: R2	0298	R	RunNo: 2	0298				
Prep Date:	Analysis D	ate: 7/	31/2014	S	SeqNo: 5	89943	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- RPD outside accepted recovery limits R
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Η Holding times for preparation or analysis exceeded
- NDNot Detected at the Reporting Limit
- Sample pH greater than 2. Reporting Detection Limit

Page 8 of 20

Hall Environmental Analysis Laboratory, Inc.

WO#:

1407D12

15-Aug-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-28-14 3rd QTR

Sample ID 5ml rb	SampT	уре: МЕ	BLK	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	ID: R2	0298	F	RunNo: 2	0298				
Prep Date:	Analysis D	ate: 7/	31/2014	S	SeqNo: 5	89943	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyitoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propyibenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0							,	
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- J Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded Η
- ND Not Detected at the Reporting Limit
- Sample pH greater than 2.
- Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1407D12

15-Aug-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-28-14 3rd QTR

Sample ID 5ml rb	SampT	уре: МЕ	BLK	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	1D: R2	0298	F	RunNo: 2	0298				
Prep Date:	Analysis D	ate: 7/	31/2014	S	SeqNo: 5	89943	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	8.8		10.00		88.2	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		98.9	70	130			
Surr: Dibromofluoromethane	10		10.00		102	70	130			
Surr: Toluene-d8	9.9		10.00		98.9	70	130			

Sample ID 100ng Ics	SampT	ype: LC	S	Tes	tCode: E	ATILES				
Client ID: LCSW	Batch	1D: R2	0298	R	RunNo: 2	0298				
Prep Date:	Analysis D	ate: 7/	31/2014	S	SeqNo: 5	89945	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	20	1.0	20.00	0	102	70	130			
Toluene	21	1.0	20.00	0	107	80	120			
Chlorobenzene	20	1.0	20.00	0	99.3	70	130			
1,1-Dichloroethene	22	1.0	20.00	0	110	82.6	131			
Trichloroethene (TCE)	21	1.0	20.00	0	103	70	130			
Surr: 1,2-Dichloroethane-d4	9.2		10.00		91.6	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		100	70	130			
Surr: Dibromofluoromethane	10		10.00		101	70	130			
Surr: Toluene-d8	9.4		10.00		94.3	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Not Detected at the Reporting
- P Sample pH greater than 2.RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1407D12

15-Aug-14

Western Refining Southwest, Inc.

Client: Western Refining Southwest, Inc Project: Injection Well 7-28-14 3rd QTR

Sample ID mb-14520	SampT	ype: MI	BLK	Tes	tCode: E	PA Method	8270C: Semi	olatiles		
Client ID: PBW	Batch	ID: 14	520	F	RunNo: 2	0300				
Prep Date: 7/31/2014	Analysis D	ate: 7	31/2014	8	SeqNo: 5	90031	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Aniline	ND	10								
Anthracene	ND	10								
Azobenzene	ND	10								
Benz(a)anthracene	ND	10								
Benzo(a)pyrene	ND	10								
Benzo(b)fluoranthene	ND	10								
Benzo(g,h,i)perylene	ND	10								
Benzo(k)fluoranthene	ND	10								
Benzoic acid	ND	20								
Benzyl alcohol	ND	10								
Bis(2-chloroethoxy)methane	ND	10								
Bis(2-chloroethyl)ether	ND	10								
Bis(2-chloroisopropyl)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	10								
4-Bromophenyl phenyl ether	ND	10								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								
4-Chloro-3-methylphenol	ND	10								
4-Chloroaniline	ND	10								
2-Chloronaphthalene	ND	10								
2-Chlorophenol	ND	10								
4-Chlorophenyl phenyl ether	ND	10								
Chrysene	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Dibenz(a,h)anthracene	ND	10								
Dibenzofuran	ND	10								
1,2-Dichlorobenzene	ND	10								
1,3-Dichlorobenzene	ND	10								
1,4-Dichlorobenzene	ND	10								
3,3'-Dichlorobenzidine	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
2,4-Dichlorophenol	ND	20								
2,4-Dimethylphenol	ND	10								
4,6-Dinitro-2-methylphenol	ND	20								
2,4-Dinitrophenol	ND	20								

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Page 11 of 20

Hall Environmental Analysis Laboratory, Inc.

WO#: 1407D12

15-Aug-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-28-14 3rd QTR

Sample ID mb-14520	SampT	ype: Mi	BLK	Tes	tCode: El	PA Method	8270C: Semi	volatiles		
Client ID: PBW	Batch	ID: 14	520	F	RunNo: 2	0300				
Prep Date: 7/31/2014	Analysis D	ate: ` 7/	31/2014	S	SeqNo: 5	90031	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	ND	10								
2,6-Dinitrotoluene	ND	10								
Fluoranthene	ND	10								•
Fluorene	ND	10								
Hexachlorobenzene	ND	10								
Hexachlorobutadiene	ND	10								
Hexachlorocyclopentadiene	ND	10								
Hexachloroethane	ND	10								
Indeno(1,2,3-cd)pyrene	ND	10								
Isophorone	ND	10								
1-Methylnaphthalene	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	20								
3+4-Methylphenol	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodimethylamine	ND	10								
N-Nitrosodiphenylamine	ND	10								
Naphthalene	ND	10								
2-Nitroaniline	ND	10								
3-Nitroaniline	ND	10								
4-Nitroanitine	ND	10		•						
Nitrobenzene	ND	10								
2-Nitrophenol	ND	10							•	
4-Nitrophenol	ND	10								
Pentachlorophenol	ND	20								
Phenanthrene	ND	10								
Phenol	ND	10								
Pyrene	ND	10								
Pyridine	ND	10								
1,2,4-Trichlorobenzene	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
Surr: 2-Fluorophenol	130		200.0		66.7	12.1	85.8			
Surr: Phenol-d5	95		200.0		47.4	17.7	65.8			
Surr: 2,4,6-Tribromophenol	170		200.0		86.4	26	138			
Surr: Nitrobenzene-d5	84		100.0		83.6	47.5	119			
Surr: 2-Fluorobiphenyl	84		100.0		83.7	48.1	106			
Surr: 4-Terphenyl-d14	94		100.0		94.5	44	· 113			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.

 RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1407D12

15-Aug-14

Client: Western Refining Southwest, Inc. Project: Injection Well 7-28-14 3rd QTR

Sample ID Ics-14520	SampType: LCS TestCode: EPA Method 8270C: Semivolatiles												
Client ID: LCSW	Batch	1D: 14	520	F	RunNo: 2	0300							
Prep Date: 7/31/2014	Analysis D	ate: 7/3	31/2014	8	90032	Units: µg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual			
Acenaphthene	87	10	100.0	0	87.0	50.3	109						
4-Chloro-3-methylphenol	200	10	200.0	0	99.0	51.2	113						
2-Chlorophenol	190	10	200.0	0	94.9	48.5	104						
1,4-Dichlorobenzene	80	10	100.0	0	79.5	39.5	106						
2,4-Dinitrotoluene	82	10	100.0	0	82.3	45.4	107						
N-Nitrosodi-n-propylamine	91	10	100.0	0	91.0	50.4	119						
4-Nitrophenol	110	10	200.0	0	53.6	15.5	62.2						
Pentachlorophenol	150	20	200.0	0	72.7	23.5	93.5						
Phenol	110	10	200.0	0	54.8	26.8	65.6						
Pyrene	96	10	100.0	0	95.5	54.4	108						
1,2,4-Trichlorobenzene	78	10	100.0	0	78.0	39.9	106						
Surr: 2-Fluorophenol	140		200.0		72.4	12.1	85.8						
Surr: Phenol-d5	100		200.0		52.5	17.7	65.8						
Surr: 2,4,6-Tribromophenol	170		200.0		87.0	26	138						
Surr: Nitrobenzene-d5	100 100.0			101	47.5	119							
Surr: 2-Fluorobiphenyl	96		100.0		96.0 48.1								
Surr: 4-Terphenyl-d14	91		100.0		90.9	44	113						

Sample ID Icsd-14520	SampT	ype: LC	SD	Tes	TestCode: EPA Method 8270C: Semivolatiles										
Client ID: LCSS02	Batch	ID: 14	520	F	RunNo: 2	0300									
Prep Date: 7/31/2014	Analysis D	ate: 7/	31/2014	8	SeqNo: 5	90033	Units: µg/L								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual					
Acenaphthene	77	10	100.0	0	76.5	50.3	109	12.8	27.2						
4-Chloro-3-methylphenol	190	10	200.0	0	93.8	51.2	113	5.37	25.9						
2-Chlorophenol	170	10	200.0	0	84.4	48.5	104	11.7	22.5						
1,4-Dichlorobenzene	73	10	100.0	0	73.3	39.5	106	8.19	24.6						
2,4-Dinitrotoluene	73	10	100.0	0	73.1	45.4	107	11.9	25.3						
N-Nitrosodi-n-propylamine	85	10	100.0	0	84.9	50.4	119	6.98	23.6						
4-Nitrophenol	110	10	200.0	0	52.7	15.5	62.2	1.69	34.7						
Pentachlorophenol	150	20	200.0	0	72.9	23.5	93.5	0.275	32.8						
Phenol	100	10	200.0	0	51.6	26.8	65.6	6.05	25.5						
Pyrene	89	10	100.0	0	88.8	54.4	108	7.31	31.4						
1,2,4-Trichlorobenzene	68	10	100.0	0	68.4	39.9	106	13.1	25.9						
Surr: 2-Fluorophenol	140		200.0		68.8	12.1	85.8	0	0						
Surr: Phenol-d5	110		200.0		53.9	17.7	65.8	0	0						
Surr: 2,4,6-Tribromophenol	170		200.0		86.5	26	138	0	0						
Surr: Nitrobenzene-d5	88		100.0		88.1	47.5	119	0	0						
Surr: 2-Fluorobiphenyl	90		100.0		89.9	48.1	106	0	0						

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- RPD outside accepted recovery limits R
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Sample pH greater than 2.
- Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1407D12

15-Aug-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-28-14 3rd QTR

Sample ID Icsd-14520

SampType: LCSD

TestCode: EPA Method 8270C: Semivolatiles

Client ID: LCSS02

Batch ID: 14520

RunNo: 20300

Prep Date: 7/31/2014 Analyte

Analysis Date: 7/31/2014

SeqNo: 590033 Units: µg/L

PQL SPK value SPK Ref Val Result

%REC

HighLimit

%RPD

RPDLimit

Qual

90

90.0

44

Surr: 4-Terphenyl-d14

100.0

113

Qualifiers:

Value exceeds Maximum Contaminant Level.

Ε Value above quantitation range

Analyte detected below quantitation limits J

0 RSD is greater than RSDlimit

RPD outside accepted recovery limits R

Spike Recovery outside accepted recovery limits

Analyte detected in the associated Method Blank В

Holding times for preparation or analysis exceeded Η

Not Detected at the Reporting Limit ND

Sample pH greater than 2. P

Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1407D12 15-Aug-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-28-14 3rd QTR

Sample ID 1407d12-001b dup

SampType: DUP

TestCode: SM2510B: Specific Conductance

Client ID: Injection Well Batch ID: R20245

RunNo: 20245

Prep Date:

Analysis Date: 7/29/2014

SeqNo: 588403

Units: µmhos/cm

Analyte Conductivity Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit**

4.30

Qual

20

1800 0.010

Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

Analyte detected below quantitation limits

RSD is greater than RSDlimit 0

R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

Analyte detected in the associated Method Blank В

Holding times for preparation or analysis exceeded Н

ND Not Detected at the Reporting Limit

Sample pH greater than 2.

Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1407D12

15-Aug-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-28-14 3rd QTR

Sample ID MB-14571

SampType: MBLK

TestCode: EPA Method 7470: Mercury

LowLimit

Client ID: PBW

8/4/2014

Batch ID: 14571

RunNo: 20345

Prep Date: Analyte

Analysis Date: 8/4/2014 PQL SPK value SPK Ref Val %REC

SeqNo: 591482

Units: mg/L HighLimit

%RPD **RPDLimit**

Qual

Mercury

ND 0.00020

Sample ID LCS-14571 Client ID: LCSW

SampType: LCS Batch ID: 14571 TestCode: EPA Method 7470: Mercury

RunNo: 20345

Prep Date: 8/4/2014 Analysis Date: 8/4/2014

SeqNo: 591483

%REC

Units: mg/L

RPDLimit

Qual

Analyte

0.005000

SPK value SPK Ref Val

%RPD

Mercury

0.0049 0.00020

PQL

98.9

HighLimit

120

Qualifiers:

Value exceeds Maximum Contaminant Level.

Ε Value above quantitation range

J Analyte detected below quantitation limits

0 RSD is greater than RSDlimit

R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

В Analyte detected in the associated Method Blank

Η Holding times for preparation or analysis exceeded

Not Detected at the Reporting Limit ND

P Sample pH greater than 2.

Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1407D12

15-Aug-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-28-14 3rd QTR

Sample ID M	IB-14549	Samp	Type: ME	BLK	TestCode: EPA 6010B: Total Recoverable Metals											
Client ID: PI	BW	Batc	h ID: 14	549	F	RunNo: 2	0323									
Prep Date: 8	8/1/2014	Analysis [Date: 8/	2/2014	S	SeqNo: 5	90696	Units: mg/L								
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual					
Arsenic		ND	0.020													
Barium		ND	0.020													
Cadmium		ND	0.0020													
Calcium		ND	1.0													
Chromium		ND	0.0060													
Lead		ND	0.0050													
Magnesium		ND	1.0													
Potassium		ND	1.0													
Selenium		ND	0.050													
Silver		ND	0.0050													
Sodium		ND	1.0													

Sample ID LCS-14549	Samp	Type: LC	S	TestCode: EPA 6010B: Total Recoverable Metals											
Client ID: LCSW	Bato	h ID: 14	549	F	RunNo: 2	0323									
Prep Date: 8/1/2014	Analysis	Date: 8/	/2/2014	8	SeqNo: 5	90697	Units: mg/L								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual					
Arsenic	0.50	0.020	0.5000	0	101	80	120								
Barium	0.50	0.020	0.5000	0	99.7	80	120								
Cadmium	0.50	0.0020	0.5000	0	99.7	80	120								
Calcium	ND	1.0	50.00	0	0	80	120			S					
Chromium	0.50	0.0060	0.5000	0	100	80	120								
Lead	0.50	0.0050	0.5000	. 0	99.5	80	120								
Magnesium	ND	1.0	50.00	0	0	80	120			S					
Potassium	ND	1.0	50.00	0	0	80	120			S					
Selenium	0.52	0.050	0.5000	0	105	80	120								
Silver	0.085	0.0050	0.1000	0	84.9	80	120								
Sodium	ND	1.0	50.00	0	0	80	120			S					

Sample ID LCS Cat-14549	SampT	ype: LC	s	TestCode: EPA 6010B: Total Recoverable Metals										
Client ID: LCSW	Batch	1D: 14	549	R	RunNo: 2	0323								
Prep Date: 8/1/2014	Analysis D	ate: 8/	2/2014	S	SeqNo: 5	90698	Units: mg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual				
Calcium	51	1.0	50.00	0	102	80	120							
Magnesium	51	1.0	50.00	0	101	80	120							
Potassium	49	1.0	50.00	0	97.3	80	120							
Sodium	50	1.0	50.00	0	101	80	120							

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Page 17 of 20

Hall Environmental Analysis Laboratory, Inc.

WO#:

1407D12

15-Aug-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-28-14 3rd QTR

Sample ID 1407d12-001b dup

SampType: DUP

TestCode: SM4500-H+B: pH

Client ID: Injection Well

Batch ID: R20245 Analysis Date: 7/29/2014 RunNo: 20245 SeqNo: 588388

SPK value SPK Ref Val %REC LowLimit

Units: pH units

Prep Date: Analyte

PQL.

HighLimit %RPD **RPDLimit**

Qual

1.68

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- RPD outside accepted recovery limits R
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.

Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1407D12

15-Aug-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-28-14 3rd QTR

Sample ID mb-1

SampType: MBLK

TestCode: SM2320B: Alkalinity

Client ID:

PBW

Batch ID: R20245 Analysis Date: 7/29/2014 RunNo: 20245

Prep Date:

PQL

SeqNo: 588355

Units: mg/L CaCO3

Analyte

SPK value SPK Ref Val %REC LowLimit HighLimit

RPDLimit

Qual

Total Alkalinity (as CaCO3)

ND

SampType: LCS

TestCode: SM2320B: Alkalinity

Sample ID Ics-1 Client ID: LCSW

Batch ID: R20245

PQL

20

20

RunNo: 20245

Units: mg/L CaCO3

Prep Date: Analyte

Analysis Date: 7/29/2014

SeqNo: 588356

SPK value SPK Ref Val 0

%REC LowLimit

HighLimit 110 %RPD **RPDLimit**

Qual

Total Alkalinity (as CaCO3)

Result

80.00

100

%RPD

80

TestCode: SM2320B: Alkalinity

Sample ID mb-2 Client ID: Prep Date:

PBW

SampType: MBLK Batch ID: R20245

Analysis Date: 7/29/2014

PQL

20

RunNo: 20245

SeqNo: 588376

Units: mg/L CaCO3

HighLimit

%RPD

RPDLimit Qual

Analyte Total Alkalinity (as CaCO3)

Sample ID Ics-2

Result ND

Result

80

SampType: LCS

TestCode: SM2320B: Alkalinity

Client ID: LCSW

Batch ID: R20245

RunNo: 20245

Prep Date:

Analysis Date: 7/29/2014

SeqNo: 588377

Units: mg/L CaCO3

Qual

Analyte

PQL SPK value SPK Ref Val

%REC

LowLimit

HighLimit

%RPD

RPDLimit

Total Alkalinity (as CaCO3)

20

80.00

0

SPK value SPK Ref Val %REC LowLimit

100

90

110

Qualifiers:

Value exceeds Maximum Contaminant Level.

Spike Recovery outside accepted recovery limits

- Ε Value above quantitation range J Analyte detected below quantitation limits
- 0 RSD is greater than RSDI imit
- R RPD outside accepted recovery limits

- В Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit Sample pH greater than 2.
- Reporting Detection Limit RL

Page 19 of 20

Hall Environmental Analysis Laboratory, Inc.

WO#:

1407D12

15-Aug-14

Client:

Western Refining Southwest, Inc.

Project:

Analyte

Analyte

Injection Well 7-28-14 3rd QTR

Sample ID MB-14475

SampType: MBLK

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: PBW

Batch ID: 14475

RunNo: 20257

Prep Date: 7/29/2014

Analysis Date: 7/30/2014

PQL

SeqNo: 588640

Units: mg/L

HighLimit

RPDLimit

%RPD

Qual

Total Dissolved Solids

ND 20.0

Result

Sample ID LCS-14475 Client ID: LCSW

SampType: LCS Batch ID: 14475

RunNo: 20257

Prep Date: 7/29/2014

Analysis Date: 7/30/2014

SeqNo: 588641

Units: mg/L HighLimit

%RPD

Result **PQL**

1000

SPK value SPK Ref Val %REC LowLimit

102

80

RPDLimit

Qual

Total Dissolved Solids

1020

20.0

SPK value SPK Ref Val

%REC LowLimit

TestCode: SM2540C MOD: Total Dissolved Solids

120

Qualifiers:

Value exceeds Maximum Contaminant Level.

Ε Value above quantitation range

Analyte detected below quantitation limits

RSD is greater than RSDlimit 0

RPD outside accepted recovery limits R

Spike Recovery outside accepted recovery limits

В Analyte detected in the associated Method Blank

Η Holding times for preparation or analysis exceeded

Not Detected at the Reporting Limit ND

Reporting Detection Limit

Sample pH greater than 2.

Page 20 of 20



Hall Environmental Analysis Laboratory 4901 Hawkins NE . Albuquerque, NM 87109

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: Western Refining Southw Work Order N	umber: 1407D12		ReptNo: 1
Received by/date: A 07 29119			
Logged By: Anne Thorne 7/29/2014 7:55:0	00 AM	ani Sham	_
Completed By: Anne Thorne 7/29/2014		ane Ilm	
Reviewed By: NG 07/29/14		Clarke Journal	
Chain of Custody		-	
1. Custody seals intact on sample bottles?	Yes 🗌	No 🗌	Not Present
2. Is Chain of Custody complete?	Yes 🗹	No 🗆	Not Present
3. How was the sample delivered?	Courier		
<u>Log In</u>			
4. Was an attempt made to cool the samples?	Yes 🗹	No 🗆	NA 🗆
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes 🗹	No 🗆	NA 🗆
6. Sample(s) in proper container(s)?	Yes 🗹	No 🗆	
7. Sufficient sample volume for indicated test(s)?	Yes 🗹	No 🗆	
8. Are samples (except VOA and ONG) properly preserved?	Yes 🗹	No 🗆	
9. Was preservative added to bottles?	Yes 🗌	No 🗹	NA 🗆
10.VOA vials have zero headspace?	Yes 🗹	No 🗆	No VOA Vials
11. Were any sample containers received broken?	Yes	No 🗹	# of preserved
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes 🗹	No 🗆	for pH: (<2)or (12 unless noted)
13. Are matrices correctly identified on Chain of Custody?	Yes 🗹	No 🗆	Adjusted? 100
14. Is it clear what analyses were requested?	Yes 🗹	No 🗆	4.0
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes 🗹	No 🗌	Checked by:
Special Handling (if applicable)			
16. Was client notified of all discrepancies with this order?	Yes 🗌	No 🗆	na 🗹
Person Notified:	ate		
By Whom: V	'ia: ☐ eMail ☐ P	hone 🔲 Fax	☐ In Person
Regarding:	to the same to the same the same of the sa	and a process of the same of	The state of the s
Client Instructions:	of all of commenced and and and any and and	and the second second second	The second second second field
17. Additional remarks:			
18. Cooler Information Cooler No Temp C Condition Seaf Intact Seal N 1 1.0 Good Yes	o Seal Date	Signed By	

INTERNATION NATIONAL DESIGNATION NATIONAL DESIGNATI		www.hallenvironmental.com	4901 Hawkins NE - Albuquerque, NM 87109	Tel. 505-345-3975 Fax 505-345-4107	Analysis Request	(°C)	SB.S.B.S.S.S.S.S.S.S.S.S.S.S.S.S.S.S.S.	OB OB OB OB OB OB OB OB OB OB OB OB OB O	4 TPH 4 TPH 6 A A A A A A A A A A A A A A A A A A A	(GF)	BTEX + MT TPH 8015B PPH's (8310 RCRA 8 Me RCRA 1 Me RCRA	. X	X	×	X	×	×	×	×		Remarks:			If necessary samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.
Turn-Around Time:	□ Rush	Project Name:	Injection Well 3nd TR	Project #:		Project Manager:	9021		Bob W GS: The Billion		Container Preservative Example X Type and # Type	3-10A Hel -cul	1-liter amber 00	192	1-50ml 100	1 H2 SO4	1-500ml HNO3		1-50cm. Acetaire 700		Date Time	Chroshelylach Mash 1452		intracted to other accredited laboratories. This serves as notice of this pos
ord	Client Western ReGuius		Mailing Address: #56 CR 4990	IN 874/3	11/		QA/QC Package:	Standard 🗆 Level 4 (Full Validation)	Accreditation	□ EDD (Type)	Date Time Matrix Sample Request ID	7-28-14 9:30 HaO Injection Well	1 . 1 . 1								Date: Relinquished by:	2811 1452 Robert Kalkon	Time: Relinquished by:	



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

OrderNo.: 1410102

October 23, 2014

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4166 FAX (505) 632-3911

RE: Injection Well 4th QTR 10-1-14

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 10/2/2014 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109



Hall Environmental Analysis Laboratory

4901 Hawkins NE

Albuquerque, NM 87109

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com **Case Narrative**

WO#:

1410102

Date:

10/23/2014

CLIENT:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10-1-14

Analytical Notes Regarding EPA Method 8260:

The injection well sample was diluted due to a foamy matrix.

Analytical Report

Lab Order 1410102

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 10/23/2014

CLIENT: Western Refining Southwest, Inc.

Injection Well 4th QTR 10-1-14

Project:

Lab ID: 1410102-001 Client Sample ID: Injection Well

Collection Date: 10/1/2014 10:00:00 AM

Received Date: 10/2/2014 6:50:00 AM

Analyses	Result	RL Qu	ıal Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analyst	: LGP
Chloride	220	10	mg/L	20	10/2/2014 4:07:13 PM	R21640
Sulfate	26	2.5	mg/L	5	10/2/2014 3:54:49 PM	R21640
EPA METHOD 7470: MERCURY					Analyst	: MMD
Mercury	ND	0.00020	mg/L	1	10/8/2014 3:02:49 PM	15770
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst	ELS
Arsenic	ND	0.020	mg/L	1	10/10/2014 9:26:53 AM	15825
Barium	0.20	0.020	mg/L	1	10/10/2014 9:26:53 AM	
Cadmium	ND	0.0020	mg/L	1	10/10/2014 9:26:53 AM	15825
Calcium	110	5.0	mg/L	5	10/10/2014 9:28:28 AM	
Chromium	ND	0.0060	mg/L	1	10/10/2014 9:26:53 AM	
Lead	ND	0.0050	mg/L	1	10/10/2014 9:26:53 AM	
Magnesium	23	1.0	mg/L	1	10/10/2014 9:26:53 AM	
Potassium	8.2	1.0	mg/L	1	10/10/2014 9:26:53 AM	
Selenium	ND	0.050	mg/L	1	10/10/2014 9:26:53 AM	
Silver	ND	0.0050	mg/L	1	10/10/2014 9:26:53 AM	
Sodium	220	5.0	mg/L	5	10/10/2014 9:28:28 AM	
		5.0	IIIg/L	5		
EPA METHOD 8270C: SEMIVOLATIL	ES				Analyst	DAM
Acenaphthene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Acenaphthylene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Aniline	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Anthracene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Azobenzene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Benz(a)anthracene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Benzo(a)pyrene	ND ·	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Benzo(b)fluoranthene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Benzo(g,h,i)perylene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Benzo(k)fluoranthene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Benzoic acid	ND	40	μg/L	1	10/9/2014 9:16:21 PM	15747
Benzyl alcohol	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Bis(2-chloroethyl)ether	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Bis(2-ethylhexyl)phthalate	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
4-Bromophenyl phenyl ether	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Butyl benzyl phthalate	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Carbazole	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
4-Chloro-3-methylphenol	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
4-Chloroaniline	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range Ε
- Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- RPD outside accepted recovery limits R
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit Page 2 of 18
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Analytical Report Lab Order 1410102

Date Reported: 10/23/2014

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

Project: Injection Well 4th QTR 10-1-14 Collection Date: 10/1/2014 10:00:00 AM

Lab ID: 1410102-001 Matrix: AQUEOUS Received Date: 10/2/2014 6:50:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLA	TILES				Analys	t: DAM
2-Chloronaphthalene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
2-Chlorophenoi	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
4-Chlorophenyl phenyl ether	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Chrysene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Di-n-butyl phthalate	ND.	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Di-n-octyl phthalate	ND	20	μg/L	1	10/9/2014 9:16:21 PM	15747
Dibenz(a,h)anthracene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Dibenzofuran	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
1,2-Dichlorobenzene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
1,3-Dichlorobenzene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
1,4-Dichlorobenzene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
3,3'-Dichlorobenzidine	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Diethyl phthalate	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Dimethyl phthalate	, ND	· 10	μg/L	1	10/9/2014 9:16:21 PM	15747
2,4-Dichlorophenol	ND	20	μg/L	1	10/9/2014 9:16:21 PM	15747
2,4-Dimethylphenol	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
4,6-Dinitro-2-methylphenol	ND	20	μg/L	1	10/9/2014 9:16:21 PM	15747
2,4-Dinitrophenol	ND	20	μg/L	1	10/9/2014 9:16:21 PM	15747
2,4-Dinitrotoluene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
2,6-Dinitrotoluene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Fluoranthene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Fluorene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Hexachlorobenzene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Hexachlorobutadiene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Hexachlorocyclopentadiene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Hexachloroethane	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Indeno(1,2,3-cd)pyrene	ND	10	μ g/ L	1	10/9/2014 9:16:21 PM	15747
Isophoròne	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
1-Methylnaphthalene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
2-Methylnaphthalene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
2-Methylphenol	ND	20	μg/L	1	10/9/2014 9:16:21 PM	15747
3+4-Methylphenol	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
N-Nitrosodi-n-propylamine	. ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
N-Nitrosodimethylamine	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
N-Nitrosodiphenylamine	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
Naphthalene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
2-Nitroaniline	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
3-Nitroaniline	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747
4-Nitroaniline	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 3 of 18

- P Sample pH greater than 2.
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 10/23/2014

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

Project: Injection Well 4th QTR 10-1-14

Collection Date: 10/1/2014 10:00:00 AM

Lab ID: 1410102-001

Matrix: AQUEOUS

Received Date: 10/2/2014 6:50:00 AM

				ALLEGATION TO A PROPERTY AND A PARTY AND A					
Analyses	Result	RL Qu	ial Units	DF	Date Analyzed	Batch			
EPA METHOD 8270C: SEMIVOLATILES	 3			Analyst: I					
Nitrobenzene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747			
2-Nitrophenol	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747			
4-Nitrophenol	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747			
Pentachlorophenol	ND	20	μg/L	1	10/9/2014 9:16:21 PM	15747			
Phenanthrene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747			
Phenol	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747			
Pyrene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747			
Pyridine	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747			
1,2,4-Trichlorobenzene	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747			
2,4,5-Trichlorophenol	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747			
2,4,6-Trichlorophenol	ND	10	μg/L	1	10/9/2014 9:16:21 PM	15747			
Surr: 2-Fluorophenol	59.4	12.1-85.8	%REC	1	10/9/2014 9:16:21 PM	15747			
Surr: Phenol-d5	52.8	17.7-65.8	%REC	1	10/9/2014 9:16:21 PM	15747			
Surr: 2,4,6-Tribromophenol	83.8	26-138	%REC	1	10/9/2014 9:16:21 PM	15747			
Surr: Nitrobenzene-d5	76.3	47.5-119	%REC	1	10/9/2014 9:16:21 PM	15747			
Surr: 2-Fluorobiphenyl	68.0	48.1-106	%REC	1	10/9/2014 9:16:21 PM	15747			
Surr: 4-Terphenyl-d14	69.3	44-113	%REC	1	10/9/2014 9:16:21 PM	15747			
EPA METHOD 8260B: VOLATILES					Analyst	RAA			
Benzene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R216			
Toluene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R216			
Ethylbenzene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM				
Methyl tert-butyl ether (MTBE)	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R216			
1,2,4-Trimethylbenzene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R216			
1,3,5-Trimethylbenzene	ND	5.0	μg/L .	5	10/3/2014 10:52:10 PM				
1,2-Dichloroethane (EDC)	ND	5.0	μ g/ L	5	10/3/2014 10:52:10 PM				
1,2-Dibromoethane (EDB)	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R216			
Naphthalene	ND	10	μg/L	5	10/3/2014 10:52:10 PM				
1-Methylnaphthalene	ND	20	μ g/ L	5	10/3/2014 10:52:10 PM	R216			
2-Methylnaphthalene	ND	20	μg/L	5	10/3/2014 10:52:10 PM	R216			
Acetone	120	50	μg/L	5	10/3/2014 10:52:10 PM				
Bromobenzene	ND	5.0	μ g /L	5	10/3/2014 10:52:10 PM				
Bromodichloromethane	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM				
Bromoform	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R216			
Bromomethane	ND	15	μg/L	5	10/3/2014 10:52:10 PM	R216			
2-Butanone	ND	50	μ g/ L	5	10/3/2014 10:52:10 PM	R216			
Carbon disulfide	ND	50	μg/L	5	10/3/2014 10:52:10 PM	R216			
Carbon Tetrachloride	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R2165			
Chlorobenzene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM				
Chloroethane	ND	10	μg/L	5	10/3/2014 10:52:10 PM	R2165			

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 4 of 18

- P Sample pH greater than 2.
- RL Reporting Detection Limit

Analytical Report Lab Order 1410102

Date Reported: 10/23/2014

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Injection Well 4th QTR 10-1-14

Lab ID: 1410102-001

Project:

Client Sample ID: Injection Well

Collection Date: 10/1/2014 10:00:00 AM

Received Date: 10/2/2014 6:50:00 AM

Analyses	Result	RL Qua	l Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES			•		Analyst	RAA
Chloroform	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
Chloromethane	ND	15	μg/L	5	10/3/2014 10:52:10 PM	R21653
2-Chlorotoluene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
4-Chiorotoluene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
cis-1,2-DCE	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
cis-1,3-Dichloropropene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
1,2-Dibromo-3-chloropropane	ND	10	μg/L	5	10/3/2014 10:52:10 PM	R21653
Dibromochloromethane	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
Dibromomethane	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
1,2-Dichlorobenzene	ND	5.0	μg/L´	5	10/3/2014 10:52:10 PM	R21653
1,3-Dichlorobenzene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
1,4-Dichlorobenzene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
Dichlorodifluoromethane	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
1,1-Dichloroethane	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
1,1-Dichloroethene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
1,2-Dichloropropane	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
1,3-Dichloropropane	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
2,2-Dichloropropane	ND	10	μg/L	5	10/3/2014 10:52:10 PM	R21653
1,1-Dichloropropene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
Hexachlorobutadiene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
2-Hexanone	ND	50	μg/L	5	10/3/2014 10:52:10 PM	R21653
Isopropylbenzene	ND .	5.0	μg/L	. 5	10/3/2014 10:52:10 PM	R21653
4-isopropyltoluene	ND .	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
4-Methyl-2-pentanone	ND	50	μg/L	5	10/3/2014 10:52:10 PM	R21653
Methylene Chloride	ND	15	μg/L	5	10/3/2014 10:52:10 PM	R21653
n-Butylbenzene	ND	15	μg/L	5	10/3/2014 10:52:10 PM	R21653
n-Propylbenzene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
sec-Butylbenzene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
Styrene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
tert-Butylbenzene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
1,1,1,2-Tetrachloroethane	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
1,1,2,2-Tetrachloroethane	ND	10	μg/L	5	10/3/2014 10:52:10 PM	R21653
Tetrachloroethene (PCE)	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
trans-1,2-DCE	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
trans-1,3-Dichloropropene	ND	5.0	μ g/ L	5	10/3/2014 10:52:10 PM	R21653
1,2,3-Trichlorobenzene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
1,2,4-Trichlorobenzene	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
1,1,1-Trichloroethane	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653
1,1,2-Trichloroethane	ND	5.0	μg/L	5	10/3/2014 10:52:10 PM	R21653

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 5 of 18

- P Sample pH greater than 2.
- RL Reporting Detection Limit

Analytical Report

Lab Order 1410102

Date Reported: 10/23/2014

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well Collection Date: 10/1/2014 10:00:00 AM

Injection Well 4th QTR 10-1-14 Lab ID: 1410102-001

Matrix: AQUEOUS Received Date: 10/2/2014 6:50:00 AM

Analyses	Result	RL (Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES		-				Analys	: RAA
Trichloroethene (TCE)	ND	5.0		μg/L	5	10/3/2014 10:52:10 PM	R21653
Trichlorofluoromethane	ND	5.0		μg/L	5	10/3/2014 10:52:10 PM	R21653
1,2,3-Trichloropropane	ND	10		μg/L	5	10/3/2014 10:52:10 PM	R21653
Virryi chloride	ND	5.0		μg/L	5	10/3/2014 10:52:10 PM	R21653
Xylenes, Total	ND	7.5		μg/L	5	10/3/2014 10:52:10 PM	R21653
Surr: 1,2-Dichloroethane-d4	82.3	70-130		%REC	5	10/3/2014 10:52:10 PM	R21653
Surr: 4-Bromofluorobenzene	84.8	70-130		%REC	5	10/3/2014 10:52:10 PM	R21653
Surr: Dibromofluoromethane	79.9	70-130		%REC	5	10/3/2014 10:52:10 PM	R21653
Surr: Toluene-d8	84.8	70-130		%REC	5	10/3/2014 10:52:10 PM	R21653
SM2510B: SPECIFIC CONDUCTANCE						Analyst	:: JRR
Conductivity	1100	0.010		µmhos/cm	1	10/6/2014 5:51:56 PM	R21715
SM4500-H+B: PH						Analyst	: JRR
pН	7.08	1.68	Н	pH units	1	10/6/2014 5:51:56 PM	R21715
SM2320B: ALKALINITY						Analyst	: JRR
Bicarbonate (As CaCO3)	150	20		mg/L CaCO3	1	10/6/2014 5:51:56 PM	R21715
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	10/6/2014 5:51:56 PM	R21715
Total Alkalinity (as CaCO3)	150	20		mg/L CaCO3	1	10/6/2014 5:51:56 PM	R21715
SM2540C MOD: TOTAL DISSOLVED S	OLIDS					Analyst	: KS
Total Dissolved Solids	742	40.0	*	mg/L	1	10/8/2014 4:42:00 PM	15759

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range Е
- Analyte detected below quantitation limits
- RSD is greater than RSDlimit O
- RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

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- P Sample pH greater than 2.
- RL Reporting Detection Limit

Anatek Labs, Inc.

1282 Álturas Drive · Moscow, ID 63843 · (208) 883-2839 · Fax (208) 882-9246 · email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

141003043

Address:

4901 HAWKINS NE SUITE D

Project Name:

1410102

ALBUQUERQUE, NM 87109

Attn:

ANDY FREEMAN

Analytical Results Report

Sample Number

141003043-001

Sampling Date 10/1/2014

Date/Time Received 10/3/2014 1:30 PM

Sampling Time 10:00 AM

Citent Sample ID **Matrix**

1410102-001E / INJECTION WELL

Sample Location

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	1	10/15/2014	CRW	SW846 CH7	
Flashpoint	>200	°F		10/15/2014	KFG	EPA 1010	
рH	6.82	ph Units		10/6/2014	KJS	SM 4500pH-B	
Reactive suifide	3.01	mg/L	1	10/15/2014	HSW	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCI

EPA's Maximum Contaminant Level

ND

Not Detected

PQL

Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.

The results reported relate only to the samples indicated.

Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Anatek Labs, Inc. 1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anatekiabs.com

504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

141003043

Address:

4901 HAWKINS NE SUITE D **ALBUQUERQUE, NM 87109**

Project Name:

1410102

Attn:

ANDY FREEMAN

Analytical Results Report **Quality Control Data**

Lab Control Sample										
Parameter	LC\$ Resu	it Units	LCS	Spike	%Rec	AR	%Rec	Prep	Date	Analysis Date
Reactive sulfide	0.180	mg/L	. 0	.2	90.0	70	-130	10/15	/2014	10/15/2014
Cyanide (reactive)	0.519	mg/l.		.5	103.8	80	-120	10/15	/2014	10/15/2014
Matrix Spike									 -	
Sample Number Param	ater	Sample Result	MS Result	Uni	ts	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
-	re sulfide	3.01	3.77	mg/		0.767	99.1	70-130	•	•
	e (reactive)	ND	2.41	mg/	_	2.5	96.4	80-120	10/15/2014	10/15/2014
Matrix Spike Duplicat			·.				<u> </u>			
Parameter	MSD Result	Units	MSD Spike	%5	ec ·	%RPD	AR %RPI) Pre	ep Date	Analysis Date
Cyanide (reactive)	2.41	mg/L	2.5		5.4	0.0	0-25		15/2014	10/15/2014
Method Blank										
Parameter		Re	sult	U	nits		PQL	Pi	rep Date	Analysis Date
Cyanide (reactive)		N	ID	m	ıg/L		1	10/	15/2014	10/15/2014
Reactive sulfide		N	ID		ig/L		1	10/	15/2014	10/15/2014

Acceptable Range

Not Detected

PQL

Practical Quantitation Limit Relative Percentage Difference

Comments:

Hall Environmental Analysis Laboratory, Inc.

WO#:

1410102 23-Oct-14

Client: Project:

Prep Date:

Western Refining Southwest, Inc. Injection Well 4th QTR 10-1-14

Sample ID MB Client ID: PBW

SampType: MBLK

TestCode: EPA Method 300.0: Anions

Batch ID: R21640 RunNo: 21640

Analysis Date: 10/2/2014

SeqNo: 634799 Units: mg/L

%RPD **RPDLimit** Qual SPK value SPK Ref Val %REC LowLimit HighLimit Analyte Result **PQL**

0.50 ND Chloride Sulfate ND 0.50

Sample ID LCS Client ID: LCSW SampType: LCS Batch ID: R21640 TestCode: EPA Method 300.0: Anions

RunNo: 21640

Units: mg/L Analysis Date: 10/2/2014 SeqNo: 634800

Prep Date: %RPD **RPDLimit** Qual HighLimit SPK value SPK Ref Val %REC LowLimit Analyte Result PQL. 90 110 5.000 0 94.0 4.7 0.50 Chloride 9.7 0.50 10.00 0 96.8 90 110 Sulfate

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range E
- J Analyte detected below quantitation limits
- RSD is greater than RSDlimit 0
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Holding times for preparation or analysis exceeded Н
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- Reporting Detection Limit RL

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1410102

23-Oct-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10-1-14

Sample ID 5ml-rb	SampT	ype: Mi	BLK	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	ID: R2	1653	F	RunNo: 2	1653				
Prep Date:	Analysis D	ate: 10	0/3/2014	s	SeqNo: 6	36225	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								*
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
,										

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Page 8 of 18

Hall Environmental Analysis Laboratory, Inc.

WO#:

1410102 23-Oct-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10-1-14

Sample ID 5ml-rb	SampType: MBLK			TestCode: EPA Method 8260B: VOLATILES						
Client ID: PBW	Batch	ID: R2	1653	F	RunNo: 2	1653				
Prep Date:	Analysis D	ate: 10	/3/2014	S	SeqNo: 6	36225	Units: µg/L			
Analyte	Result	PQL		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloropropene	ND	1.0	SFK value	SPK Rei Vai	MREC	LOWLITH	nightimit	MKFD	KLDFILIII	Quai
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	1.0								
isopropyibenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xyienes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	8.0		10.00		80.4	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		101	70	130			
Surr: Dibromofluoromethane	8.0		10.00		80.5	70	130			
Surr: Toluene-d8	8.9		10.00		89.4	70	130			

Sample ID 100ng Ics	SampT	S	Tes	tCode: El	ATILES					
Client ID: LCSW	Batch	ID: R2	1653	F	RunNo: 2	1653				
Prep Date:	Analysis D	ate: 10	0/3/2014	8	SeqNo: 6	36227	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Вепzепе	19	1.0	20.00	0	96.4	70	130			
Toluene	20	1.0	20.00	0	98.8	80	120			
Chlorobenzene	20	1.0	20.00	0	97.9	70	130			

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- NO Not Detected at the Reporting Lim
- P Sample pH greater than 2.
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1410102

23-Oct-14

Client: Project: Western Refining Southwest, Inc. Injection Well 4th QTR 10-1-14

Sample ID 100ng Ics	Samp1	SampType: LCS			TestCode: EPA Method 8260B: VOLATILES					
Client ID: LCSW	Batch ID: R21653			F	RunNo: 21653					
Prep Date:	Analysis D	Analysis Date: 10/3/2014			SeqNo: 636227 Units:					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethene	21	1.0	20.00	0	105	82.6	131			
Trichloroethene (TCE)	19	1.0	20.00	0	96.9	70	130			
Surr: 1,2-Dichloroethane-d4	8.5		10.00		84.9	70	130			
Surr: 4-Bromofluorobenzene	9.8		10.00		97.7	70	130			
Surr: Dibromofluoromethane	8.0		10.00		79.7	70	130			
Surr: Toluene-d8	9.1		10.00		91.1	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Page 10 of 18

Hall Environmental Analysis Laboratory, Inc.

WO#:

1410102 23-Oct-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10-1-14

Sample ID mb-15747	SampT	pe: MBLK	Tes	tCode: EF	PA Method	8270C: Semi	volatiles		
Client ID: PBW	Batch	ID: 15747	Ī	RunNo: 2	1803				
Prep Date: 10/7/2014	Analysis Da	ate: 10/9/2014	:	SeqNo: 64	40784	Units: µg/L			
Analyte	Result	PQL SPK va	ue SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10							
Acenaphthylene	ND	10							
Aniline	ND	10							
Anthracene	ND	10							
Azobenzene	ND	10							
Benz(a)anthracene	ND	10							
Benzo(a)pyrene	ND	10							
Benzo(b)fluoranthene	ND	10							
Benzo(g,h,i)perylene	ND	10							
Benzo(k)fluoranthene	ND	10							
Benzoic acid	ND	40							
Benzyl alcohol	ND	10							
Bis(2-chloroethoxy)methane	ND	10							
Bis(2-chloroethyl)ether	ND	10							
Bis(2-chloroisopropyl)ether	ND	10							
Bis(2-ethylhexyl)phthalate	ND	10							
4-Bromophenyl phenyl ether	ND	10							
Butyi benzyl phthalate	ND	10							
Carbazole	ND	10							
4-Chloro-3-methylphenol	ND	10							
4-Chloroaniline	ND	10							
2-Chloronaphthalene	ND	10							
2-Chloropheno!	ND	10							
4-Chlorophenyl phenyl ether	ND	10							
Chrysene	ND	10							
Di-n-butyl phthalate	ND	10							
Di-n-octyl phthalate	ND	20							
Dibenz(a,h)anthracene	ND	10							
Dibenzofuran	ND	10							
1,2-Dichlorobenzene	ND	10							
1,3-Dichlorobenzene	ND	10							
1,4-Dichlorobenzene	ND ND	10 10							
3,3'-Dichlorobenzidine	ND	10							
Diethyl phthalate									
Dimethyl phthalate	ND	10 20							
2,4-Dichlorophenol	ND								
2,4-Dimethylphenol	ND	10							
4,6-Dinitro-2-methylphenol	ND	20							
2,4-Dinitrophenol	ND	20							

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

Page 11 of 18

Hall Environmental Analysis Laboratory, Inc.

WO#:

1410102

23-Oct-14

Client: Project:

Western Refining Southwest, Inc. Injection Well 4th QTR 10-1-14

Sample ID mb-15747 SampType: MBLK TestCode: EPA Method 8270C: Semivolatiles								
Client ID: PBW		ID: 15747		21803				
Prep Date: 10/7/2014		ate: 10/9/2014		640784	Unite: ua/I			
Fiep Date. 10/1/2014	Allalysis Da	ile. 10/9/2014	Seqivo.	040704	Units: µg/L			
Analyte	Result		SPK Ref Val %RE	C LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrotoluene	ND	10						
2,6-Dinitrotoluene	ND	10						
Fluoranthene	ND	10						
Fluorene	ND	10						
Hexachlorobenzene	ND	10						
Hexachlorobutadiene	ND	10						
Hexachlorocyclopentadiene	ND	10						
Hexachloroethane	ND	10						
Indeno(1,2,3-cd)pyrene	ND	10						
Isophorone	ND	10						
1-Methylnaphthalene	ND	10						
2-Methylnaphthalene	ND	10						
2-Methylphenol	ND	20	;					
3+4-Methylphenol	ND	10						
N-Nitrosodi-n-propylamine	ND	10						
N-Nitrosodimethylamine	ND	10						
N-Nitrosodiphenylamine	ND	10						
Naphthalene	ND	10						
2-Nitroaniline	ND	10						
3-Nitroaniline	ND	10						
4-Nitroanifine	ND	10						
Nitrobenzene	ND	10						
2-Nitrophenol	ND	10						
4-Nitrophenol	ND	10						
Pentachlorophenol	ND	20						
Phenanthrene	ND	10						
Phenol	ND	10						
Pyrene	ND	10						
Pyridine	ND	10						
1,2,4-Trichlorobenzene	ND	10						
2,4,5-Trichlorophenoi	ND	10						
2,4,6-Trichlorophenol	ND	10						
Surr: 2-Fluorophenol	140	200.0	68.	8 12.1	85.8			
Surr: Phenol-d5	130	200.0	64.	5 17.7	65.8			
Surr: 2,4,6-Tribromophenol	130	200.0	66.	6 26	138			
Surr: Nitrobenzene-d5	79	100.0	79.	4 47.5	119			
Surr: 2-Fluorobiphenyl	75	100.0	75.	3 48.1	106			
Surr: 4-Terphenyl-d14	74	100.0	74.		113			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1410102

23-Oct-14

Client: Project:

Western Refining Southwest, Inc. Injection Well 4th QTR 10-1-14

Sample ID Ics-15747	SampType: LCS TestCode: EPA Method 8270C: Semivolatiles									
Client ID: LCSW	Batch	n ID: 15	747	RunNo: 21803					•	
Prep Date: 10/7/2014	Analysis D	oate: 10	/9/2014	8	SeqNo: 6	40785	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	77	10	100.0	0	76.7	47.9	114			
4-Chloro-3-methylphenol	180	10	200.0	0	88.1	51.7	122			
2-Chlorophenol	170	10	200.0	0	83.0	40.7	113			
1,4-Dichlorobenzene	70	10	100.0	0	70.4	39.6	99.9			
2,4-Dinitrotoluene	69	10	100.0	0	68.9	40.8	113			
N-Nitrosodi-n-propylamine	81	10	100.0	0	81.2	51.2	111			
4-Nitrophenol	130	10	200.0	0	64.1	15.7	86.9			
Pentachlorophenol	120	20	200.0	0	59.2	21.6	104			
Phenol	140	10	200.0	0	71.0	28.6	71.7			
Pyrene	73	10	100.0	0	73.1	54.2	128			
1,2,4-Trichlorobenzene	71	10	100.0	0	71.2	40.9	101			
Surr. 2-Fluorophenol	150		200.0		73.2	12.1	85.8			
Suir: Phenol-d5	140		200.0		71.8	17.7	65.8			S
Surr. 2,4,6-Tribromophenol	140		200.0		70.9	26	138			
Surr: Nitrobenzene-d5	83		100.0		83.4	47.5	119			
Surr: 2-Fluorobiphenyl	0.46		100.0		0.460	48.1	106			S
Surr: 4-Terphenyl-d14	75		100.0		75.1	44	113			

Sample ID Icsd-15747	SampType: LCSD TestCode: EPA Method 8270C: Semivolatiles										
Client ID: LCSS02	Batch	ID: 15	747	F	RunNo: 2	1803					
Prep Date: 10/7/2014	Analysis D	ate: 10)/9/2014	S	SeqNo: 6	40786	Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Acenaphthene	79	10	100.0	0	78.8	47.9	114	2.60	27.2		
4-Chloro-3-methylphenol	190	10	200.0	0	94.7	51.7	122	7.26	25.9		
2-Chlorophenol	160	10	200.0	0	80.2	40.7	113	3.52	22.5		
1,4-Dichlorobenzene	74	10	100.0	0	73.7	39.6	99.9	4.50	24.6		
2,4-Dinitrotoluene	73	10	100.0	0	73.1	40.8	113	6.00	25.3		
N-Nitrosodi-n-propylamine	79	10	100.0	0	79.0	51.2	111	2.82	23.6		
4-Nitrophenol	140	10	200.0	0	69.4	15.7	86.9	7.95	34.7		
Pentachlorophenol	120	20	200.0	0	61.6	21.6	104	4.01	32.8		
Phenol	140	10	200.0	0	68.3	28.6	71.7	3.88	25.5		
Pyrene	79	10	100.0	0	78.8	54.2	128	7.56	31.4		
1,2,4-Trichlorobenzene	76	10	100.0	0	75.7	40.9	101	6.10	25.9		
Surr: 2-Fluorophenol	150		200.0		7 3.3	12.1	85.8	0	0		
Surr: Phenol-d5	140		200.0		72.3	17.7	65.8	0	0	S	
Surr: 2,4,6-Tribromophenol	140		200.0		70.9	26	138	0	0		
Surr: Nitrobenzene-d5	88		100.0		88.0	47.5	119	0	0		
Surr: 2-Fluorobiphenyl	83		100.0		83.2	48.1	106	0	0		

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1410102

23-Oct-14

Client: Project:

Western Refining Southwest, Inc. Injection Well 4th QTR 10-1-14

Sample ID Icsd-15747

SampType: LCSD

TestCode: EPA Method 8270C: Semivolatiles

Client ID: LCSS02 Batch ID: 15747

RunNo: 21803

Prep Date: 10/7/2014

Analysis Date: 10/9/2014

Units: µg/L HighLimit

Analyte

Result PQL SegNo: 640786

RPDLimit Qual

Surr: 4-Terphenyl-d14

SPK value SPK Ref Val %REC

80.9

113

0

81

100.0

LowLimit

%RPD

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- NDNot Detected at the Reporting Limit
- P Sample pH greater than 2.
- Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1410102

23-Oct-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10-1-14

Result

Result

Sample ID MB-15770

SampType: MBLK

TestCode: EPA Method 7470: Mercury

Client ID:

PBW

Batch ID: 15770

PQL

RunNo: 21753

Prep Date: 10/7/2014 Analysis Date: 10/8/2014

SegNo: 639033

Units: mg/L HighLimit

RPDLimit

Qual

Analyte Mercury

ND 0.00020

Sample ID LCS-15770

SampType: LCS

TestCode: EPA Method 7470: Mercury

Client ID: LCSW

Batch ID: 15770

RunNo: 21753

Units: mg/L

Prep Date: 10/7/2014

Analysis Date: 10/8/2014

SeqNo: 639034

RPDLimit HighLimit %RPD

%RPD

Qual

SPK value SPK Ref Val

LowLimit

80

Mercury

PQL

0

SPK value SPK Ref Val %REC LowLimit

%REC 103

Analyte

0.0051 0.00020 0.005000

120

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range Ε
- Analyte detected below quantitation limits J
- 0 RSD is greater than RSDlimit
- RPD outside accepted recovery limits R
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Sample pH greater than 2.
- RLReporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1410102

23-Oct-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10-1-14

Sample ID I	VIB-15825	Samp	Туре: МЕ	IBLK TestCode: EPA 6010B: Total Recoverable Metals							
Client ID: F	PBW	Bato	h ID: 15	325	F	RunNo: 2	1801				
Prep Date:	10/9/2014	Analysis [Date: 10	/10/2014	8	SeqNo: 6	40639	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		ND	0.020								
Barium		ND	0.020								
Cadmium		ND	0.0020								
Calcium		ND	1.0								
Chromium		ND	0.0060								
Lead		ND	0.0050								
Magnesium		ND	1.0								
Potassium		ND	1.0								
Selenium		ND	0.050								
Silver		0.010	0.0050								
Sodium		ND	1.0								

Sample ID LCS-15825	SampType: LCS			TestCode: EPA 6010B: Total Recoverable Met					als	
Client ID: LCSW	Bato	ch ID: 15	825	R	RunNo: 2	1801				
Prep Date: 10/9/2014	Analysis	Date: 10	0/10/2014	S	SeqNo: 6	40640	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.52	0.020	0.5000	0	104	80	120			
Barium	0.49	0.020	0.5000	0	98.9	80	120			
Cadmium	0.49	0.0020	0.5000	0	98.9	80	120			
Calcium	52	1.0	50.00	0	104	80	120			
Chromium	0.48	0.0060	0.5000	0	96.8	80	120			
Lead	0.49	0.0050	0.5000	0	97.6	80	120			
Magnesium	51	1.0	50.00	0	103	80	120			
Potassium	49	1.0	50.00	0	98.8	80	120			
Selenium	0.50	0.050	0.5000	0	100	80	120			
Silver	0.10	0.0050	0.1000	0	102	80	120			В
Sodium	51	1.0	50.00	0	101	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDIimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2.
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1410102

23-Oct-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10-1-14

Sample ID mb-1

SampType: MBLK

TestCode: SM2320B: Alkalinity

Client ID:

Batch ID: R21715

RunNo: 21715

Analysis Date: 10/6/2014

Prep Date:

PQL

SeqNo: 637458

Units: mg/L CaCO3

Analyte

Result

SPK value SPK Ref Val %REC LowLimit

RPDLimit Qual

Total Alkalinity (as CaCO3)

ND 20

SampType: LCS

TestCode: SM2320B: Alkalinity

Sample ID Ics-1 Client ID: LCSW

Batch ID: R21715

RunNo: 21715

Prep Date:

SeqNo: 637459

Units: mg/L CaCO3

Analyte

Analysis Date: 10/6/2014

20

%REC

HighLimit

HighLimit

%RPD **RPDLimit** Qual

Total Alkalinity (as CaCO3)

Result **PQL** 83

SPK value SPK Ref Val 80.00 0

LowLimit 103

110

90

%RPD

Sample ID mb-2

SampType: MBLK

TestCode: SM2320B: Alkalinity

Client ID: PBW Prep Date:

LCSW

Batch ID: R21715 Analysis Date: 10/6/2014 RunNo: 21715 SeqNo: 637474

Units: mg/L CaCO3

Analyte

Result **PQL** ND 20

RPDLimit %RPD

Qual

Total Alkalinity (as CaCO3)

Sample ID Ics-2

SampType: LCS

PQL

TestCode: SM2320B: Alkalinity

RunNo: 21715

HighLimit

Client ID: Prep Date: Batch ID: R21715

Analysis Date: 10/6/2014

SeqNo: 637475

Units: mg/L CaCO3

Analyte

SPK value SPK Ref Val

%REC

LowLimit HighLimit

Result

102

%RPD

RPDLimit

Qual

Total Alkalinity (as CaCO3)

81

20 80.00

SPK value SPK Ref Val %REC LowLimit

110

- Qualifiers: Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- Analyte detected below quantitation limits J
- RSD is greater than RSDlimit 0 R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Н Holding times for preparation or analysis exceeded Not Detected at the Reporting Limit
- P Sample pH greater than 2.

ND

Reporting Detection Limit

Page 17 of 18

Hall Environmental Analysis Laboratory, Inc.

WO#:

1410102

23-Oct-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10-1-14

Sample ID MB-15759

SampType: MBLK

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID:

PBW

Batch ID: 15759

RunNo: 21752

Prep Date: 10/7/2014

Analysis Date: 10/8/2014 **PQL**

SeqNo: 638741

Units: mg/L HighLimit

RPDLimit

Qual

Total Dissolved Solids

ND

SampType: LCS

20.0

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: LCSW

Sample ID LCS-15759

Prep Date: 10/7/2014

Batch ID: 15759

RunNo: 21752

SPK value SPK Ref Val %REC LowLimit

Units: mg/L

Qual

Analyte

Result

20.0

1000

101

%REC

Total Dissolved Solids

1010

0

Analyte

PQL

Analysis Date: 10/8/2014

LowLimit

SPK value SPK Ref Val

SeqNo: 638742

120

RPDLimit

%RPD

%RPD

HighLimit

Qualifiers:

Value exceeds Maximum Contaminant Level.

Value above quantitation range

Analyte detected below quantitation limits 0 RSD is greater than RSDlimit

R RPD outside accepted recovery limits Spike Recovery outside accepted recovery limits В Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

Sample pH greater than 2.

Reporting Detection Limit

ND

Not Detected at the Reporting Limit Page 18 of 18



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

Sample Log-In Check List

Clie	nt Name:	Western Re	efining Southw	Work C	order Numbe	r. 14101	02			ReptNo:	1
Rece	eived by/dat	te:	21/0/02	1/4							
Logg	ed By:	Anne Tho	me	10/2/2014	1 6:50:00 AN	Æ		ame 2	M-	_	
Com	pleted By:	Anne Tho	rne	10/2/2014	٠,			Ame L Aone L	A.	_	
Revie	ewed By:	1	4	inte	2/14			-			
Chai	in of Cus	tody	1	(6-1-1							
1. 0	Custody sea	als intact on s	ample bottles?			Yes		No		Not Present	
2, 1	s Chain of	Custody com	plete?			Yes	✓	No		Not Present	
3. F	low was the	e sample deli	vered?			Cour	<u>ler</u>				
Log	<u>In</u>										
4. \	Was an atte	empt made to	cool the samp	les?		Yes	V	No		na 🗆	
5. V	Vere all sar	mples receive	ed at a tempera	ture of >0°C	to 6.0°C	Yes	✓	No		na 🗆	
6. 8	Sample(s) i	n proper con	tainer(s)?			Yes	V	No			
7. S	Sufficient sa	ample volume	for indicated to	est(s)?		Yes	V	No			
8. A	re samples	except VO	A and ONG) pro	operly preserve	ed?	Yes	V	No			
9. v	Vas presen	vative added	to bottles?			Yes		No	V	NA 🗆	
10.v	OA vials h	ave zero hea	dspace?			Yes	V	No		No VOA Vials	
11.1	<i>N</i> ere any s	ample contai	ners received b	roken?		Yes		No	V	# of preserved	~ ^
										bottles checked	20
		work match b cancles on c	ottle labels? hain of custody	1		Yes	V	No		for pH:	r (12) unless noted)
•		-	entified on Chai			Yes	V	No		Adjusted?	NO
			were requested			Yes	✓	No			₹
		-	ole to be met?			Yes	V	No		Checked by:	
(If no, notify	customer for	authorization.)						·		
Cmar	sial Uana	dline (if on	nliachla)								
		<i>iling (if ap</i> notified of all o	discrepancies v	vith this order?		Yes		No	·	NA 🗹	
	Perso	n Notified:	T T		Date					•	7
	By Wi				. Via:	i. ∏ eMa	il [Phone [Fax	n Person	
	Regar							at Blancol to the			
	_	Instructions:									
17.	Additional r	emarks:									
18. 9	Cooler Info	ormation									
	Cooler N			Seal Intact	Seal No	Seal Da	ite ;	Signed B	ÿ.		
	1	1.3	Good	Yes							

APPENDIX C



Hall Environmental Analysis Laboratory

QUALITY ASSURANCE PLAN

Effective Date: August 13th, 2014

Revision 9.9

www.hallenvironmental.com

Control Number: 00000157

Approved By:

Andy Freeman

Laboratory Manager

Approved By:

8/12/2014

Carolyn Swanson

Quality Assurance/Quality Control Officer

Approved By:	
	of l
Ferra	8/13/14
lan Cameron	Date
Assistant Laborat	ory Manager

John Caldwell Date
Assistant Laboratory Manager
Semi-Volatiles Technical Director

Rene Aguilera Date
Volatiles Technical Director

Tiffany Shaw Date
Metals Technical Director

Stacey McCoy Date
Wet Chemistry Technical Director

Stephanie Shaffers Date
Microbiology Technical Director

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Concentration Calculations

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3.0 Introduction

Purpose of Document

The purpose of this Quality Assurance Plan is to formally document the quality assurance policies and procedures of Hall Environmental Analysis Laboratory, Inc. (HEAL), for the benefit of its employees, clients, and accrediting organizations. HEAL continually implements all aspects of this plan as an essential and integral part of laboratory operations in order to ensure that high quality data is produced in an efficient and effective manner.

Objectives

The objective of HEAL is to achieve and maintain excellence in environmental testing. This is accomplished by developing, incorporating and documenting the procedures and policies specified by each of our accrediting authorities and outlined in this plan. These activities are carried out by a laboratory staff that is analytically competent, well-qualified, and highly trained. An experienced management team, knowledgeable in their area of expertise, monitors them. Finally, a comprehensive quality assurance program governs laboratory practices and ensures that the analytical results are valid, defensible, reproducible, reconstructable and of the highest quality.

HEAL establishes and thoroughly documents its activities to ensure that all data generated and processed will be scientifically valid and of known and documented quality. Routine laboratory activities are detailed in method specific standard operating procedures (SOP). All data reported meets the applicable requirements for the specific method or methods that are referenced, ORELAP, TCEQ, EPA, client specific requirements and/or State Bureaus. In the event that these requirements are ever in contention with each other, it is HEAL's policy to always follow the most prudent requirement available. For specific method requirements refer to HEAL's Standard Operating Procedures (SOP's), EPA methods, Standard Methods 20th edition, ASTM methods or state specific methods.

HEAL management ensures that this document is correct in terms of required accuracy and data reproducibility, and that the procedures contain proper quality control measures. HEAL management additionally ensures that all equipment is reliable, well-maintained and appropriately calibrated. The procedures and practices of the laboratory are geared towards not only strictly following our regulatory requirements but also allowing the flexibility to conform to client specific specifications. Meticulous records are maintained for all samples and their respective analyses so that results are well-documented and defensible in a court of law.

The HEAL Quality Assurance/Quality Control Officer (QA/QCO) and upper management are responsible for supervising and administering this quality assurance program, and

ensuring each individual is responsible for its proper implementation. All HEAL management remains committed to the encouragement of excellence in analytical testing and will continue to provide the necessary resources and environment conducive to its achievement.

Policies

Understanding that quality cannot be mandated, it is the policy of this laboratory to provide an environment that encourages all staff members to take pride in the quality of their work. In addition to furnishing proper equipment and supplies, HEAL stresses the importance of continued training and professional development. Further, HEAL recognizes the time required for data interpretation. Therefore, no analyst should feel pressure to sacrifice data quality for data quantity. Each staff member must perform with the highest level of integrity and professional competence, always being alert to problems that could compromise the quality of their technical work.

Management and senior personnel supervise analysts closely in all operations. Under no circumstance is the willful act or fraudulent manipulation of analytical data condoned. Such acts must be reported immediately to HEAL management. Reported acts will be assessed on an individual basis and resulting actions could result in dismissal. The laboratory staff is encouraged to speak with lab managers or senior management if they feel that there are any undo commercial, financial, or other pressures, which might adversely affect the quality of their work; or in the event that they suspect that data quality has been compromised in any way. HEAL's Quality Assurance/Quality Control Officer is available if any analyst and/or manager wishes to anonymously report any suspected or known breaches in data integrity.

Understanding the importance of meeting customer requirements in addition to the requirements set forth in statutory and regulatory requirements, HEAL shall periodically seek feedback from customers and evaluate the feedback in order to initiate improvements.

All proprietary rights and client information at HEAL (including national security concerns) are considered confidential. No information will be given out without the express verbal or written permission of the client. All reports generated will be held in the strictest of confidence.

HEAL shall continually improve the effectiveness of its management system through the use of the policies and procedures outlined in this Quality Assurance Plan. Quality control results, internal and external audit findings, management reviews, new and continual training and corrective and preventive actions are continually evaluated to identify possible improvements and to ensure that appropriate communication processes are taking place regarding the effectiveness of the management system. HEAL shall ensure that the

integrity of the quality system is maintained when changes to the system are planned and implemented.

This is a controlled document. Each copy is assigned a unique tracking number and when released to a client or accrediting agency the QA/QCO keeps the tracking number on file. This document is reviewed on an annual basis to ensure that it is valid and representative of current practices at HEAL.

4.0 Organization and Responsibility

Company

HEAL is accredited in accordance with the 2009 TNI standard (see NELAC accredited analysis list in the QA Department or on the company website), through ORELAP and TCEQ and by the Arizona Department of Health Services. Additionally, HEAL is qualified as defined under the State of New Mexico Water Quality Control Commission regulations and the New Mexico State Drinking Water Bureau. HEAL is a locally owned small business that was established in 1991. HEAL is a full service environmental analysis laboratory with analytical capabilities that include both organic and inorganic methodologies and has performed analyses of soil, water, and air as well as various other matrices for many sites in the region. HEAL's client base includes local, state and federal agencies, private consultants, commercial industries as well as individual homeowners. HEAL has performed as a subcontractor to the state of New Mexico and to the New Mexico Department of Transportation. HEAL has been acclaimed by its customers as producing quality results and as being adaptive to client-specific needs.

The laboratory is divided into an organic section, an inorganic section and a microbiology section. Each section has a designated manager/technical director. The technical directors report directly to the laboratory manager, who oversees all operations.

Certifications

ORELAP - NELAC Oregon Primary accrediting authority.

TCEQ - NELAC Texas Secondary accrediting authority.

The Arizona Department of Health Services

The New Mexico Drinking Water Bureau

See our website at <u>www.hallenvironmental.com</u> or the QA Office for copies of current licenses and licensed parameters.

In the event of a certification being revoked or suspended, HEAL will notify, in writing, those clients that require the affected certification.

Personnel

HEAL management ensures the competence of all who operate equipment, perform environmental tests, evaluate results, and sign test reports. Personnel performing specific tasks shall be qualified on the basis of appropriate education, training, experience and /or demonstrated skills.

HEAL ensures that all personnel are aware of the relevance and importance of their activities and how each employee contributes to the achievement of the objectives defined throughout this document.

All personnel shall be responsible for complying with HEAL's quality assurance/quality control requirements that pertain to their technical function. Each technical staff member must have a combination of experience and education to adequately demonstrate specific knowledge of their particular function and a general knowledge of laboratory operations, test methods, quality assurance/quality control procedures, and records management.

All employees' training certificates and diplomas are kept on file with demonstrations of capability for each method they perform. An Organizational Chart can be found at the end of this section and a personnel list is available in the current Controlled Document Logbook.

Laboratory Director

The Laboratory Director is responsible for overall technical direction and business leadership of HEAL. The Laboratory Manager, the Project Manager and Quality Assurance/Quality Control Officer report-directly to the Laboratory Director. Someone with a minimum of 7 years of directly related experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

Laboratory Manager/Lead Technical Director

The Laboratory Manager shall exercise day—to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results. The Laboratory Manager shall be experienced in the fields of accreditation for which the laboratory is approved or seeking accreditation. The Laboratory Manager shall certify that personnel with appropriate educational and/or technical background perform all tests for which HEAL is accredited. Such certification shall be documented.

The Laboratory Manager shall monitor standards of performance in quality control and quality assurance and monitor the validity of the analyses performed and data generated at HEAL to assure reliable data.

The Laboratory Manager is responsible for the daily operations of the laboratory. The Laboratory Manager is the lead technical director of the laboratory and, in conjunction with the section technical directors, is responsible for coordinating activities within the laboratory with the overall goal of efficiently producing high quality data within a reasonable time frame.

In events where employee scheduling or current workload is such that new work cannot be incorporated, without missing hold times, the Laboratory Manager has authority to modify employee scheduling, re-schedule projects or, when appropriate, allocate the work to approved subcontracting laboratories.

Additionally, the laboratory manager reviews and approves new analytical procedures and methods, and performs a final review of most analytical results. The Laboratory Manager provides technical support to both customers and HEAL staff.

The Laboratory Manager also observes the performance of supervisors to ensure that good laboratory practices and proper techniques are being taught and utilized, and to assist in overall quality control implementation and strategic planning for the future of the company. Other duties include assisting in establishing laboratory policies that lead to the fulfillment of requirements for various certification programs, assuring that all Quality Assurance and Quality Control documents are reviewed and approved, and assisting in conducting Quality Assurance Audits.

The laboratory manager addresses questions or complaints that cannot be answered by the section managers.

The Laboratory Manager shall have a bachelor's degree in a chemical, environmental, biological sciences, physical sciences or engineering field, and at least five years of experience in the environmental analysis of representative inorganic and organic analytes for which the laboratory seeks or maintains accreditation.

Assistant Laboratory Manager

The Assistant Laboratory Manager shall aid the Laboratory Manager in exercising day—to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results. The Assistant Laboratory Manager shall be experienced in the fields of accreditation for which the laboratory is approved or seeking accreditation.

The Assistant Laboratory Manager is responsible for helping the Laboratory Manager in the daily operations of the laboratory. In conjunction with the section Technical Directors, the Assistant Laboratory Manager is responsible for coordinating activities within the laboratory with the overall goal of efficiently producing high quality data within a reasonable time frame.

The Assistant Laboratory Manager shall have at least ten years of experience in environmental analysis of representative inorganic and/or organic analytes for which the laboratory seeks or maintains accreditation.

Quality Assurance Quality Control Officer

The Quality Assurance/Quality Control Officer (QA/QCO) serves as the focal point for QA/QC and shall be responsible for the oversight and/or review of quality control data. The QA/QCO functions independently from laboratory operations and shall be empowered to halt unsatisfactory work and/or prevent the reporting of results generated from an out-of-control measurement system. The QA/QCO shall objectively evaluate data and perform assessments without any outside/managerial influence. The QA/QCO shall have direct access to the highest level of management at which decisions are made on laboratory policy and/or resources. The QA/QCO shall notify laboratory management of deficiencies in the quality system in periodic, independent reports.

The QA/QCO shall have general knowledge of the analytical test methods for which data review is performed and have documented training and/or experience in QA/QC procedures and in the laboratory's quality system. The QA/QCO will have a minimum of a BS in a scientific or related field and a minimum of three years of related experience.

The QA/QCO shall schedule and conduct internal audits as per the Internal Audit SOP at least annually, monitor and trend Corrective Action Reports as per the Data Validation SOP, periodically review control charts for out of control conditions, and initiate any appropriate corrective actions.

The QA/QCO shall oversee the analysis of proficiency testing in accordance with our standards and monitor any corrective actions issued as a result of this testing.

The QA/QCO reviews all standard operating procedures and statements of work in order to assure their accuracy and compliance to method and regulatory requirements.

The QA/QCO shall be responsible for maintaining and updating this quality manual.

Project Managers

The role of the project manager is to act as a liaison between HEAL and our clients. The Project Manager updates clients on the status of projects in-house, prepares quotations for new work, and is responsible for HEAL's marketing effort.

All new work is assessed by the Project Manager and reviewed with the other managers so as to not exceed the laboratory's capacity. In events where employee scheduling or current workload is such that new work cannot be incorporated without missing hold times, the Project Manager has authority to re-schedule projects.

It is also the duty of the project manager to work with the Laboratory Manager and QA/QCO to insure that before new work is undertaken, the resources required and accreditations requested are available to meet the client's specific needs.

Additionally, the Project Manager can initiate the review of the need for new analytical procedures and methods, and perform a final review of some analytical results. The Project Manager provides technical support to customers. Someone with a minimum of 2 years of directly related experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

Technical Directors

Technical Directors are full-time members of the staff at HEAL who exercise day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results for their department within HEAL. A Technical Director's duties shall include, but not be limited to, monitoring standards of performance in quality control and quality assurance, monitoring the validity of the analyses performed and the data generated in their sections to ensure reliable data, overseeing training and supervising departmental staff, scheduling incoming work for their sections, and monitoring laboratory personnel to ensure that proper procedures and techniques are being utilized. They supervise and implement new Quality Control procedures as directed by the QA/QCO, update and maintain quality control records including, but not limited to, training forms, IDOCs, ADOCPs, and MDLs, and evaluate laboratory personnel in their Quality Control activities. In addition, technical directors are responsible for upholding the spirit and intent of HEAL's data integrity procedures.

As Technical Directors of their associated section, they review analytical data to acknowledge that data meets all criteria set forth for good Quality Assurance practices. Someone with a minimum of 2 years of experience in the environmental analysis of representative analytes for which HEAL seeks or maintains accreditation and a bachelor's degree in a scientific or related discipline should fill this position.

The education requirements for a Technical Director may be waived at the discretion of HEAL's accrediting agencies.

Health and Safety / Chemical Hygiene Officer

Refer to the most recent version of the Health and Safety and Chemical Hygiene Plans for the roles, responsibilities, and basic requirements of the Health and Safety Officer (H&SO) and the Chemical Hygiene Officer (CHO). These jobs can be executed by the same employee.

Analyst I, II and III

Analysts are responsible for the analysis of various sample matrices including, but not limited to, solid, aqueous, and air, as well as the generation of high quality data in accordance with the HEAL SOPs and QA/QC guidelines in a reasonable time as prescribed by standard turnaround schedules or as directed by the Section Manager or Laboratory Manager.

Analysts are responsible for making sure all data generated is entered in the database in the correct manner and the raw data is reviewed, signed and delivered to the appropriate peer for review. An analyst reports daily to the section manager and will inform them as to material needs of the section specifically pertaining to the analyses performed by the analyst. Additional duties may include preparation of samples for analysis, maintenance of lab instruments or equipment, and cleaning and providing technical assistance to lower level laboratory staff.

The senior analyst in the section may be asked to perform supervisory duties as related to operational aspects of the section. The analyst may perform all duties of a lab technician.

The position of Analyst is a full or part time hourly position and is divided into three levels, Analyst I, II, and III. All employees hired into an Analyst position at HEAL must begin as an Analyst I and remain there at a minimum of three months regardless of their education and experience. Analyst I must have a minimum of an AA in a related field or equivalent experience (equivalent experience means years of related experience can be substituted for the education requirement). An Analyst I is responsible for analysis, instrument operation, including calibration and data reduction. Analyst II must have a minimum of an AA in a related field or equivalent experience and must have documented and demonstrated aptitude to perform all functions of an Analyst II. An Analyst II is responsible for the full analysis of their test methods, routine instrument maintenance, purchase of consumables as dictated by their Technical Director, advanced data reduction, and basic data review. Analyst II may also assist Analyst III in method development and, as dictated by their Technical Director, may be responsible for the review and/or revision of their method specific SOPs. Analyst III must have Bachelor's degree or equivalent experience and must have documented and demonstrated aptitude to perform all functions of an Analyst III. An Analyst III is responsible for all tasks completed by an Analyst I and II as well as advanced data review, non-routine instrument maintenance, assisting their technical director in basic supervisory duties and method development.

Laboratory Technician

A laboratory technician is responsible for providing support to analysts in the organics, inorganics and disposal departments. Laboratory Technicians can assist analysts in basic sample preparation, general laboratory maintenance, glassware washing, chemical inventories, sample disposal and sample kit preparation. This position can be filled by someone without the education and experience necessary to obtain a position as an analyst.

Sample Control Manager

The sample control manager is responsible for receiving samples and reviewing the sample login information after it has been entered into the computer. The sample control manager also checks the samples against the chain-of-custody for any sample and/or labeling discrepancies prior to distribution.

The sample control manager is responsible for sending out samples to the sub-contractors along with the review and shipping of field sampling bottle kits. The sample control manager acts as a liaison between the laboratory and field sampling crew to ensure that the appropriate analytical test is assigned. If a discrepancy is noted, the sample control manager or sample custodian will contact the customer to resolve any questions or problems. The sample control manager is an integral part of the customer service team.

This position should be filled by someone with a high school diploma and a minimum of 2 years of related experience and can also be filled by a senior manager.

Sample Custodians

Sample Custodians work directly under the Sample Control Manager. They are responsible for sample intake into the laboratory and into the LIMS. Sample Custodians take orders from our clients and prepare appropriate bottle kits to meet the clients' needs. Sample Custodians work directly with the clients in properly labeling and identifying samples as well as properly filling out legal COCs. When necessary, Sample Custodians contact clients to resolve any questions or problems associated with their samples. Sample Custodians are responsible for distributing samples throughout the laboratory and are responsible for notifying analysts of special circumstances such as short holding times or improper sample preservation upon receipt.

Sample Disposal Custodian

The sample disposal custodian is responsible for characterizing and disposing of samples in accordance to the most recent version of the sample disposal SOP. The sample disposal custodian collects waste from the laboratory and transports it to the disposal warehouse for storage and eventual disposal. The sample disposal custodian is responsible for maintaining the disposal warehouse and following the requirements for documentation, integrity, chemical hygiene and health and safety as set forth in the various HEAL administrative SOPs. The sample disposal custodian is responsible for overseeing any laboratory technicians employed at the disposal warehouse.

This position should be filled by someone with a high school diploma and a minimum of 1 year of related experience.

Bookkeeper

The Bookkeeper is responsible for the preparation of quarterly financials and quarterly payroll reports. The bookkeeper monitors payables, receivables, deposits, pays all bills and maintains an inventory of administrative supplies. The Bookkeeper completes final data package assembly and oversees the consignment of final reports. The Bookkeeper assists in the project management of drinking water compliance samples for NMED and NMEFC and any other tasks as assigned by the Laboratory Manager. This position should be filled by someone with a degree in accounting or a minimum of a high school diploma and at least 4 years of directly related experience.

Administrative Assistant

The Administrative Assistant is responsible for aiding administrative staff in tasks that include but are not limited to: the processing and consignment of final reports, and the generation of client specific spreadsheets. This position should be filled by someone with a minimum of a high school diploma.

IT Specialist

The IT Specialist is responsible for the induction and maintenance of all hard and software technology not maintained through a service agreement. The IT Specialist follows the requirements of this document, all regulatory documents and the EPAs Good Automated Laboratory Practices. This position should be filled by someone with a degree in a computer related field, or at least two years of directly related experience.

Delegations in the Absence of Key Personnel

Planned absences shall be preceded by notification to the Laboratory Manager. The appropriate staff members shall be informed of the absence. In the case of unplanned absences, the superior shall either assume the responsibilities and duties or delegate the responsibilities and duties to another appropriately qualified employee.

In the event that the Laboratory Manager is absent for a period of time exceeding fifteen consecutive calendar days, another full-time staff member meeting the basic qualifications and competent to temporarily perform this function will be designated. If this absence exceeds thirty-five consecutive calendar days, HEAL will notify ORELAP in writing of the absence and the pertinent qualifications of the temporary laboratory manager.

Laboratory Personnel Qualification and Training

All personnel joining HEAL shall undergo orientation and training. During this period the new personnel shall be introduced to the organization and their responsibilities, as well as the policies and procedures of the company. They shall also undergo on-the-job training and shall work with trained staff. They will be shown required tasks and be observed while performing them.

When utilizing staff undergoing training, appropriate supervision shall be dictated and overseen by the appropriate section technical director. Prior to analyzing client samples, a new employee, or an employee new to a procedure, must meet the following basic requirements. The SOP and Method(s) for the analysis must be read and signed by the employee indicating that they read, understand, and intend to comply with the requirements of the documents. The employee must undergo documented training. Training is conducted by a senior analyst familiar with the procedure and overseen by the section Technical Director. This training is documented by any means deemed appropriate by the trainer and section Technical Director, and kept on file in the employees file located in the QA/QCO's office. The employee must perform a successful Initial Demonstration of Capability (IDOC). See the current Document Control Logbook for the training documents and checklists utilized at HEAL to ensure that all of these requirements are met. Once all of the above requirements are met it is incumbent upon the section Technical Director to determine at which point the employee can begin to perform the test unsupervised. Certification to Complete Work Unsupervised (see the current Document Control Logbook) is then filled out by the employee and technical director.

IDOCs are required for all new analysts and methods prior to sample analysis. IDOCs are also required any time there is a change in the instrument, analyte list or method. If more than twelve months have passed since an analyst performed an IDOC and they

have not performed the method and/or have not met the continuing DOC requirements, the analyst must perform an IDOC prior to resuming the test.

All IDOCs shall be documented through the use of the certification form which can be found in the current Document Control Logbook. IDOCs are performed by analyzing four Laboratory Control Spikes (LCSs). Using the results of the LCSs the mean recovery is calculated in the appropriate reporting units and the standard deviations of the population sample (n-1) (in the same units) as well as the relative percent difference for each parameter of interest. When it is not possible or pertinent to determine mean and standard deviations HEAL assesses performance against establish and documented criteria dictated in the method SOP. The mean and standard deviation are compared to the corresponding acceptance criteria for precision and accuracy in the test method (if applicable) or in laboratory-generated acceptance criteria. In the event that the HEAL SOP or test method(s) fail to establish the pass/fail criteria the default limits of +/- 20% for calculated recovery and <20% relative percent difference based on the standard deviation will be utilized. If all parameters meet the acceptance criteria, the IDOC is successfully completed. If any one of the parameters do not meet the acceptance criteria, the performance is unacceptable for that parameter and the analyst must either locate and correct the source of the problem and repeat the test for all parameters of interest or repeat the test for all parameters that failed to meet criteria. Repeat failure, however, confirms a general problem with the measurement system. If this occurs the source of the problem must be identified and the test repeated for all parameters of interest

New employees that do not have prior analysis experience will not be allowed to perform analysis until they have demonstrated attention to detail with minimal errors in the assigned tasks. To ensure a sustained level of quality performance among staff members, continuing demonstration of capability shall be performed at least once a year. These are as an Annual Documentation of Continued Proficiency (ADOCP).

At least once per year an ADOCP must be completed. This is achieved by the acceptable performance of a blind sample (typically by using a PT sample, but can be a single blind (to the analyst) sample), by performing another IDOC, or by summarizing the data of four consecutive laboratory control samples with acceptable levels of precision and accuracy (these limits are those currently listed in the LIMS for an LCS using the indicated test method(s).) ADOCPs are documented using a standard form and are kept on file in each analyst's employee folder. ADOCPs may be demonstrated as an analyst group utilizing LIMS control charting, so long as all listed analysts participated, the results are consecutive and pass the requirements for precision and accuracy.

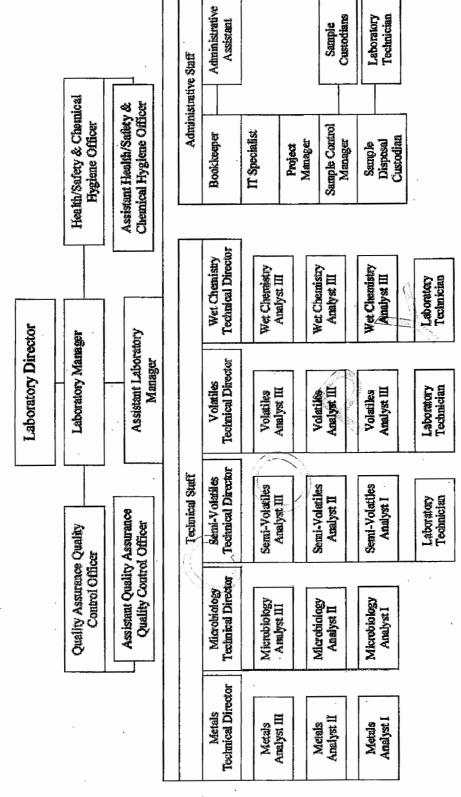
Each new employee shall be provided with data integrity training as a formal part of their new employee orientation. Each new employee will sign an ethics and data integrity agreement to ensure that they understand that data quality is our main objective. Every HEAL employee recognizes that although turnaround time is

important, quality is put above any pressure to complete the task expediently. Analysts are not compensated for passing QC parameters nor are incentives given for the quantity of work produced. Data Integrity and Ethics training are performed on an annual basis in order to remind all employees of HEAL's policy on data quality. Employees are required to understand that any infractions of the laboratory data integrity procedures will result in a detailed investigation that could lead to very serious consequences including immediate termination, debarment, or civil/criminal prosecution.

Training for each member of HEAL's technical staff is further established and maintained through documentation that each employee has read, understood, and is using the latest version of this Quality Assurance Manual. Training courses or workshops on specific equipment, analytical techniques, or laboratory procedures are documented through attendance sheets, certificates of attendance, training forms, or quizzes. This training documentation is located in analyst specific employee folders in the QA/QCO Office. On the front of all methods, SOPs, and procedures for HEAL, there is a signoff sheet that is signed by all pertinent employees, indicating that they have read, understand, and agree to perform the most recent version of the document.

The effectiveness of training will be evaluated during routine data review, annual employee reviews, and internal and external audits. Repetitive errors, complaints and audit findings serve as indicators that training has been ineffective. When training is deemed to have been ineffective a brief review of the training process will be completed and a re-training conducted as soon as possible.

HEAL Personnel Chart



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5.0 Receipt and Handling of Samples

Reviewing Requests, Tenders and Contracts

All contracts and written requests by clients are closely reviewed to ensure that the client's data quality objectives can be met to their specifications. This review includes making sure that HEAL has the resources necessary to perform the tests to the clients specifications.

When HEAL is unable to meet the clients specifications their samples will be subcontracted to an approved laboratory capable of meeting the client's data quality objectives.

Sampling

Procedures

HEAL does not provide field sampling for any projects. Sample kits are prepared and provided for clients upon request. The sample kits contain the appropriate sampling containers (with a preservative when necessary), labels, blue ice (The use of "blue ice" by anyone except HEAL personnel is discouraged because it generally does not maintain the appropriate temperature of the sample. If blue ice is used, it should be completely frozen at the time of use, the sample should be chilled before packing, and special notice taken at sample receipt to be certain the required temperature has been maintained.), a cooler, chain-of-custody forms, plastic bags, bubble wrap, and any special sampling instructions. Sample kits are reviewed prior to shipment for accuracy and completeness.

Containers

Containers which are sent out for sampling are purchased by HEAL from a commercial source. Glass containers are certified "EPA Cleaned" QA level 1. Plastic containers are certified clean when required. These containers are received with a Certificate of Analysis verifying that the containers have been cleaned according to the EPA wash procedure. Containers are used once and discarded. If the samples are collected and stored in inappropriate containers the laboratory may not be able to accurately quantify the amount of the desired components. In this case, re-sampling may be required.

Preservation

If sampling for analyte(s) requires preservation, the sample custodians fortify the containers prior to shipment to the field, or provide the preservative for the sampler to add in the field. The required preservative is introduced into the vials in uniform amounts

and done so rapidly to minimize the risk of contamination. Vials that contain a preservative are labeled appropriately. If the samples are stored with inappropriate preservatives, the laboratory may not be able to accurately quantify the amount of the desired components. In this case re-sampling may be required.

Refer to the current Login SOP and/or the current price book for detailed sample receipt and handling procedures, appropriate preservation and holding time requirements.

Sample Custody

Chain-of-Custody Form

A Chain-of-Custody (COC) form is used to provide a record of sample chronology from the field to receipt at the laboratory. HEAL's COC contains the client's name, address, phone and fax numbers, the project name and number, the project manager's name, and the field sampler's name. It also identifies the date and time of sample collection, sample matrix, field sample ID number, number/volume of sample containers, sample temperature upon receipt, and any sample preservative information.

There is also a space to record the HEAL ID number assigned to samples after they are received. Next to the sample information is a space for the client to indicate the desired analyses to be performed. There is a section for the client to indicate the data package level as well as any accreditation requirements. Finally, there is a section to track the actual custody of the samples. The custody section contains lines for signatures, dates and times when samples are relinquished and received. The COC form also includes a space to record special sample related instructions, sampling anomalies, time constraints, and any sample disposal considerations.

It is paramount that all COCs arrive at HEAL complete and accurate so that the samples can be processed and allocated for testing in a timely and efficient manner. A sample chain-of-custody form can be found in the current Document Control Logbook or on line at www.hallenvironmental.com

Should a specific project or client require the use of an internal COC, advanced notification and approval must be obtained. The use of internal COCs are not part of our standard operating procedure.

Receiving Samples

Samples are received by authorized HEAL personnel. Upon arrival, the COC is compared to the respective samples. After the samples and COC have been determined to be complete and accurate, the sampler signs over the COC. The HEAL staff member in turn signs the chain-of-custody, also noting the current date, time, and sample temperature. This relinquishes custody of the samples from the sampler and

delegates sample custody to HEAL. The first (white) copy of the COC form is filed in the appropriate sample folder. The second (yellow) copy of the COC form is filed in the COC file in the sample control manager's office. The third (pink) copy of the COC form is given to the person who has relinquished custody of the samples.

Logging in Samples and Storage

Standard Operating Procedures have been established for the receiving and tracking of all samples (refer to the current HEAL Login SOP). These procedures ensure that samples are received and properly logged into the laboratory and that all associated documentation, including chain of custody forms, is complete and consistent with the samples received. Each sample set is given a unique HEAL tracking ID number. Individual sample locations within a defined sample set are given a unique sample ID suffix-number. Labels with the HEAL numbers, and tests requested, are generated and placed on their respective containers. The pH of preserved, non-volatile samples is checked and noted if out of compliance. Due to the nature of the samples, the pHs of volatiles samples are checked after analysis. Samples are reviewed prior to being distributed for analysis.

All samples received that are requested for compliance, whether on the COC or by contract, will be identified as compliance samples in the LIMS so as to properly notify the analytical staff that they are to be analyzed in accordance with the test method(s) as well as the compliance requirements.

Samples are distributed for analysis based upon the requested tests. In the event that sample volume is limited and different departments at HEAL are required to share the sample, volatile work takes precedence and will always be analyzed first before the sample is sent to any other department for analysis.

Care will be taken to store samples isolated from laboratory contaminants, standards and highly contaminated samples

All samples that require thermal preservation shall be acceptably stored at a temperature range just above freezing to 6 °C unless specified at another range by the SOP and Method.

Each project (sample set) is entered into the Laboratory Information Management System (LIMS) with a unique ID that will be identified on every container. The ID tag includes the Lab ID, Client ID, date and time of collection, and the analysis/analyses to be performed. The LIMS continually updates throughout the lab. Therefore, at any time, an analyst or manager may inquire about a project and/or samples status. For more information about the login procedures, refer to the Sample Login SOP.

Disposal of Samples

Samples are held at HEAL for a minimum of thirty days and then transferred to the HEAL warehouse for disposal. Analytical results are used to characterize their respective sample contamination level(s) so that the proper disposal can be performed. These wastes will be disposed of according to their hazard as well as their type and level of contamination. Refer to the Hall Environmental Analysis Laboratory Chemical Hygiene Plan and current Sample Disposal SOP for details regarding waste disposal.

Waste drums are provided by an outside agency. These drums are removed by the outside agency and disposed of in a proper manner.

The wastes that are determined to be non-hazardous are disposed of as non-hazardous waste in accordance with the Chemical Hygiene Plan and Sample Disposal SOP.

6.0 Analytical Procedures

All analytical methods used at HEAL incorporate necessary and sufficient Quality Assurance and Quality Control practices. A Standard Operating Procedure (SOP) is used to provide the necessary criteria to yield acceptable results. These procedures are reviewed at least annually and revised as necessary and are attached as a pdf file in the Laboratory Information Management System (LIMS) for easy access by each analyst. The sample is often consumed or altered during the analytical process. Therefore, it is important that each step in the analytical process be correctly followed in order to yield valid data.

When unforeseen problems arise, the analyst, technical director, and, when necessary, laboratory manager meet to discuss the factors involved. The analytical requirements are evaluated and a suitable corrective action or resolution is established. The client is notified in the case narrative with the final report or before, if the validity of their result is in question.

List of Procedures Used

Typically, the procedures used by HEAL are EPA approved methodologies or 20th edition Standard Methods. However, proprietary methods for client specific samples are sometimes used. On occasion, multiple methods or multiple method revisions are used, in this event the SOP is written to include the requirements of all referenced methods. The following tables list EPA and Standard Methods Method numbers with their corresponding analytes and/or instrument classification.

Methods Utilized at HEAL

Drinking Water(DW) Non-Potable Water (NPW) Solids (S)

Methodology	Matrix	Title of Method .	
180.1.	DW NPW	"Turbidity (Nephelometric)"	
200.2	DW NPW	"Sample Preparation Procedure For Spectrochemical Determination of Total Recoverable Elements"	
200.7	DW	"Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry"	
200.8	DW NPW	"Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry."	
245.1	DW NPW	"Mercury (Manual Cold Vapor Technique)"	

300.0	DW NPW S	"Determination of Inorganic Anions by Ion Chromatography"	
413.2	NPW S	"Oil and Grease"	
418.1	NPW S	"Petroleum Hydrocarbons (Spectrophotometric, Infrared)"	
504.1	DW	"EDB, DBCP and 123TCP in Water by Microextraction and Gas Chromatography"	
524.2	DW	"Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry"	
552.3	DW .	"Determination of Haloacetic Acids and Dalapon in Drinking Water by Ion-Exchange Liquid-Solid Extraction and Gas Chromatography with an Electron Capture Detector"	
624	NPW	Appendix A to Part 136 Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater Method 624-Purgeables"	
1311	s	"Toxicity Characteristic Leaching Procedure"	
1311ZHE	S	"Toxicity Characteristic Leaching Procedure"	
166 4A	NPW	"N-Hexane Extractable Material (HEM; Oil and Grease) and Silica Gel Treated N-Hexane Extractable Material) by Extraction and Gravimetry"	
3005A	NPW	"Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by FLAA or ICP Spectroscopy"	
3010A	NPW	"Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by FLAA or ICP Spectroscopy"	
3050B	S	"Acid Digestion of Sediment, Sludge, and Soils"	
3510C	DW NPW	"Separatory Funnel Liquid-Liquid Extraction"	
3540	s	"Soxhlet Extraction"	
3545	s	"Pressurized Fluid Extraction(PFE)"	
3665	NPW S	"Sulfuric Acid/Permanganate Cleanup"	
5030B	NPW	"Purge-and-Trap for Aqueous Samples"	
5035	s	"Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples"	
6010B	NPW S	"Inductively Coupled Plasma-Atomic Emission Spectrometry"	

		"Mercury in Liquid Waste (Manual Cold-Vapor Technique)"	
7471A	S	"Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)"	
	NPW	"Aromatic and Halogenated Volatiles By Gas	
8021B	s	Chromatography Using Photoionization and/or Electrolytic Conductivity Detectors"	
8015D	NPW	"Nonhalogenated Volatile Organics by Gas Chromatography"	
00100	S	(Gasoline Range and Diesel Range Organics)	
8081A	NPW S	"Organochlorine Pesticides by Gas Chromatography"	
8082	NPW S	"Polychlorinated Biphenyls (PCBs) by Gas Chromatography"	
8260B	NPW S	"Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)"	
8270C	NPW S	"Semivolatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)"	
8310	NPW S	"Polynuclear Aromatic Hydrocarbons"	
9060	NPW	"Total Organic Carbon"	
9067	NPW S	"Phenolics (Spectrophotometric, MBTH With Distillation)"	
9095A	s	"Paint Filter Liquids Test"	
H-8167	DW NPW	"Method 8167 Chlorine, Total"	
Walkley/Black	s	FOC/TOC WB	
SM2320 B	DW NPW	"Alkalinity"	
SM2340B	NPW	"2340 Hardness"	
SM2510B	DW NPW	"2510 Conductivity"	
SM2540 B	NPW	"Total Solids Dried at 103-105° C"	
SM2540 C	DW NPW	"Total Dissolved Solids Dried at 180° C"	
SM2540 D	NPW	"Total Suspended Solids Dried at 103-105° C"	
SM4500-H+B	DW NPW	"pH Value"	
	NPW S	"4500-NH3" Ammonia	
SM4500-Norg	NPW	"4500-Norg" Total Kjeldahl Nitrogen (TKN)	

C	s		
SM5210 B	NPW	"5210 B. 5-day BOD Test"	
SM5310 B	DW	"5310" Total Organic Carbon (TOC)	
SM9223B	NPW	"9223 Enzyme Substrate Coliform Test"	
	DW		
8000B	NPW	"Determinative Chromatographic Sengrations"	
	s	"Determinative Chromatographic Separations"	
8000C	NPW	"Determinative Chromotographic Congretions"	
	s	"Determinative Chromatographic Separations"	

Criteria for Standard Operating Procedures

HEAL has Standard Operating Procedures (SOPs) for each of the test methods listed above. These SOPs are based upon the listed methods and detail the specific procedure and equipment utilized as well as the quality requirements necessary to prove the integrity of the data. SOPs are reviewed or revised every twelve months or sooner if necessary. The review/revision is documented in the Master SOP Logbook filed in the QA/QC Office. All SOPs are available in the LIMS under the Documents and SOPs menu.

Hand written corrections or alterations to SOPs are not permitted. In the event that a correction is needed and a revision is not immediately possible, a corrective action report will be generated documenting the correction or alteration, signed by the section Technical Director and the QA/QC Officer and will be scanned into the current SOP and will document the change until a new revision is possible.

Controlled documents such as calibration summary forms, analysis bench sheets, etc. are tracked as appendices in SOPs, through the Controlled Document Logbook with copies available through the LIMS or through the MOAL as bound logbooks.

Each HEAL test method SOP shall include or reference the following topics where applicable:

Identification of the test method;

Applicable matrix or matrices;

Limits of detection and quantitation;

Scope and application, including parameters to be analyzed;

Summary of the test method;

Definitions:

Interferences:

Safety:

Equipment and supplies:

Reagents and standards;

Sample collection, preservation, shipment and storage;

Quality control parameters;

Calibration and standardization;

Procedure;

Data analysis and calculations;

Method performance;

Pollution prevention;

Data assessment and acceptance criteria for quality control measures;

Corrective actions for out-of-control data,

Contingencies for handling out-of-control or unacceptable data;

Waste management;

References; and

Any tables, diagrams, flowcharts and validation data.

7.0 Calibration

All equipment and instrumentation used at HEAL are operated, maintained and calibrated according to manufacturers' guidelines, as well as criteria set forth in applicable analytical methodology. Personnel who have been properly trained in their procedures perform the operation and calibration. Brief descriptions of the calibration processes for our major laboratory equipment and instruments are found below.

Thermometers

The thermometers in the laboratory are used to measure the temperatures of the refrigerators, freezers, ovens, water baths, incubators, hot blocks, ambient laboratory conditions, TCLP Extractions, digestion blocks, and samples at the time of log-in. All NIST traceable thermometers are either removed from use upon their documented expiration date or they are checked annually with a NIST-certified thermometer and a correction factor is noted on each thermometer log. See the most current Login SOP for detailed procedures on this calibration procedure.

Data Loggers are used to record refrigerator temperatures. These data loggers are calibrated quarterly with NIST-certified thermometers.

The NIST thermometer should be recalibrated at least every five years or whenever the thermometer has been exposed to temperature extremes.

Refrigerators/Freezers

Each laboratory refrigerator or freezer contains a thermometer capable of measuring to a minimum precision of 0.1°C. The thermometers are kept with the bulb immersed in liquid. Each day of use, the temperatures of the refrigerators are recorded to insure that the refrigerators are within the required designated range. Samples are stored separately from the standards to reduce the risk of contamination.

See the current Catastrophic Failure SOP for the procedure regarding how to handle failed refrigerators or freezers.

Ovens

The ovens contain thermometers graduated by 1° C. The ovens are calibrated quarterly against NIST thermometers and checked each day of use as required and in whatever way is dictated by or appropriate for the method in use.

Analytical and Table Top Balances

The table top balances are capable of weighing to a minimum precision of 0.01 grams. The analytical balances are capable of weighing to a minimum precision of 0.0001 grams. Records are kept of daily calibration checks for the balances in use. Working weights are used in these checks. The balances are annually certified by an outside source and the certifications are on file with the QA/QCO.

Balances, unless otherwise indicated by method specific SOPs, will be checked each day of use with at least two weights that will bracket the working range of the balance for the day. Daily balance checks will be done using working weights that are calibrated annually against Class S weights. Class S weights are calibrated by an external provider as required. The Class S weights are used once a year, or more frequently if required, to assign values to the Working Weights. During the daily balance checks, the working weights are compared to their assigned values and must pass in order to validate the calibration of the balance. The assigned values, as well as the daily checks, for the working weights are recorded in the balance logbook for each balance.

Instrument Calibration

An instrument calibration is the relationship between the known concentrations of a set of calibration standards introduced into an analytical instrument and the measured response they produce. Calibration curve standards are a prepared series of aliquots at various known concentration levels from a primary source reference standard. Specific mathematical types of calibration techniques are outlined in SW-846 8000B and/or 8000C. The entire initial calibration must be performed prior to sample analyses.

The lowest standard in the calibration curve must be at or below the required reporting limit.

Refer to the current SOP to determine the minimum requirement for calibration points.

Most compounds tend to be linear and a linear approach should be favored when linearity is suggested by the calibration data. Non-linear calibration should be considered only when a linear approach cannot be applied. It is not acceptable to use an alternate calibration procedure when a compound fails to perform in the usual manner. When this occurs, it is indicative of instrument issues or operator error.

If a non-linear calibration curve fit is employed, a minimum of six calibration levels must be used for second-order (quadratic) curves.

When more than 5 levels of standards are analyzed in anticipation of using second-order calibration curves, all calibration points MUST be used regardless of the calibration option employed. The highest or lowest calibration point may be excluded for the purpose of narrowing the calibration range and meeting the requirements for a specific calibration option. Otherwise, unjustified exclusion of calibration data is expressly forbidden.

Analytical methods vary in QC acceptance criteria. HEAL follows the method specific guidelines for QC acceptance. The specific acceptance criteria are outlined in the analytical methods and their corresponding SOPs.

pH Meter

The pH meter measures to a precision of 0.01 pH units. The pH calibration logbook contains the calibration before each use, or each day of use, if used more than once per day. It is calibrated using a minimum of 3 certified buffers. Also available with the pH meter is a magnetic stirrer with a temperature sensor. See the current pH SOP (SM4500 H+ B) for specific details regarding calibration of the pH probe.

Other Analytical Instrumentation and Equipment

The conductivity probe is calibrated as needed and checked daily when in use.

Eppendorf (or equivalent brands) pipettes are checked gravimetrically prior to use.

Standards

All of the source reference standards used are ordered from a reliable commercial vendor. A Certificate of Analysis (CoA), which verifies the quality of the standard, accompanies the standards from the vendor. The Certificates of Analysis are dated and stored on file by the Technical Directors or their designee. These standards are traceable to the National Institute of Standards (NIST). When salts are purchased and used as standards the certificate of purity must be obtained from the vendor and filed with the CoAs.

All standard solutions, calibration curve preparations, and all other quality control solutions are labeled in a manner that can be traced back to the original source reference standard. All source reference standards are entered into the LIMS with an appropriate description of the standard. Dilutions of the source reference standard (or any mixes of the source standards) are fully tracked in the LIMS. Standards are labeled with the date opened for use and with an expiration date.

As part of the quality assurance procedures at HEAL, analysts strictly adhere to manufacturer recommendations for storage times/expiration dates and policies of analytical standards and quality control solutions.

Reagents

HEAL ensures that the reagents used are of acceptable quality for their intended purpose. This is accomplished by ordering high quality reagents and adhering to good laboratory practices so as to minimize contamination or chemical degradation. All reagents must meet any specifications noted in the analytical method. Refer to the current Purchase of Consumables SOP for details on how this is accomplished and documented.

Upon receipt, all reagents are assigned a separate ID number, and logged into the LIMS. All reagents shall be labeled with the date received into the laboratory and again with the date opened for use. Recommended shelf life, as defined by the manufacturer, shall be documented and controlled. Dilutions or solutions prepared shall be clearly labeled, dated, and initialed. These solutions are traceable back to their primary reagents and do not extend beyond the expiration date listed for the primary reagent.

All gases used with an instrument shall meet specifications of the manufacturer. All safety requirements that relate to maximum and/or minimum allowed pressure, fitting types, and leak test frequency, shall be followed. When a new tank of gas is placed in use, it shall be checked for leaks and the date put in use will be written in the instrument maintenance logbook.

HEAL continuously monitors the quality of the reagent water and provides the necessary indicators for maintenance of the purification systems in order to assure that the quality of laboratory reagent water meets established criteria for all analytical methods. The majority of HEAL methods utilize medium quality deionized reagent water maintained at a resistivity greater than $1M\Omega$ in accordance with SM1080.

Reagent blank samples are also analyzed to ensure that no contamination is present at detectable levels. The frequency of reagent blank analysis is typically the same as calibration verification samples. Refrigerator storage blanks are stored in the volatiles refrigerator for a period of one week and analyzed and replaced once a week.

8.0 Maintenance

Maintenance logbooks are kept for each major instrument and all support equipment in order to document all repair and maintenance. In the front of the logbook, the following information is included:

Unique Name of the Item or Equipment
Manufacturer
Type of Instrument
Model Number
Serial Number
Date Received and Date Placed into Service
Location of Instrument
Condition of Instrument Upon Receipt

For routine maintenance, the following information shall be included in the log:

Maintenance Date
Maintenance Description
Maintenance Performed by Initials

A manufacturer service agreement (or equivalent) covers most major instrumentation to assure prompt and reliable response to maintenance needs beyond HEAL instrument operator capabilities.

Refer to the current Maintenance and Troubleshooting SOP for each section in the laboratory for further information.

9.0 Data Integrity

For HEAL's policy on ethics and data integrity, see section 3.0 of this document. Upon being hired, and annually thereafter, all employees at HEAL undergo documented data integrity training. All new employees sign an Ethics and Data Integrity Agreement, documenting their understanding of the high standards of integrity required at HEAL and outlining their responsibilities in regards to ethics and data integrity. See the current Document Control Logbook for a copy of this agreement.

In instances of ethical concern, analysts are required to report the known or suspected concern to their Technical Director, the Laboratory Manager, or the QA/QCO. This will be done in a confidential and receptive environment, allowing all employees to privately discuss ethical issues or report items of ethical concern.

Once reported and documented, the ethical concern will be immediately elevated to the Laboratory Manager and the need for an investigation, analyst remediation, or termination will be determined on a case-by-case basis.

All reported instances of ethical concern will be thoroughly documented and handled in a manner sufficient to rectify any breaches in data integrity with an emphasis on preventing similar incidences from happening in the future.

10.0 Quality Control

Internal Quality Control Checks

HEAL utilizes various internal quality control checks, including duplicates, matrix spikes, matrix spike duplicates, method blanks, laboratory control spikes, laboratory control spike duplicates, surrogates, internal standards, calibration standards, quality control charts, proficiency tests and calculated measurement uncertainty.

Refer to the current method SOP to determine the frequency and requirements of all quality controls. In the event that the frequency of analysis is not indicated in the method specific SOP, duplicate samples, laboratory control spikes (LCS), Method Blanks (MB), and matrix spikes and matrix spike duplicates (MS/MSD) are analyzed for every batch of twenty samples.

When sample volume is limited on a test that requires an MS/MSD an LCSD shall be analyzed to demonstrate precision and accuracy and when possible a sample duplicate will be analyzed.

Duplicates are identical tests repeated for the same sample or matrix spike in order to determine the precision of the test method. A Relative Percent Difference (RPD) is calculated as a measure of this precision. Unless indicated in the SOP, the default acceptance limit is </= 20%.

Matrix Spikes and Matrix Spike Duplicates are spiked samples (MS/MSD) that are evaluated with a known added quantity of a target compound. This is to help determine the accuracy of the analyses and to determine the matrix effects on analyte recovery. A percent recovery is calculated to assess the quality of the accuracy. In the event that the acceptance criteria is not outlined in the SOP, a default limit of 70-130% will be utilized. When an MSD is employed an RPD is calculated and when not indicated in the SOP shall be acceptable at

In an effort to evaluate all received matricies, MS/MSD samples are chosen randomly. Notable exceptions to this policy are when a client requests the MS/MSD be analyzed utilizing their sample or in the event the matrix requires such a significant dilution that utilizing it as an MS/MSD is impractical.

When appropriate for the method, a Method Blank should be analyzed with each batch of samples processed to assess contamination levels in the laboratory. MBs consist of all the reagents measured and treated as they are with samples, except without the samples. This enables the laboratory to ensure clean reagents and procedures. Guidelines should be in place for accepting or rejecting data based on the level of contamination in the blank. In the event that these guidelines are not dictated by the SOP or in client specific work plans, the MB should be less than the MDL reported for the analyte being reported.

It is important to note that the LIMS qualifies samples for Method Blank failures when the amount in the blank is greater than the sample's listed PQL.

A Laboratory Control Spike and Laboratory Control Spike Duplicate (LCS/LCSD) are reagent blanks, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. It is generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system. Guidelines are outlined in each SOP for the frequency and pass fail requirements for LCS and LCSDs. These limits can be set utilizing control charts as discussed below.

Surrogates are utilized when dictated by method and are substances with properties that mimic the analytes of interest. The surrogate is an analyte that is unlikely to be found in environmental samples. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for surrogates.

Internal Standards are utilized when dictated by the method and are known amounts of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for Internal Standards.

Proficiency Test (PT) Samples are samples provided by an unbiased third party. They are typically analyzed twice a year, between five and seven months apart, or at any other interval as defined in the method SOP. They contain a pre-determined concentration of the target compound, which is unknown to HEAL. HEAL's management and all analysts shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates and other procedures as used when analyzing routine samples. PT results are reported as normal samples, within the working range of the associated calibration curve. In the event an analyte concentration is less than the PQL, the result shall be reported as less than the PQL.

With regards to analyzing PT Samples HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seek accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall not attempt to obtain the assigned value of any PT sample from the PT Provider.

Upon receiving a Not Acceptable PT result for any analyte, a root cause analysis is conducted and the cause of the failure determined and corrected. As defined by TNI, two

out of the past three PTs must be acceptable to maintain accreditation for any given analyte. If this requirement is not met, a successful history will be reestablished by the analysis of an additional PT sample. For accredited tests, the PT provider will be notified, when the PT is for corrective action purposes. The analysis dates of successive PT samples for the same TNI accredited analyte shall be at least fifteen days apart.

Calibration standards are standards run to calibrate. Once the calibration is established the same standards can be analyzed as Continuing Calibration Verifications (CCV), used to confirm the consistency of the instrumentation. Calibration standards can be utilized at the beginning and end of each batch, or more frequently as required. Typically Continuing Calibration Blanks (CCB) are run in conjunction with CCVs. Refer to the current method SOP for frequency and pass/fail requirements of CCVs and CCBs.

Control Limits are limits of acceptable ranges of the values of quality control checks. The control limits approximate a 99% confidence interval around the mean recovery. Any matrix spike, surrogate, or LCS results outside of the control limits require further evaluation and assessment. This should begin with the comparison of the results from the samples or matrix spike with the LCS results. If the recoveries of the analytes in the LCS are outside of the control limits, then the problem may lie with the application of the extraction, with cleanup procedures, or with the chromatographic procedure. Once the problem has been identified and addressed, corrective action may include reanalysis of samples or reextraction followed by reanalysis. When the LCS results are within the control limits, the issue may be related to the sample matrix or to the use of an inappropriate extraction, cleanup, and/or determinative method for the matrix. If the results are to be used for regulatory compliance monitoring, then steps must be taken to demonstrate that the analytes of concern can be determined in the sample matrix at the levels of interest. Data generated with laboratory control samples that fall outside of the established control limits are judged to be generated during an "out-of-control" situation. These data are considered suspect and shall be repeated or reported with qualifiers.

Control limits are to be updated only by Technical Directors, Section Supervisors or the Quality Assurance Officer. Control limits should be established and updated according to the requirements of the method being utilized. When the method does not specify, and control limits are to be generated or updated for a test, the following guidelines shall be utilized.

Limits should typically be generated utilizing the most recent 20-40 data values. In order to obtain an even distribution across multiple instruments and to include more than a single day's worth of data, surrogate limits should be generated using around 100 data values. The data values used shall not reuse values that were included in the previous Control Limit update. The data values shall also be reviewed by the LIMS for any Grubbs Outliers, and if identified, the outliers must be removed prior to generating new limits. The results used to update control limits should meet all other QC criteria associated with the determinative method. For example, MS/MSD recoveries from a GC/MS procedure should be generated from samples analyzed after a valid tune and a valid initial calibration that includes all

analytes of interest. Additionally, no analyte should be reported when it is beyond the working range of the calibration currently in use. MS/MSD and surrogate limits should be generated using the same set of extraction, cleanup, and analysis procedures.

All generated limits should be evaluated for appropriateness. Where limits have been established for MS/MSD samples, the LCS/LCSD limits should fall within those limits, as the LCS/LCSD are prepared in a clean matrix. Surrogate limits should be updated using all sample types and should be evaluated to ensure that all instruments as well as a reasonable dispersion across days are represented by the data. LCS/LCSD recovery limits should be evaluated to verify that they are neither inappropriately wide nor unreasonably tight. The default LCS/LCSD acceptance limits of 70-130% and RPD of 20% (or those limits specified by the method for LCS/LCSD and/or CCV acceptability), should be used to help make this evaluation. Technical directors may choose to use warning limits when they feel their generated limits are too wide, or default LCS limits when they feel their limits have become arbitrarily tight.

Once new Control Limits have been established and updated in the LIMS, the Control Charts shall be printed and reviewed by the appropriate section supervisor and primary analyst performing the analysis for possible trends and compared to the previous Control Charts. The technical director initials the control charts, indicating that they have been reviewed and that the updated Limits have been determined to be accurate and appropriate. Any manual alterations to the limits will be documented and justified on the printed control chart. These initialed charts are then filed in the QA/QCO office.

Once established, control limits should be reviewed after every 20-30 data values and updated at least every six months, provided that there are sufficient points to do so. The limits used to evaluate results shall be those in place at the time that the sample was analyzed. Once limits are updated, those limits apply to all subsequent analyses.

When updating surrogate control limits, all data regardless of sample/QC type, shall be updated together and assigned one set of limits for the same method/matrix.

In the event that there are insufficient data points to update limits that are over a year old, the default limits, as established in the method or SOP, shall be re-instated. Refer to the requirements in SW-846 method 8000B and 8000C for further guidance on generating control limits.

Calculated Measurement Uncertainty is calculated annually using LCSs in order to determine the laboratory specific uncertainty associated with each test method. These uncertainty values are available to our clients upon request and are utilized as a trending tool internally to determine the effectiveness of new variables introduced into the procedure over time.

Client Requested QC

Occasionally certain clients will require QC that is not defined by or covered in the SOPs. These special requests will be issued to all analysts and data reviewers in writing and the analysts and data reviewers will be provided with guidance on how to properly document the client requested deviation/QC in their preparation and analytical batches.

Precision, Accuracy, Detection Levels

Precision

The laboratory uses sample duplicates, laboratory control spike duplicates, and matrix spike duplicates to assess precision in terms of relative percent difference (RPD). HEAL requires the RPD to fall within the 99% confidence interval of established control charts or an RPD of less than 20% if control charts are not available. RPD's greater than these limits are considered out-of-control and require an appropriate response.

RPD = 2 x (Sample Result – Duplicate Result) X 100 (Sample Result + Duplicate Result)

Accuracy

The accuracy of an analysis refers to the difference between the calculated value and the actual value of a measurement. The accuracy of a laboratory result is evaluated by comparing the measured amount of QC reference material recovered from a sample and the known amount added. Control limits can be established for each analytical method and sample matrix. Recoveries are assessed to determine the method efficiency and/or the matrix effect.

Analytical accuracy is expressed as the Percent Recovery (%R) of an analyte or parameter. A known amount of analyte is added to an environmental sample before the sample is prepared and subsequently analyzed. The equation used to calculate percent recovery is:

%Recovery = {(concentration* recovered)/(concentration* added)} X 100

*or amount

HEAL requires that the Percent Recovery to fall within the 99 % confidence interval of established control limits. A value that falls outside of the confidence interval requires a warning and process evaluation. The confidence intervals are calculated by determining the mean and sample standard deviation. If control limits are not available, the range of 80 to 120% is used unless the specific method dictates

otherwise. Percent Recoveries outside of this range mandate additional action such as analyses by Method of Standard Additions, additional sample preparation(s) where applicable, method changes, and out-of-control action or data qualification.

Detection Limit

Current practices at HEAL define the Detection Limit (DL) as the smallest amount that can be detected above the baseline noise in a procedure within a stated confidence level.

HEAL presently utilizes an Instrument Detection Limit (IDL), a Method Detection Limit (MDL), and a Practical Quantitation Limit (PQL). The relationship between these levels is approximately

IDL: MDL: PQL = 1:5:5.

The IDL is a measure of the sensitivity of an analytical instrument. The IDL is the amount which, when injected, produces a detectable signal in 99% of the analyses at that concentration. An IDL can be considered the minimum level of analyte concentration that is detectable above random baseline noise.

The MDL is a measure of the sensitivity of an analytical method. MDL studies are required annually for each quality system matrix, technology and analyte, unless indicated otherwise in the referenced method. An MDL determination (as required in 40CFR part 136 Appendix B) consists of replicate spiked samples carried through all necessary preparation steps. The spike concentration is three times the standard deviation of three replicates of spikes. At least seven replicates are spiked and analyzed and their standard deviation(s) calculated. Routine variability is critical in passing the 10 times rule and is best achieved by running the MDLs over different days and when possible over several calibration events. Standard Methods and those methods used for drinking water analysis must have MDL studies that are performed over a period of at least three days in order to include day to day variations. The method detection limit (MDL) can be calculated using the standard deviation according to the formula:

$$MDL = s * t (99\%),$$

where t (99%) is the Student's t-value for the 99% confidence interval. The t-value depends on the number of trials used in calculating the sample standard deviation, so choose the appropriate value according to the number of trials.

Number of Trials	t(99%)
6	3.36
7	3.14
8	3.00
9	2.90

Page 41 of 59 Quality Assurance Plan 9.9 Effective August 13th, 2014 The calculated MDL must not be less than 10 times the spiked amount or the study must be performed again with a lower concentration.

Where there are multiple MDL values for the same test method in the LIMS the highest MDL value is utilized.

The PQL is significant because different laboratories can produce different MDLs although they may employ the same analytical procedures, instruments and sample matrices. The PQL is about two to five times the MDL and represents a practical, and routinely achievable, reporting level with a good certainty that the reported value is reliable. It is often determined by regulatory limits. The reported PQL for a sample is dependent on the dilution factor utilized during sample analysis.

In the event that an analyte will not be reported less than the PQL, an MDL study is not required and a PQL check shall be done, at least annually, in place of the MDL study. The PQL check shall consist of a QC sample spiked at or below the PQL. All sample-processing and analysis steps of the analytical method shall be included in the PQL check and shall be done for each quality system matrix, technology, and analyte. A successful check is one where the recovery of each analyte is within the established method acceptance criteria. When this criterion is not defined by the method or SOP, a default limit of +/-50% shall be utilized.

Quality Control Parameter Calculations

Mean

The sample mean is also known as the arithmetic average. It can be calculated by adding all of the appropriate values together, and dividing this sum by the number of values.

Average = $(\Sigma x_i) / n$

 x_i = the value x in the i^{th} trial i^{th} trial i^{th} trial i^{th}

Standard Deviation

The sample standard deviation, represented by s, is a measure of dispersion. The dispersion is considered to be the difference between the average and each of the

values x_i . The variance, s^2 , can be calculated by summing the squares of the differences and dividing by the number of differences. The sample standard deviation, s, can be found by taking the square root of the variance.

Standard deviation =
$$s = \left[\sum (x_l - average)^2 /(n-1)\right]^{\frac{1}{2}}$$

Percent Recovery (LCS and LCSD)

Percent Recovery (MS, MSD)

Control Limits

Control Limits are calculated by the LIMS using the average percent recovery (x), and the standard deviation (s).

Upper Control Limit =
$$x + 3s$$

Lower Control Limit = $x - 3s$

These control limits approximate a 99% confidence interval around the mean recovery.

Grubbs Outliers

Grubbs Outliers are calculated by the LIMS during the generation of control limits and uncertainties. An outlier is an observation that appears to deviate markedly from other observations in the sample set and are removed, unless documented otherwise.

Identify both the lowest and highest values in the sample set. Use the following equations to determine the T values.

$$T = \frac{x_{max} - x_{mean}}{sd}$$
 (for the largest value)

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$$T = \frac{x_{mean} - x_{min}}{sd}$$
 (for the smallest value)

Compare the T values to the Grubbs' critical value table. If either value of T is greater than the critical value (assuming a 5% risk) for the sample size, the point(s) must be dropped then the calculation repeated for both the lowest and highest value using the new mean and standard deviation.

The Grubbs test is repeated until there are no longer any outliers detected. Keep in mind you must have at least 20 data points available to generate your limits.

RPD (Relative Percent Difference)

Analytical precision is expressed as a percentage of the difference between the results of duplicate samples for a given analyst. Relative percent difference (RPD) is calculated as follows:

RPD = 2 x (Sample Result – Duplicate Result) X 100 (Sample Result + Duplicate Result)

Uncertainty Measurements

Uncertainty, as defined by ISO, is the parameter associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurement. Ultimately, uncertainty measurements are used to state how good a test result is and to allow the end user of the data to properly interpret their reported data. All procedures allow for some uncertainty. For most analyses, the components and estimates of uncertainty are reduced by following well-established test methods. To further reduce uncertainty, results generally are not reported below the lowest calibration point (PQL) or above the highest calibration point (UQL). Understanding that there are many influential quantities affecting a measurement result, so many in fact that it is impossible to identify all of them, HEAL calculates measurement uncertainty at least annually using LCSs. These estimations of measurement uncertainty are kept on file in the method folders in the QA/QC office.

Measurement Uncertainty contributors are those that may be determined statistically. These shall be generated by estimating the overall uncertainty in the entire analytical process by measuring the dispersion of values obtained from laboratory control samples over time. At least 20 of the most recent LCS data points are gathered. The standard deviation(s) is calculated using these LCS data points. Since it can be

assumed that the possible estimated values of the spikes are approximately normally distributed with approximate standard deviation(s), the unknown value of the spike is believed to lie in 95% confidence interval, corresponding to an uncertainty range of +/- 2(s).

Calculate standard deviation (s) and 95% confidence interval according to the following formulae:

$$s = \sqrt{\frac{\sum (x - \overline{x})^2}{(n-1)}}$$

Where: s = standard deviation

x = number in series

 \bar{x} = calculated mean of series

n = number of samples taken

95% confidence = $2 \times s$

Example: Assuming that after gathering 20 of the most recent LCS results for Bromide, we have calculated the standard deviations of the values and achieved a result of 0.0326, our measurement of uncertainty for Bromide (at 95% confidence = $2 \times s$) is 0.0652.

Total Nitrogen

Total nitrogen is calculated as follows:

Total Nitrogen = TKN + NO₂ + NO₃

Langelier Saturation Index

The Langelier Saturation Index (LSI) is calculated as follows:

Solids Factor (SF) =(Log10[TDS] - 1) / 10 Ca Hardness Factor (HF) = Log10([Ca] x 2.497) - 0.4 Alkalinity Factor (AF) = Log10[Alkalinity] Temp. Factor (TF) = -13.12 x Log10($^{\circ}$ C + 273) + 34.55 pHs (pH @ saturation) =(9.3 + SF + TF) - (HF + AF) LSI = pH - pH_s

Calibration Calculations

1. Response Factor or Calibration Factor:

$$RF = ((A_x)(C_{is}))/((A_{is})(C_x))$$

$$CF=(A_x)/(C_x)$$

a. Average RF or CF

$$RF_{AVE} = \Sigma RF_i / n$$

b. Standard Deviation

s = SQRT { [
$$\Sigma$$
 (RF_i - RF_{AVE})²] / (n-1) }

c. Relative Standard Deviation

Where:

A_x = Area of the compound

 C_x = Concentration of the compound

Ais = Area of the internal standard

Cis = Concentration of the internal standard

n = number of pairs of data

RF_i = Response Factor (or other determined value)

RF_{AVE} = Average of all the response factors

 Σ = the sum of all the individual values

2. Linear Regression



$$m = (n\Sigma x_i y_i - (n\Sigma x_i)^*(n\Sigma y_i)) / (n\Sigma x_i^2 - (\Sigma x_i)^2)$$

b. Intercept (b)

$$b = y_{AVE} - m^*(x_{AVE})$$

c. Correlation Coefficient (cc)

$$\begin{array}{l} \text{CC (r) = } \{ \ \Sigma((x_i \!\!-\! x_{ave})^*(y_i \!\!-\! y_{ave})) \ \} \ / \ \{ \ \text{SQRT}((\Sigma(x_i \!\!-\! x_{ave})^2)^*(\Sigma(y_i \!\!-\! y_{ave})^2))) \ \} \\ \text{Or} \\ \text{CC (r) = } [(\Sigma w \ ^* \Sigma wxy) - (\Sigma wx \ ^* \Sigma wy)] \ / \ (\text{sqrt}(\ (\ [(\Sigma w \ ^* \Sigma wx^2) - (\Sigma wx \ ^* \Sigma wx)] \ ^* \ [(\Sigma w \ ^* \Sigma wy^2) - (\Sigma wy \ ^* \Sigma wy)])))] \\ \end{array}$$

d. Coefficient of Determination

$$COD(r^2) = CC*CC$$

Where:

y = Response (Area) Ratio A_x/A_{is}

x = Concentration Ratio C_x/C_{is}

m = slope

b = intercept

n = number of replicate x,y pairs

 x_i = individual values for independent variable

y_i = individual values for dependent variable

 Σ = the sum of all the individual values

xave = average of the x values

yave = average of the y values

w = weighting factor, for equal weighting w=1

3. Quadratic Regression

$$y = ax^2 + bx + c$$

a. Coefficient of Determination

COD (r²) =(
$$\Sigma(y_i - y_{ave})^2 - \{[(n-1)/(n-p)] * [\Sigma(y_i - Y_i)^2]\}) / \Sigma(y_i - y_{ave})^2$$

Where:

y = Response (Area) Ratio A_x/A_{is}

x = Concentration Ratio C_x/C_{is}

 $a = x^2$ coefficient

b = x coefficient

c = intercept

y_i = individual values for each dependent variable

 x_i = individual values for each independent variable

y_{ave} = average of the y values

n = number of pairs of data

p = number of parameters in the polynomial equation (I.e., 3 for third order, 2 for second order)

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$Yi = ((2*a*(C_x/C_{is})^2)-b^2+b+(4*a*c))/(4a)$

b. Coefficients (a,b,c) of a Quadratic Regression

$$a = S_{(x2y)}S_{(xx)} - S_{(xy)}S_{(xx2)} / S_{(xx)}S_{(x2x2)} - [S_{(xx2)}]^2$$

$$b = S_{(xy)}S_{(x2x2)} - S_{(x2y)}S_{(xx2)} / S_{(xx)}S_{(x2x2)} - [S_{(xx2)}]^2$$

$$c = [(\Sigma yw)/n] - b^*[(\Sigma xw)/n] - a^*[\Sigma (x^2w)/n]$$

Where:

n = number of replicate x,y pairs

x = x values

y = y values

 $w = S^{-2} / (\Sigma S^{-2}/n)$

 $S_{(xx)} = (\Sigma x^2 w) - [(\Sigma x w)^2 / n]$

 $S_{(xy)} = (\Sigma xyw) - [(\Sigma xw)^*(\Sigma yw) / n]$

 $S_{(xx2)} = (\Sigma x^{3}w) - [(\Sigma xw)^{*}(\Sigma x^{2}w) / n]$

 $S_{(x2y)} = (\Sigma x^2 yw) - [(\Sigma x^2 w)^* (\Sigma yw) / n]$

 $S_{(x2x2)} = (\Sigma x^4 w) - [(\Sigma x^2 w)^2 / n]$

Or If unweighted calibration, w=1

 $S(xx) = (Sx^2) - [(Sx)^2 / n]$

S(xy) = (Sxy) - [(Sx)*(Sy) / n]

S(xx2) = (Sx3) - [(Sx)*(Sx2) / n]

S(x2y) = (Sx2y) - [(Sx2)*(Sy) / n]

S(x2x2) = (Sx4) - [(Sx2)2 / n]

Weighting

Weighting of 1/x or $1/x^2$ is permissible for linear calibrations. Weighting shall not be employed for quadratic calibrations. When weighting, use the above equations by substituting x for 1/x or $1/x^2$.

Concentration Calculations

On-Column Concentration for Average RRF Calibration using Internal Standard

On-Column Concentration $C_x = ((A_x)(C_{is}))/((A_{is})(RF_{AVE}))$

On-Column Concentration for Average CF Calibration using External Standard

On-Column Concentration $C_x = (A_x)/(CF_{AVE})$

On-Column Concentration for Linear Calibration

Page 48 of 59 Quality Assurance Plan 9.9 Effective August 13th, 2014 If determining an external standard, then exclude the Ais and Cis for internal standards On-Column Concentration $C_x = ((Absolute\{[(A_x)/(A_{is})] - b\})/m) * C_{is}$

Where: m = slope

b = intercept

 A_x = Area of the Sample

Cis = Concentration of the Internal Standard

Ais = Area of the Internal Standard

On-Column Concentration for Quadratic Calibration

If determining an external standard, then exclude the Ais and Cis for internal standards On-Column Concentration =[(+SQRT(b^2 -(4*a*(c-y)))-b)/(2*a)] * C_{is} Where: $a = x^2$ coefficient

b = x coefficient

c = intercept

y = Area Ratio = A_x/A_{is}

Cis = Concentration of the Internal Standard

Final Concentration (Wet Weight)

Concentration for Extracted Samples = (On-Column Conc)(Difution)(Final Volume) (Initial Amount)(Injection Volume)

Concentration for Purged Samples = (On-Column Conc)(Purged Amount)(Dilution) (Purged Amount)

Dry Weight Concentration

Dry Weight Concentration =Final Concentration Wet Weight *100 % Solids

Percent Difference

% Difference= Absolute(Continuing Calibration RRF - Average RRF) Average RRF

Percent Drift

% Drift= Absolute(Calculated Concentration - Theoretical Concentration) Theoretical Concentration

Dilution Factor

Dilution Factor = (Volume of Solvent + Solute) / Volume of Solute

Relative Retention Time

RRT =RT of Compound / RT of ISTD

Breakdown Percent

Breakdown = <u>Area of DDD + Area of DDE</u> Average (DDT, DDE and DDD)

-or-

<u>Area of Endrin Ketone + Area of Endrin Aldehyde</u> Average (Endrin, Endrin Ketone, Endrin Aldehyde)

11.0 Data Reduction, Validation, Reporting, and Record Keeping

All data reported must be of the highest possible accuracy and quality. During the processes of data reduction, validation, and report generation, all work is thoroughly checked to insure that error is minimized.

Data Reduction

The analyst who generated the data usually performs the data reduction. The calculations include evaluation of surrogate recoveries (where applicable), and other miscellaneous calculations related to the sample quantitation.

If the results are computer generated, then the formulas must be confirmed by hand calculations, at minimum, one per batch.

See the current Data Validation SOP for details regarding data reduction.

Validation

A senior analyst, most often the section supervisor, validates the data. All data undergoes peer review. If an error is detected, it is brought to the analyst's attention so that he or she can rectify the error, and perform further checks to ensure that all data for that batch is sound. Previous and/or common mistakes are stringently monitored throughout the validation process. Data is reported using appropriate significant figure criteria. In most cases, two significant digits are utilized, but three significant digits can be used in QC calculations. Significant digits are not rounded until after the last step of a sample calculation. All final reports undergo a review by the laboratory manager, the project manager, or their designee, to provide a logical review of all results before they are released to the client.

If data is to be manually transferred between media, the transcribed data is checked by a peer. This includes data typing, computer data entry, chromatographic data transfer, data table inclusion to a cover letter, or when data results are combined with other data fields.

All hand-written data from run logs, analytical standard logbooks, hand-entered data logbooks, or on instrument-generated chromatograms, are systematically archived should the need for future retrieval arise.

See the current Data Validation SOP for details regarding data validation.

Reports and Records

All records at HEAL are retained and maintained through the procedures outlined in the most recent version of the Records Control SOP.

Sample reports are compiled by the Laboratory Information Management System (LIMS). Most data is transferred directly from the instruments to the LIMS. After being processed by the analyst and reviewed by a data reviewer, final reports are approved and signed by the senior laboratory management. A comparative analysis of the data is performed at this point. For example, if TKN and NH3 are analyzed on the same sample, the NH3 result should never be greater than the TKN result. Lab results and reports are released only to appropriately designated individuals. Release of the data can be by fax, email, electronic deliverables, or mailed hard copy.

When a project is completed, the final report, chain of custody, any relevant supporting data, and the quality assurance/control worksheets are scanned as a pdf file onto the main server. Original client folders are kept on file and are arranged by project number. Additionally, all electronic data is backed up routinely on the HEAL main server. The backup includes raw data, chromatograms, and report documents. Hard copies of chromatograms are stored separately according to the instrument and the analysis date. All records and analytical data reports are retained in a secure location as permanent records for a minimum period of five years (unless specified otherwise in a client contract). Access to archived information shall be documented with an access log. Access to archived electronic reports and data will be password protected. In the event that HEAL transfers ownership or terminates business practices, complete records will be maintained or transferred according to the client's instructions.

After issuance, the original report shall remain unchanged. If a correction to the report is necessary, then an additional document shall be issued. This document shall have a title of "Addendum to Test Report or Correction to Original Report", or equivalent. Demonstration of original report integrity comes in two forms. First, the report date is included on each page of the final report. Second, each page is numbered in sequential order, making the addition or omission of any data page(s) readily detectable.

12.0 Corrective Action

Refer to the most recent version of the Data Validation SOP for the procedure utilized in filling out a Corrective Action Report. A blank copy of the corrective action report is available in the current Document Control Logbook.

The limits that have been defined for data acceptability also form the basis for corrective action initiation. Initiation of corrective action occurs when the data generated from continuing calibration standard, sample surrogate recovery, laboratory control spike, matrix spike, or sample duplicates exceed acceptance criteria. If corrective action is necessary, the analyst or the section supervisor will coordinate to take the following guidelines into consideration in order to determine and correct the measurement system deficiency:

Check all calculations and data measurements systems (Calibrations, reagents, instrument performance checks, etc.).

Assure that proper procedures were followed.

Unforeseen problems that arise during sample preparation and/or sample analysis that lead to treating a sample differently from documented procedures shall be documented with a corrective action report. The section supervisor and laboratory manager shall be made aware of the problem at the time of the occurrence. See the appropriate SOP regarding departures from documented procedures.

Continuing calibration standards below acceptance criteria cannot be used for reporting analytical data unless method specific criteria states otherwise.

Continuing calibration standards above acceptance criteria can be used to report data as long as the failure is isolated to a single standard and the corresponding samples are non-detect for the failing analyte.

Samples with non-compliant surrogate recoveries should be reanalyzed, unless deemed unnecessary by the supervisor for matrix, historical data, or other analysis-related anomalies.

Laboratory and Matrix Spike acceptance criteria vary significantly depending on method and matrix. Analysts and supervisors meet and discuss appropriate corrective action measures as spike failures occur.

In the event that results must be reported with associated QC failures, the data must be qualified appropriately to notify the end user of the QC failure.

Sample duplicates with RPD values outside control limits require supervisor evaluation and possible reanalysis.

A second mechanism for initiation of corrective action is that resulting from Quality Assurance performance audits, system audits, inter- and intra-laboratory comparison studies. Corrective Actions initiated through this mechanism will be monitored and coordinated by the laboratory QA/QCO.

All corrective action forms are entered in the LIMS and included with the raw data for peer review, signed by the technical director of the section and included in the case narrative to the client whose samples were affected. All Corrective action forms in the LIMS are reviewed by the QA/QCO.

13.0 Quality Assurance Audits, Reports and Complaints

Internal/External Systems' Audits, Performance Evaluations, and Complaints

Several procedures are used to assess the effectiveness of the quality control system. One of these methods includes internal performance evaluations, which are conducted by the use of control samples, replicate measurements, and control charts. External performance audits, which are conducted by the use of inter-laboratory checks, such as participation in laboratory evaluation programs and performance evaluation samples available from a NELAC-accredited Proficiency Standard Vendor, are another method.

Proficiency samples will be obtained twice per year from an appropriate vendor for all tests and matrices for which we are accredited and for which PTs are available. HEAL participates in soil, waste water, drinking water, and underground storage tank PT studies. Copies of results are available upon request. HEAL's management and all analysts shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities, and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates, and other procedures as used when analyzing routine samples.

With regards to analyzing PT Samples, HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seek accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall not attempt to obtain the assigned value of any PT sample from the PT Provider.

Internal Audits are performed annually by the QA/QCO in accordance with the current Internal Audit SOP. The system audit consists of a qualitative inspection of the QA system in the laboratory and an assessment of the adequacy of the physical facilities for sampling, calibration, and measurement. This audit includes a careful evaluation and review of laboratory quality control procedures. Internal audits are performed using the guidelines outlined below, which include, but are not limited to:

- 1. Review of staff qualifications, demonstration of capability, and personnel training programs
- 2. Storage and handling of reagents, standards, and samples
- 3. Standard preparation logbook and LIMS procedures
- 4. Extraction logbooks
- 5. Raw data logbooks
- 6. Analytical logbooks or batch printouts and instrument maintenance logbooks

- 7. Data review procedures
- 8. Corrective action procedures
- Review of data packages, which is performed regularly by the lab manager/QA Officer.

The QA/QCO will conduct these audits on an annual basis.

Management Reviews

HEAL management shall periodically, and at least annually, conduct a review of the laboratory's quality system and environmental testing activities to ensure their continuing suitability and effectiveness, and to introduce necessary changes or improvements. The review shall take account of:

- 1. the suitability and implementation of policies and procedures
- 2. reports from managerial and supervisory personnel
- 3. the outcome of recent internal audits
- 4. corrective and preventive actions
- 5. assessments by external bodies
- 6. the results of inter-laboratory comparisons or proficiency tests
- 7. changes in volume and type of work
- 8. client feed back
- 9. complaints
- 10. other relevant factors, such as laboratory health and safety, QC activities, resources, and staff training.

Findings from management reviews and the actions that arise from them shall be recorded and any corrective actions that arise shall be completed in an appropriate and agreed upon timescale.

Complaints

Complaints from clients are documented and given to the laboratory manager. The lab manager shall review the information and contact the client. If doubt is raised concerning the laboratory's policies or procedures, then an audit of the section or sections may be performed. All records of complaints and subsequent actions shall be maintained in the client compliant logbook for five years unless otherwise stated.

Internal and External Reports

The QA/QCO is responsible for preparation and submission of quality assurance reports to the appropriate management personnel as problems and issues arise. These reports include the assessment of measurement systems, data precision and accuracy, and the results of performance and system audits. Additionally, they include significant QA problems, corrective actions, and recommended resolution measures. Reports of these Quality Assurance Audits describe the particular activities audited, procedures utilized in the examination and evaluation of laboratory records, and data validation procedures. Finally, there are procedures for evaluating the performance of Quality Control and Quality Assurance activities, and laboratory deficiencies and the implementation of corrective actions with the review requirements.

14.0 References (Analytical Protocols Utilized at HEAL)

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- 5. <u>Handbook of Chemistry and Physics, 62nd Edition</u>, CRC Press, Inc. 1981-1982.
- 6. <u>Handbook on Reference Methods for Soil Testing.</u> The Council on Soil Testing & Plant Analysis, 1980 and 1992
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- 13. <u>Methods for the Determination of Metals in Environmental Samples</u>, USEPA, EPA-600/4-91-010, June 1991
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- 19. <u>Soil Survey Laboratory Methods Manual.</u> Soil Survey Laboratory Staff. Soil Survey Investigations Report No. 42, version 2.0, August 1992.
- 20. Soil Testing Methods Used at Colorado State University for the Evaluation of Fertility, Salinity and Trace Element Toxicity, Technical Bulletin LT B88-2 January, 1988
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ANNUAL CLASS I WELL REPORT

Waste Disposal Well #1 January – December 2012



Western Refining Southwest, Inc.
Bloomfield Refinery
Bloomfield, New Mexico
Permit # - UIC-CL1-009
API # - 30-45-29002

Submitted January 30, 2013

Prepared by:

Kelly Robinson

Environmental Supervisor

Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Ron Weaver

Regional Terminals Manager

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EXECUTIVE SUMMARY

This report provides a summary of activities conducted in 2012 on Waste Disposal Well #1 (WDW-#1) at the Bloomfield Refinery. The following is a summary of well operations and well testing activities performed in 2012.

Operational Summary

Injection Volume - The volume injected into the disposal well during 2012 was 8,996,020 gallons. Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation.

Sampling and Chemical Analyses - Injection fluids samples were collected on a quarterly basis for chemical analysis. Analytical results did not exhibit characteristics of hazardous waste.

Maintenance Operations - No down-hole maintenance activities were conducted in 2012.

Mechanical Integrity Tests - The 2012 well testing program witnessed by a representative of the New Mexico Oil Conservation Division (NMOCD) included a High-Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test. Results of these tests prove that the operational integrity of the well is sound.

Area of Review (AOR) - No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

Recommendations

Western will continue the routine monitoring, maintenance, and testing programs which include quarterly chemical analysis of injection fluids, mechanical integrity testing, and Bradenhead testing. Western will continue to utilize the maximum operating injection pressure at the wellhead as permitted by Discharge Permit GW-130.

1.0 INTRODUCTION

This report provides a summary of activities conducted during 2012 on Waste Disposal Well #1 (WDW #1). The disposal well is part of the Bloomfield Refinery operations. The refinery is located immediately south of Bloomfield, New Mexico in San Juan County. The well location is depicted in Figure 1. The physical address of the facility is as follows:

Bloomfield Refinery

#50 County Road 4990 Bloomfield, NM 87413

The Bloomfield Refinery is located on approximately 263 acres. Bordering the facility is a combination of federal and private properties. Public property managed by the Bureau of Land Management lies to the south. The majority of undeveloped land in the vicinity of the facility is used extensively for oil and gas production and, in some instances, grazing. U.S. Highway 550 is located approximately one-half mile west of the facility. The topography of the main portion of the site is generally flat with steep bluffs to the north.

WDW #1 is owned by San Juan Refining Company, a New Mexico corporation. It is operated by Western Refining Southwest, Inc. formerly known as Giant Industries Arizona, Inc. an Arizona corporation.

1.1 Well Information

Well Name & Number: Waste Disposal Well #1

OCD UIC: UIC-CL1-009

OCD Discharge Plan Permit Number: GW-130

Well Classification: Class I Non-hazardous

API Number: 30-045-29002

Legal Location: 1250 FEL, 2442FSL, I Sec 27 T29S R11E Physical Address: #50 Road 4990, Bloomfield, NM 87413

2.0 SUMMARY OF ACTIVITIES

The following list of activities was conducted in 2012 on WDW #1 located at the Bloomfield Refinery:

•	01/17/12	1st Quarter 2012 Sampling Event
•	04/03/12	2nd Quarter 2012 Sampling Event
•	07/31/12	3rd Quarter 2012 Sampling Event
•	09/06/12	Bradenhead Test
•	09/06/12	High-Pressure Shut-Down Test
•	09/06/12	Mechanical Integrity Test
•	10/11/12	4th Quarter 2011 Sampling Event

Quarterly samples collected for laboratory analysis were submitted to Hall Environmental Laboratories located in Albuquerque, New Mexico. Copies of the analytical reports are provided in Appendix B. A summary of the analytical results is provided in Table 3.

A representative of New Mexico Oil Conservation Division (NMOCD) was on-site to witness the Bradenhead Test, High-Pressure Shut-Down Test, and Mechanical Integrity Test on September 6, 2012. A copy of the test reports is provided in Appendix A.

The Annual Pressure Fall-Off Test was not conducted in 2012. In an e-mail to Western from NMOCD dated August 2, 2012, it states that Fall Off Test frequency requirements are believe evaluated by NMOCD and operators will be notified by NMOCD when a Fall Off Test is required. Western did not receive notification from NMOCD that a Fall-Off Test was required for 2012.

3.0 INJECTION VOLUME

The Monthly Injection Well Report summarizing injection volumes and well performance parameters is presented as Table 1.

3.1 Injection Volume

The volume injected into the disposal well during 2012 was 8,996,020 gallons. Throughout 2012 the Bloomfield Refinery injection well operated within the operational limits of less than 1,150 psi.

3.2 Injection Well Down-Time

The injection well was down approximately 4,019 hours in 2012. Decreased volume of plant produced water during 2012 resulted in extended periods in which the injection well was not operational. General maintenance activities on the injection well equipment upstream of the injection well also contributed to the injection well down-time during 2012.

4.0 SAMPLING AND CHEMICAL ANALYSIS

Samples were collected of the injection water on a quarterly basis and analyzed for the following per Item #9 of the Bloomfield Refinery Class I (Non-Hazardous) Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal dated March 23, 2004:

- Volatile Organic Compounds (VOCs);
- Semi-Volatile Organic Compounds (SVOCs);
- General Chemistry Parameters (included calcium, potassium, magnesium, sodium, bicarbonate, carbonate, chloride, sulfate, total dissolved solids, pH, and conductivity);
- RCRA 8 Metals; and
- RCRA Characteristics for Ignitability, Corrosivity, and Reactivity.

First quarter samples were collected on January 17, 2012. Second quarter samples were collected April 3, 2012. Third quarter samples were obtained July 31, 2012. Fourth quarter samples were taken October 11, 2012. A summary of the analytical results is provided in Table 3.

All quarterly samples collected for laboratory analysis were submitted to Hall Environmental Analysis Laboratory located in Albuquerque, NM. The analytical results conclude that the injected water did not exhibit characteristics of hazardous waste. The respective quarterly analytical reports and Laboratory Quality Assurance Plan are provided in Appendices B and C, respectively.

5.0 TESTING AND MAINTENANCE ACTIVITIES

In addition to the conducting general preventative maintenance activities on the injection well equipment, the following testing and well maintenance activities were conducted during 2012:

 Mechanical Integrity Testing (including high-pressure shutdown and Bradenhead Testing)

All activities were conducted following NMOCD approval, and such documentation is provided in Appendix A. The following is a brief summary of the testing and well maintenance activities conducted in 2012.

5.1 Mechanical Integrity Testing

A representative of New Mexico Oil Conservation Division (NMOCD) was on-site to witness a High Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test (MIT) on September 6, 2012. All tests were witnessed by Monica Kuehling of NMOCD-Aztec. The MIT held at 495 psi for 30 minutes, therefore confirming the integrity of the well. A copy of the Test Reports is provided in Appendix A.

6.0 WELL EVALUATION

6.1 Well Evaluation

In 2012, the injection well operated normally and within the operation limit of 1,150 psi. The increased down-time of well operations when compared to 2011 operational hours is mostly contributed to the decrease in produced water at the Bloomfield facility.

6.2 Area of Review (AOR)

The Area of Review data was updated in the 2011 Annual Bottomhole Pressure Surveys and Pressure Fall-Off Tests for Waste Disposal Well #1Report (Cobb & Associates, 2011). No new wells were found in the one-mile radius.

Fifty-eight wells were found within a one-mile radius of WDW #1, which injects water into the Mesaverde formation. The wells and status are spotted on an area map, Figure 3, with a well number listed with the well data in Table 2. Of these wells, 15 have been plugged and abandoned. Four wells are classified as dry holes and are believed to be plugged and abandoned. Twenty-four wells produce petroleum from shallow zones. One well is an Entrada injection well. Fourteen wells produce petroleum from the Dakota and Gallup zones, which are deeper than the Mesaverde interval used for injection purposes. No wells are producing from the injection interval within a one-mile radius of WDW #1.

Twenty-four of the 59 wells have penetrated the injection zone. Of these, three have been plugged. Five wells are currently producing from shallow zones and 14 wells produce from deep zones. There are two injection wells including WDW #1 and Ashcroft SWD #1 well.

No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The following is a summary of well operations and well testing activities performed in 2012.

7.1 Conclusions

Injection Volume - The volume injected into the disposal well during 2012 was 8,996,020 gallons. Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation.

Sampling and Chemical Analyses - Injection fluids samples were collected on a quarterly basis for chemical analysis. Analytical results did not exhibit characteristics of hazardous waste.

Maintenance Operations - No down-hole maintenance activities were conducted in 2012.

Mechanical Integrity Tests - The 2012 well testing program witnessed by a representative of OCD included a High-Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test. Results of these tests prove that the operational integrity of the well is sound.

Well Evaluation – The injection well operated normally within the operational limit of 1,150 psi throughout 2012.

Area of Review (AOR) - No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

7.2 Recommendations

Western will continue the routine monitoring, maintenance, and testing programs which include quarterly chemical analysis of injection fluids, high-pressure shut-down testing,

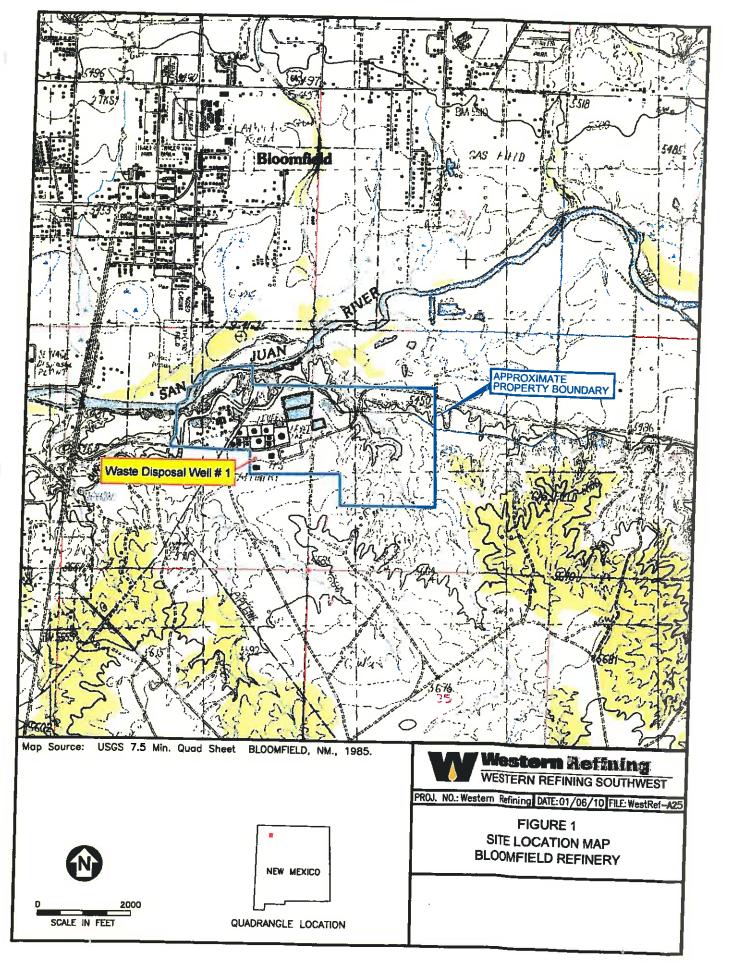
mechanical integrity testing, and Bradenhead testing in 2013. Western will continue to utilize the maximum operating injection pressure at the wellhead as permitted by Discharge Permit GW-130.

8.0 REFERENCES

Cobb & Associates, 2009a, Evaluation of Disposal Well #1 Bloomfield Refinery, August 26, 2009.

Cobb & Associates, 2011, 2011 Annual Bottomhole Pressure Surveys and Pressure Fall-Off Tests for Waste Disposal Well #1Report December 21, 2011.

Bloomfield Refinery Class I (Non-Hazardous) Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal dated March 23, 2004.



WESTERN REFINING DISPOSAL WELL #1 NW, SW SECTION 26, T29N, R11W

NO.: 30-045-29002

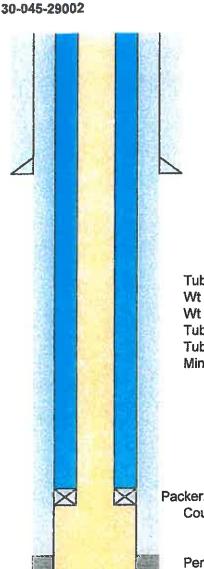




Figure 2

DISPOSAL WELL #1 WELL SCHEMATIC Western Refining inc. Bloomfield, NM

Date:	4/26/2006	Approved By:	rls	Job No.:	70F5830
Drawn By:	rts	Checked By:		Scale:	N/A

8-5/8", 48#/ft, Surface Casing @ 830'

TOC: Surface Hole Size: 11.0"

Tubing: 2-7/8", Acid Resistant Fluoroline Cement Lined

Wt of Tubing: 6.5 #/ft

Wt of Tubing Lined: 7.55 #/ft

Tubing ID: 2.128" Tubing Drift ID: 2.000"

Minimum ID @ Packer: ~1.87" estimated

Packer: Unknown Packer Type @ 3221' Could be a Guiberson or similar model Uni-6

Perforations: 3276' - 3408' 4JSPF 0.5 EHD Top of the Cliff House Formation: 3276'

Fill was cleaned out of well on 4/20/06 Fill was orginally tagged at 3325'

Perforations: 3435' - 3460' 4JSPF 0.5 EHD Top of the Menefee Formation: 3400'

RBP: 3520'

5-1/2", 15.5#/ft, Production Casing @3600'

TOC: Surface Hole Size: 7-7/8"

Figure 3

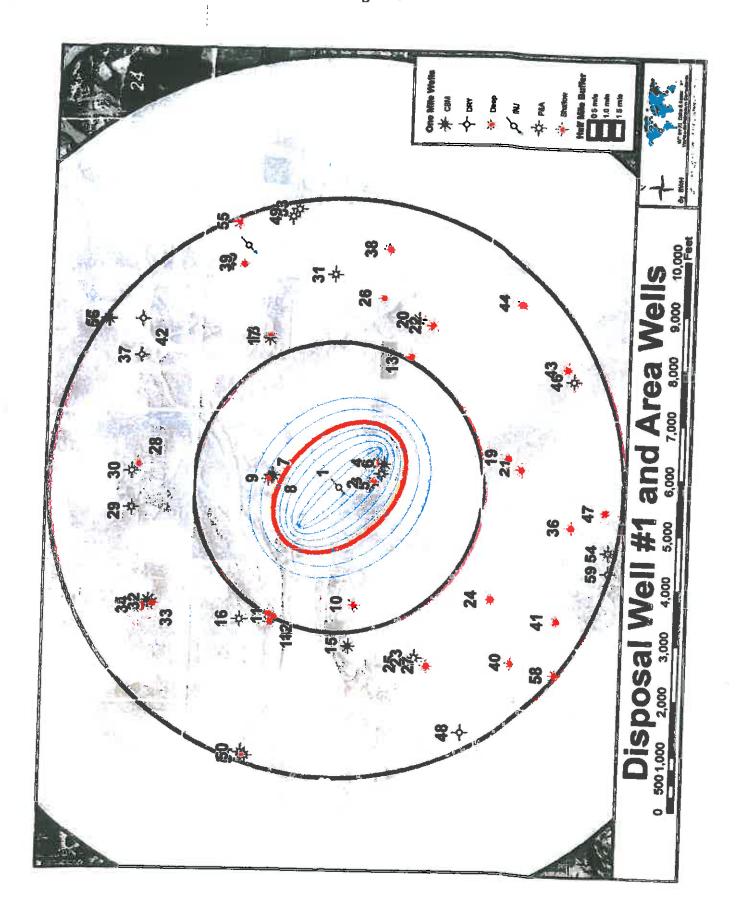


Table 1

WESTERN REFINING SOUTHWEST, INC. - BLOOMFIELD REFINERY P.O. BOX 159

BLOOMFIELD, NEW MEXICO 87413

MONTHLY INJECTION WELL REPORT DISCHARGE PLAN GW-130 NE1/4 SE1/4 SECTION 27, T29N, R11W NMPM, SAN JUAN COUNTY, NEW MEXICO

				١.				1									_	1
 	S	AVG	(GPM)	1	42	23	19		18	4	23	4	29	23	23	1	6	
ON-LINE	FLOW RATES	NIM	(GPM)		21	17	2		14	0	0	0	0	0	0	0	0	
		MAX	(GPM)		98	30	25.0		27	28	64	62	65	62	58	21	47	
	URE	AVG	(PSIA)		158	174	207		236	173	158	160	151	170	141	173	159	
	ANNULAR PRESSURE	NIM	(PSIA)		131	158	179		196	107	107	132	120	111	106	125	115	
	ANNI	MAX	(PSIA)		200	186	239		278	245	200	200	176	208	207	185	187	
	URE	AVG	(PSIA)		926	906	888		895	862	893	849	913	899	889	827	817	
	INJECTION PRESSURE	NIN	(PSIA)		901	885	882		879	844	841	830	837	838	835	817	757	
	INJEC	MAX	(PSIA)		1045	922	668		935	941	1016	989	1008	986	991	861	006	
	-NAOG	TIME	(HRS)		194	0	0		0	637	246	711	360	439	321	673	438	gallons
TOTALIZER	AMOUNT	INJECTED	(GALLONS)		1,384,309	927,412	841,031		753,498	125,509	991,574	109,779	1,390,728	996,779	1,069,507	41,469	364,425	8,996,020
AMOUNT	TO SOLAR	EVAP PONDS	(GALLONS)		408,692	596,588	875,969		937,502	1,751,491	1,336,426	2,448,221	21,272	516,221	466,493	1,050,531	938,575	012 is:
AMOUNT	OF WATER	FROM RIVER	(GALLONS)		855	1,806	859		2,011	1,819	2,350	ιn	2,630	2,496	609	2,291	2,199	The total amount injected in 2012 is:
		PERIOD	2012	:	JAN	FEB	MAR		APR	MAY	NOr	JUL	AUG	SEP	OCT	NOV	DEC	The total amo

Page 1

DATE

CERTIFICATION

Pen. Ini.	Zone	Yes	Yes	Š	Vac	3 :	2 ;	2 2		2	Yes	Yes	ş	Yes	}	8 4	€ ;		Š	Yes	ļ	Yes	Yes	Š	٩	9	Š	£	Yes
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RESERVOIR		MESAVERDE	DAKOTA	CHACRA	GALLUP	PICTIBED CLIEES	FRI ITTI AND COAL	FRUITI AND COAL		*COALLO	A STANCES	PICTURED CLIFFS	FRUITLAND SAND	DAKOTA	DAKOTA	CHACRA	CEVILLI AND COAL	אינים לאיניוניים		FRUITLAND COAL	DAKOTA		GALLUP	FRUITLAND COAL	CHACRA		CHACKA	PICTURED CLIFFS	GALLUP
OPERATOR		DE ANTERIOR MESAVERDE	DT AMERICA	XTO ENERGY, INC	XTO ENERGY, INC	Pre-Ongard		H-27-29N-11W HOLCOMB O&G	Pre-Ongard	H-27-29N-11W XTO ENERGY INC	ONI (TOURNEY) INC	Burkington	F-27-29N-11W MANANA GAS INC	Burlington	Burlington	F-27-29N-11W MANANA GAS INC	Burlington		DIBRID DE	F-26-29N-11W HOLCOMB O&G	F-26-29N-11W XTO ENERGY, INC		Bunington	Burlington					
ULSTR	I-27-29N-11W	-		MLL-N67-17-1	I-27-29N-11W	1-27-29N-11W	I-27-29N-11W	H-27-29N-11W		H-27-29N-11W	V 27 20M 44MA	N-27-28N-11VV Burkington	F-27-29N-11W	F-27-29N-11W Burlington	M-26-29N-11W Burlington	F-27-29N-11W	L-27-29N-11W	09-Now-78 C-27-29N-11W Branch		F-26-29N-11W	F-26-29N-11W	A 34 20M 441M	Control IVV Bullington	N-26-29N-11W Burlington	A-34-29N-11W Burlington	N-26-29N-11W ENEDGEN		A. Juli-73 M-27-28N-11W Pre-Ongard	C-34-29N-11W ENERGEN
P&A Date		19-Jan-94				18-Oct-82			18-Aug-55									09-Nov-78	•				•	-		~	97, him 75, 4	n 6/-mm-/7	U
Total Depth	3514	6298	2830	3	6177	1717	1714	1689	1800	6262	5808		1354	6160	6348	2710	6214	800	:	4030	6242	6148	1760	8	2857	2869	1747		2970
Perf Bottom	3514	6298	2839	}	5646		1714	1689		2810	1770	1264	# 0.00	6160	6348	2710	1861		!	1645	6242	6148			2857	2869	1747		5970
Pa de	3276	6157	2827		5314		1543	1483		2701	1680	1326	950	6024	6176	2578	1388			1462	9809	6086			2/4/	2746	1664		3326
APINO	30-045-29002	30-045-07825	30-045-23554		30-049-30833	30-045-07812	30-045-34463	30-045-34409	30-045-07883	30-045-24084	30-045-25673	30-045-27384		30-045-24673	30-045-12003	30-045-27365	30-045-07835	30-045-07896	440	30-045-25329	30-045-24083	30-045-25657	100 30-045-31118			30-045-24572	30-045-07903		
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10. WELLNAME	DISPOSAL	DAVIS GAS COM F	DAVIS GAS COM G	DAVIS GAS COME		Davis Pooled Unit	JACQUE	JACQUE	Davis PU/FB Umbarger	DAVIS GAS COM F	CONGRESS	LAUREN KELLY			CALVIN	MARIAN S	MANGUM	Black Diamond	DAVIS GAS COM			CONGRESS	CALVIN	SUMMIT		CONGRESS	Garland "B"	SUMMIT	
Miles to	0.00	0.11	0.12	0.15		0.16	0.18	0.23	0.23	0.24	0.41	0.49	070		0.51	0.52	0.55	0.56	0.57		0.58	0.60	0.64	0.64		9.0	0.64	0.65	
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RESERVOIR		CHACRA	GALLUP	PICTURED CLIFFS	CHACRA	FRUITLAND SAND	DAKOTA	Old College	(A/A)	CHACKA	FRUITLAND COAL	DAKOTA	FRUITLAND SAND	PICTURED CLIFFS	FARMINGTON	DAKOTA	AHONAG	ANOIA	FARMINGTON, NORTH Shallow	DAKOTA	CADIMICACO	NO ISMINISTRA	CHACKA	GALLUP	MORRISON BY LIFE EN		PICTURED CLIFFS	DAKOTA	
OPERATOR		V ENERGEN	Bunington	/ Burlington	P-22-29N-11W MANANA GAS INC	O-22-29N-11W JOHN C PICKETT	P-22-29N-11W MANANA GAS INC	Pre-Ondard	N-22-29N-113M MANIANA CAS INC	N-22-29N-14W MANIANA OCO INC	N-22-29N-11W MANANA GAS INC	N-22-29N 41W MANAGAR GAS INC	MANANA GAS INC	G-34-29N-11W CHAPARRAL O&G	Pre-Ongard	Burlington	B-26-29N-11W XTO ENERGY INC	CALL FINENCE I, MAC	D-34-29N-11W MCELVAIN O&G	Burlington	Pre-Ongard	Rugination		Burlington	B-26-29N-11W XTO ENERGY, INC	E-35-29N-11W CHAPABBA! 0.0		Surlington	ne-Ongard
ULSTR	M-97-99N-44W ENERGE	WALL-MOT IT III	M I -NEZ-0Z-N	M-27-29N-11W Burlington	P-22-29N-11W	0-22-29N-11W	P-22-29N-11W	M-26-29N-11W Pre-Oncard	N-22_29N_11'W	N-22-20N 14'A	N-22_29N_441M	N-22-20N 4414	AA I (-NG7-77-N	G-34-29N-11W	M-23-29N-11W Pre-Ongard	J-26-29N-11W	B-26-29N-11W		D-34-29N-11W	F-34-29N-11W Burlington	O-23-29N-11W Pre-Ondard	E-35-29N-11W Rudinaton		C-33-ZBN-11W Burlington	3-26-29N-11W	-35-29N-11W		G-54-28N-11W Burlington	P-28-29N-11W Pre-Ongard
P&A Date						02-Mar-00	14~Jun-99	11-Nov-58													Ŭ		•	,		18-Dec-99 E		•	ď.
Total Depth	2790	5870	187B		4C/2	1466	6274	1917	2732	1608	6226	1410		1/36	2335	6430	6160	1634	070	6347	2015	6328	5043	3	7382	1790 1	6340	!	870
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Perf	2668	5295	1648	2637	707	1380	6072		2622	1440	6052	1390	1706			6172	6047	1060		6202		2784 2	5369 5		6952 7	1776 1	6171 6		
의	24573	25612	1732	6721	, ,	7959		9777							2123					_	124								
APINO	30-045-24573	30-045-25612	30-045-21732	30-045-26721		30-045-07959	30-045-07961	30-045-07776	30-045-26731	30-045-34312	30-045-07940	30-045-13089	30-045-20755		30-545-02123	30-045-33093	30-045-07733	30-045-24834		30-045-24835	30-545-02124	30-045-24837	30-045-25675	90 00	88/05-540-05	30-045-20752	30-045-07672	30-045-07751	
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WELLNAME	GARLAND	CALVIN	GARLAND B	NANCY HARTMAN	TOUR DE LA COL	GRACE PEARCE	HARTMAN	Davis	MARY JANE	ROYAL FLUSH	СООК	COOK	SHELLY	000	יואואני	CALVIN	SULLIVAN GAS COM D	ELLEDGE FEDERAL 34	CONCERR	CONSTESS	HARE	CONGRESS	CONGRESS	ASHCROFT SWD		LEA ANN	CONGRESS	Viles EE	
Map Miles to Seq. DW1	0.65	0.67	0.68	0.70	2,7	5	0.72	0.73	0.75	0.76	0.79	0.79	0.82	28.0	70.0	28.	0.85	0.85	080			0.90	06.0	0.90			0.94	0.94	
Map Seq.	25	8	27	78	ģ		ଛ	34	32	33	\$	88	36	37	5 ;	38	33	9	7	: ;	y :	4 5	4	45	46		47	84	

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Status		P&A	P&	P&A	Deep	D&A		5 I	Molieuc	S S	P&A	Shallow	DRY
RESERVOIR		PICTURED CLIFFS	PICTURED CLIFFS		DAKOTA	PICTURED CLIFFS	PICTURED CLIEFS	CHACRA	EBLITTI AND COAL		PANCIA	PICTURED CLIFFS	FRUITLAND SAND
OPERATOR	Pre-Once		rre-Ongard	rre-Ongard	A-28-29N-11W XTO ENERGY, INC	Pre-Ongard	Pre-Ongard	B-26-29N-11W XTO ENERGY. INC	K-23-29N-11W HOLCOMB O&G	RP AMEDICA		E-34-29N-11W CHAPARRAL O&G	Pre-Ongard
ULSTR	23-Jun-55 G-26-29N-11W Pre-Oncard	05-May-78 A 28 20M 44M C. C.	05-lin-78 A-28 20M 44W P-0-0ngard	AA -NG %-07-U	A-28-29N-11W	1420 31-Aug-53 G-26-29N-11W Pre-Ongard	30-Oct-53 J-34-29N-11W Pre-Ongard	B-26-29N-11W	K-23-29N-11W	K-23-29N-11W RP AMEDICA		E-34-29N-11W	-34-29N-11W
P&A Date	23-Jun-55	05-May-78	05-lim-78			31-Aug-53	30-Oct-53			10-Mar-97	•		
Total Depth	006	1600	909	10.00	C710	1420	5	2761	2761	6182	1734	2	Frttnd
Perf Total Bottom Depth				30,10	6710			2761	1648	6182	1734		_
Perf				6003	300			2750	1470	6154	4712	<u>!</u> :	
APINO	30-045-29107	30-045-07895	30-045-07762	30-045-07894		30-045-07870	30-045-07674	30-045-23163	30-045-23550	30-045-07985	30-045-20609		30-345-02151
46:1	¥	8	m	-	•	_	-	-	-	-	₹-	r	N
WELLNAME	Sullivan	Madsen Selby Pooled Unit	Masden-Selby	MASDEN GAS COM	Cullivan	Compact	CONGRESS	EARL B SULLIVAN	STATE GAS COM BS	PEARCE GAS COM	CHAPARRAL	0.99 CONGRESS	
Miles to DW1	0.95	26.0	0.97	0.97	0 07		0.98	98.0	66.0	0.99 F	0.99	0.89	
	6	20	21	22		?	Z.	ıΩ	χQ	<u> </u>		a)	•

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Pen Inj. Zone	윋	12	4	0	G	#	0	35
	Yes	ო	0	8	N	က	4	24
Total	Wells	15	4	~	7	11	4	69
	Status	P&A	Dry	Š	CBM	Shallow	Deep	Total

Injection Well
2012 Quarterly Analytical Summary

Table 3

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quar
latile Organic Compounds (ug/L)					
1.1,1,2-Tetrachloroethane 1.1.1-Trichloroethane		1.0	1.0	:1.0	< 10
		< 1.0	:1.0	1.0	: 10
1,1,2-2-Tetrachloroethane 1,1,2-Trichloroethane		2.0	2.0	2.0	: 20
1,1-Dichloroethane		:1.0	< 1.0	1.0	10
1,1-Dichloroethene		1.0	1.0	1.0	10
1.1-Dichloropropene	1	1.0	1.0	1.0	10
1.2.3-Trichlorobenzene			1.0 1.0	1.0	:10
1.2,3-Trichloropropane		2.0	2.0	1.0	:10
1.2.4-Trichlorobenzene		1.0	:1.0	:2.0	:20
1.2,4-Trimethylbenzene		₹ 1.0	-: 1.0 -: 1.0	< 1.0 = 1.0	= 10
1,2-Dibromo-3-chloropropane		2.0	2.0	:2,0	:10
1,2-Dibromoethane (EDB)		:1.0	1.0	1.0	:20
1,2-Dichlorobenzene		< 1.0	< 1.0	:1.0	:10
1,2-Dichloroethane (EDC)	500	1.0	1.0	1.0	10
1.2-Dichloropropane	500	1.0	1.0	1.0	=: 10 =: 10
1,3,5-Trimethylbenzene		1.0	:1.0	1.0	:10
1-3-Dichlorobenzene		1.0	1.0	:1.0	:10
1,3-Dichloropropane		1.0	:1.0	1.0	: 10
1.4-Dichlorobenzene	7500	1.0	:1.0	:1.0	: 10
1-Methylnaphthalene	1300	4.0	:4.0	4.0	=: 40
2.2-Dichloropropane		2.0	< 2.0	2.0	: 20
2-Butanone		24	:10	21	100
2-Chlorotoluene		1.0	1.0	:1.0	< 10
2-Hexanone		< 10	10	10	100
2-Methylnaphthalene		4.0	4.0	:4.0	: 40
4-Chlorotoluene		:1.0	11.0	₹1,0	-10
4-Isopropyltoluene		< 1.0	< 1.0	1.0	10
4-Methyl-2-pentanone		10	< 10	:10	100
Acetone		520	78	590	130
Benzene	500	1.0	< 1.0	1.0	1:10
Bromobenzene	1	:1.0	≪1.0	:1.0	< 10
Bromodichloromethane		< 1.0	: 1.0	:1,0	:10
Bromoform		1.0	= 1.0	:1.0	:10
Bromomethane		3.0	= 3.0	3,0	< 30
Carbon disulfide		32	=: 10	=:10	- 100
Carbon Tetrachloride	500	1:1.0	√: 1.0	1.0	10
Chlorobenzene	100000	< 1.0	: 1.0	:1.0	:10
Chloroethane		-:2.0	≅ 2.0	: 2.0	: 20
Chloroform	6000	1.0	1.0	≤1.0	: 10
Chloromethane		413.0	3.0	=:3.0	:: 30
cis-1.2-DCE		:1.0	: 1.0	1.0	< 10
cis-1.3-Dichloropropene		≤1.0	≪ 1.0	1.0	:: 10
Dibromochloromethane		<: 1.0	< 1.0	≪ 1.0	:10
Dibromomethane		: 1.0	€1,0	1.0	: 10
Dichlorodifluoromethane		: 1.0	= 1.0	: 1.0	= 10
Ethylbenzene		1.0	< 1.0	1.0	=: 10
Hexachlorobutadiene	500	< 1.0	-: 1.0	-: 1.0	~: 10
Isopropylbenzene		1.0	≒ 1.0	€1.0	: 10
Methyl tert-butyl ether (MTBE)		= 1.0	€1.0	< 1.0	- 10
Methylene Chloride		∹3.0	3.0	:3.0	∷30
Naphthalene	1	< 2.0	1: 2.0	: 2.0	< 20
n-Butylbenzene		< 1.0	1.0	<1.0	< 30
n-Propylbenzene		1.0	:1.0	:1.0	10
sec-Butylbenzene		: 1.0	:1.0	: 1.0	=: 10
Styrene		: 1.0	< 1.0	: 1.0	≤ 10
tert-Butylbenzene		1.0	≤ 1.0	1.0	< 10
Tetrachloroethene (PCE)		:1.0	-: 1.0	1.0	1:10
Toluene		12	< 1.0	2.6	< 10
trans-1,2-DCE		1.0	1.0	4 1.0	-: 10
rans-1.3-Dichloropropene		≤ 1.0	1.0	: 1.0	1 10
Trichloroethene (TCE)		1.0	1.0	1.0	10
Frichlorofluoromethane Vinyl chloride	200	= 1.0	1.0	1.0	: 10
		= 1.0	: 1.0	:1,0	10

Injection Well 2012 Quarterly Analytical Summary

Table 3

mi Voletile Oranda Communication	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Qua
mi-Volatile Organic Compounds (ug/L) 1.2.4-Trichlorobenzene		1 (10			
1,2-Dichlorobenzene		10	: 50 : 50	- 50	< 50
1.3-Dichlorobenzene				: 50	: 50
1,4-Dichlorobenzene	7500	:10	≅ 50 - 50	: 50	- 50
1-Methylnaphthalene	7500	< 10	: 50	150	: 50
2,4.5-Trichlorophenol		< 10	: 50	:50	: 50
2,4.6-Trichlorophenol	2000	- 10	: 50	50	=: 50
2.4-Dichlorophenol	2000	<10	<:50	:50	< 50
		20	< 100	= 100	= 100
2.4-Dimethylphenol		= 10	:50	: 50	< 50
2,4-Dinitrophenol		€20	≪ 100	:100	: 100
2.4-Dinitrotoluene	130	= 10	< 50	≤ 50	1:50
2.6-Dinitrotoluene		:10	< 50	< 50	: 50
2-Chloronaphthalene		:10	< 50	:50	: 50
2-Chlorophenol		<10	-: 50	:50	∹ 50
2-Methylnaphthalene		10	₹ 50	50	. 50
2-Methylphenol		26	< 50	:50	<:50
2-Nitroaniline		10	₹50	:50	1:50
2-Nitrophenol		₹10	:: 50	< 50	∹ 50
3,3'-Dichlorobenzidine		10	-: 50	≤ 50	≪:50
3+4-Methylphenol		31	81	140	€ 50
3-Nitroaniline		=: 10	-: 50	:50	-: 50
4.6-Dinitro-2-methylphenol		⇒20	< 100	:100	1:100
4-Bromophenyl phenyl ether		≐10	⊴: 50	50	<: 50
4-Chloro-3-methylphenol		10	: 50	: 50	: 50
4-Chloroaniline		∹10	: 50	₹50	: 50
4-Chlorophenyl phenyl ether		≪10	: 50	₹50	: 50
4-Nitroaniline		< 20	< 100	100	:50
4-Nitrophenol		:10	₹50	:50	-: 50
Acenaphthene		< 10	: 50	150	: 50
Acenaphthylene		< 10	: 50	:50	:50
Aniline		:10	: 50	:50	- 50
Anthracene		:10	<:50	₹ 50	30
Azobenzene		10	:50	< 50	: 50
Benz(a)anthracene		10	- 50	:50	- 50
Benzo(a)pyrene		<10	:50	< 50	
Benzo(b)fluoranthene		:10	: 50	:50	-: 50
Benzo(g.h,i)perylene		10	: 50	± 50	50
Benzo(k)fluoranthene		10	:50		: 50
Benzoic acid		:20	:100	< 50	- 50
Benzyl alcohol		:10	:50	:100	100
Bis(2-chloroethoxy)methane				:50	: 50
		10	~: 50	: 50	: 50
Bis(2-chloroethyl)ether		< 10	50	50	: 50
Bis(2-chloroisopropyl)ether		:10	: 50	: 50	50
Bis(2-ethylhexyl)phthalate		< 10	< 50	:50	: 50
Butyl benzyl phthalate		≤ 10	50	1:50	: 50
Carbazole		=:10	₹50	₹50	: 50
Chrysene		10	- 50	- 50	150
Dibenz(a.h)anthracene		10	: 50	-: 50	: 50
Dibenzofuran		:10	: 50	:50	: 50
Diethyl phthalate		10	: 50	< 50	: 50
Dimethyl phthalate		:10	: 50	50	50
Di-n-butyl phthalate		=∶10	∗: 50	=: 50	: 50
Di-n-octyl phthalate		=10	: 50	: 50	100
Fluoranthene		=: 10	: 50	₹50	< 50
Fluorene		= 10	< 50	- 50	: 50
Hexachlorobenzene	130	:10	: 50	< 50	:50
Hexachlorobutadiene	500	≪ 10	- 50	- 50	< 50
Hexachlorocyclopentadiene		:10	< 50	: 50	-: 50
Hexachloroethane	3000	:10	- 50	:50	: 50
indeno(1,2.3-cd)pyrene		< 10	<: 50	- 50	: 50
sophorone		< 10	: 50	:50	:50
Vaphthalene		e: 10	< 50	: 50	: 50
Vitrobenzene	2000	:10	< 50	: 50	.: 50
N-Nitrosodimethylamine	2000	<10	:50	< 50	
N-Nitrosodi-n-propylamine		= 10	:50	:50	50
N-Nitrosodi-n-propylannie N-Nitrosodiphenylamine		10	50		: 50
Pentachlorophenol	100000			₹50 100	50
Phenauthrene	100000	120	100	100	:100
Phenol		:10	:50	:50	: 50
		I4	: 50	50	: 50
Pyrene		10	=: 50	: 50	: 50
Pyridine	5000	∹10	: 50	: 50	:50

Injection Well
2012 Quarterly Analytical Summary

Table 3

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarte
General Chemistry (mg/I unless otherwi	se stated)				
Specific Conductance (umhos/cm)		2,700	2,900	4200	4600
Chloride		710	850	1100	1200
Sulfate		68	77	15	37
Total Dissolved Solids		1,770	2.120	2740	2910
pH (pH Units)		7.32	6.91	7.95	7.35
Bicarbonate (As CaCO3)		320	330	510	510
Carbonate (As CaCO3)		2.0	< 2.0	:2.0	< 2.0
Calcium		120	110	94	150
Magnesium		26	35	44	44
Potassium		10	15	17	14
Sodium		450	800	760	670
Total Alkalinity (as CaCO3)		320	330	510	510
Total Metals (mg/L)					
Arsenic	5.0	0.020	- 0.020	€ 0.020	-: 0.020
Barium	0.001	0.43	0.46	0.39	0.41
Cadmium	1.0	<: 0.0020	- 0.0020	-: 0.0020	< 0.0020
Chromium	5.0	< 0.0060	:0.0060	: 0.0060	=: 0.0060
Lead	5	: 0.0050	< 0.0050	: 0.0050	< 0.0050
Selenium	1	: 0.050	: 0.050	≤ 0.050	0.050
Silver	5	0.0050	< 0.0050	: 0.0050	: 0.0050
Mercury	0.2	< 0.00020	0.00038	: 0.00020	0.00020
ignitability Corrosivity and Reactivity					
Reactive Cyanide (mg. kg)		1.0	< 1.0	0.1	10.0
Reactive Sulfide (mg/kg)		4.8	4.07	10	6.43
Ignitability (°F)	: 140° F	: 200	: 200	: 200	200
Corrosivity (ph Units)	2 or 12.5	6.58	6.58	7.55	6,43

Robinson, Kelly

From:

Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]

Sent:

Thursday, August 30, 2012 11:06 AM

To:

Robinson, Kelly

Cc:

Sanchez, Daniel J., EMNRD; VonGonten, Glenn, EMNRD; Kuehling, Monica, EMNRD

Subject:

RE: UIC-CL-009 Annual Testing for 2012 - Request for Approval

Attachments:

MIT Approval 8-30-2012.pdf

Kelly:

The New Mexico Oil Conservation Division (OCD) hereby approves the C-103 (See attachment) for specified well testing proposed by Western Refining Southwest, Inc. - Bloomfield Refinery (Western). Western must coordinate with Ms. Kuehling at the OCD Aztec DO to witness the testing.

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Department

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Drive, Santa Fe, New Mexico 87505

Office: (505) 476-3490

E-mail: CarlJ.Chavez@State.NM.US

Website: http://www.emnrd.state.nm.us/ocd/

"Why Not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward With the Rest of the

Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at

http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental

From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Thursday, August 30, 2012 10:41 AM

To: Chavez, Carl J, EMNRD

Subject: RE: UIC-CL-009 Annual Testing for 2012 - Request for Approval

Carl,

I apologize. I was not aware that the FOT was currently being evaluated by OCD. I would like to withdraw my C-103 for the Annual Fall-Off Test at this time. Western would rather postpone the testing until such time that OCD had determined that a Fall-Off Test for the injection well at the Bloomfield Refinery is needed. I appreciate the courtesy reminder.

After receipt of your approval on the C-103 for the MIT, Bradenhead, and High-Pressure Fall-Off Test, we will make sure those tests are scheduled and completed prior to the September 30, 2012 deadline.

Thanks gain for the reminder.

Sincerely,

Kelly R. Robinson Environmental Supervisor

Western Refining Southwest, Inc.

111 County Road 4990 Bloomfield, NM87413

(o) 505-632-4166

(c) 505-801-5616

(f) 505-632-4024

(e) kelly.robinson@wnr.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Thursday, August 30, 2012 10:31 AM

To: Robinson, Kelly

Subject: RE: UIC-CL-009 Annual Testing for 2012 - Request for Approval

Kelly:

Based on the attached OCD E-mail dated August 2, 2012, I believe that Western may not have to conduct a Fall-Off Test this year. Please let me know if you wish to proceed with conducting a FOT and I will address the C-103 for it today.

Western does need to proceed to complete the annual Bradenhead and MIT by Midnight 9/30 under the OCD Discharge Permit and for OCD reporting to the EPA. I will respond to the C-103 today hopefully after you let me know if Western still wishes to proceed with the FOT this year.

Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Department

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Drive, Santa Fe, New Mexico 87505

Office: (505) 476-3490

E-mail: CarlJ.Chavez@State.NM.US

Website: http://www.emnrd.state.nm.us/ocd/

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Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at

http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental

From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Wednesday, August 29, 2012 1:30 PM

To: Chavez, Carl J, EMNRD

Cc: Powell, Brandon, EMNRD; Kuehling, Monica, EMNRD; Schmaltz, Randy **Subject:** UIC-CL-009 Annual Testing for 2012 - Request for Approval

Good Afternoon Sir,

On behalf of Western Refining Southwest, Inc. – Bloomfield Refinery (Western), I am requesting OCD's approval to conduct the following annual testing on the Bloomfield Refinery's injection well (UIC-CL-009):

- MIT, Bradenhead, and High-Pressure Shutdown Tests; and
- Annual Fall-Off Test.

Attached are the completed C-103 notifications for these events. The proposed testing protocol for the Annual Fall-Off Test mirrors the procedures followed in previous years. A more detailed summary of the proposed testing procedures for the Annual Fall-Off Test is included with the C-103 notification attached.

Pending OCD approval and availability to witness the testing, Western would like to conduct the MIT, Bradenhead, and High-Pressure Shutdown Tests on Thursday, September 6th. Western is currently in communication with OCD-Aztec to confirm a date for testing that would work with their availability. In addition pending OCD approval, Western would like to initiate the Annual Fall-Off Test starting Monday, September 10th, 2012.

If you have any questions or need any additional information, please do not hesitate to contact me at your convenience.

Thank you for your time!

Sincerely,

Kelly R. Robinson Environmental Supervisor

Western Refining Southwest, Inc.

111 County Road 4990 Bloomfield, NM87413

- (o) 505-632-4166
- (c) 505-801-5616
- (f) 505-632-4024
- (e) kelly.robinson@wnr.com

Office Submit a Copies to Appropriate District	State of New M	exico	Form C-103
District 1	Energy, Minerals and Nat	ural Resources	May 27, 2004
1625 N. French Dr., Hobbs, NM 88240		V	VELL API NO.
District il	OIL CONSERVATION	UDIVISION 3	0-045-29002-00
1301 W. Grand Ave., Artesia, NM 88210 District III			. Indicate Type of Lease
1000 Rio Brazos Rd., Aztec, NM 87410	1220 South St. Fra	uicis Di.	STATE FEE X
District IV	Santa Fe, NM 8	7505	State Oil & Gas Lease No.
1220 S. St. Francis Dr., Santa Fe, NM			/A
87505 CHANDRA VO	The state of the s		
AND NOT HELE THE EXPLICATION	TICES AND REPORTS ON WELLS OSALS TO DRILL OR TO DEEPEN OR PL		Lease Name or Unit Agreement Name
DIFFERENT RESERVOIR TISE "APPL	JEATION FOR PERMIT" (FORM C-101) F	THE MACK TELA 1 IS	isposel
PROPOSALS.)	COLOR CONTENDED TOWNS C. 1011 L		
1. Type of Well: Oil Well	Gas Well Other X (Disposal)	8	Well Number #001
2. Name of Operator	The second secon		OGRID Number
Western Refining Southwest, Inc.	- Bloomfield Refinery		037218
3. Address of Operator	And	1	D. Pool name or Wildcat
#50 Road 4990 Bloomfield, NM	87413		lanco/Mesa Verde
4. Well Location		B	anco Meza Acide
Unit Letter 1 : 2442	feet from the South	line and1250_feet fr	om the East line
Section 27	Township 29 S Range	11 E NMPM	County San Juan
	11. Elevation (Show whether DR	RKB RT GR etc.)	County Sail Juan
		, mile, mi, wit, big.,	
Pit or Relow-grade Tonk Application	or Closure		
	vaterDistance from nearest fresh w		
Pit Liner Thickness: mil	Below-Grade Tank: Volume	hbls; Constr	uction Material
12. Check	Appropriate Box to Indicate N	ature of Notice De	som an Other Date
	appropriate Dox to tituleate iv	atme to Nonce, Ke	port of Other Data
NOTICE OF IN	TENTION TO:	SURSE	QUENT REPORT OF:
PERFORM REMEDIAL WORK		REMEDIAL WORK	
TEMPORARILY ABANDON	CHANGE PLANS	COMMENCE DRILLIN	ALTERING CASING
PULL OR ALTER CASING		CASING/CEMENT JO	
	MOLTHIEL COMPL	CASING/CEMENT JO	р П
OTHER: MIT Bradenheed and I-	ligh Pressure Shut-Down Tests 🗵	OTHER:	
OTTLER. 1817, DISCOLLIGED, SHUT	Man Lieszmie Sunt-Down Tests Mi	OTHER:	
13 Describe proposed or com-	lated engentians (Classic etc., all		75.5
of station and managed or	retes operations. (Clearly state 31) p	sertiment details, and giv	e pertinent dates, including estimated date
or recompletion.	ark). See RULE 1103. For Multipl	e Completions: Attach	wellbore diagram of proposed completion
or recompletion.			
Bloomfield Refinery requests permi	ssion to perform the annual High Pre	essure Shutdown Test, I	Bradenhead Test, and Mechanical Integrity
lest on the Class I injection well ref	erenced above on September 6th, 20	112, pending final sched	tiling with OCD Agree commentations
schedule. Western will contact the (DCD Aztec office to ensure testing is	s performed at a time th	at a representative from their office is able
to be on-site to witness the testing as	tivities		\$
I harshy austify that the information	abassa is torse and associate to the fire		
arede took has beenfull be controlled or	above is true and complete to the be-	st of my knowledge and	belief. I further certify that any pit or below- (attached) alternative OCD-upproved plan
SIGNATURE POLITICAL	UN TITLE E	nationmental Comments	PATTI AMARA
Sidning Con	MAATTE E	nvaconmentar Superviso	B DATE 8/29/2012
Type or print name Kelly Robinson	Complete address of the control of t	himan - Grand	28 · 6 · 5 · 6 · 6 · 6 · 6 · 6 · 6 · 6 · 6
For State Use Only	F-mail address: Kelly Ro	binson@wnr.com	Telephone No. (505) 632-4166
	F-mail address: Kelly Ro	binson@wnr.com	Telephone No. (505) 632-4166
A STATE OF THE STA	. Табо. В. н. и уффиционую пристем		
APPROVED BY: Last 4	. Табо. В. н. и уффиционую пристем		Telephone No. (505) 632-4166 LEngines DATE 3/30/2012

Chavez, Carl J, EMNRD

From:

Chavez, Carl J, EMNRD

Sent:

Thursday, August 02, 2012 8:06 AM

To:

pthompson@merrion.bz; Holder, Mike (Mike.Holder@hollyfrontier.com); Combs, Robert

(Robert.Combs@hollyfrontier.com); Schmaltz, Randy (Randy.Schmaltz@wnr.com);

Chervl.Johnson@wnr.com

Cc:

Sanchez, Daniel J., EMNRD; VonGonten, Glenn, EMNRD

Subject:

UIC Class I (NH) Injection Well Operators (Annual MIT Reminder) Due on/or before

September 30, 2012

Dear Sir or Madam:

It is that time of year again to remind operators that their annual MIT for this season must be completed by 9/30/2012. The list of operator names with associated UIC Class I (non-hazardous) Injection Wells are provided above.

Operators are aware of the MIT (30 min @ 300 psig or more MIT with Bradenhead) requirement(s) that are typically run with the Fall-Off Test (FOT). The OCD is currently evaluating the FOT frequency requirement at OCD UIC Class I Facilities in New Mexico and until further notice either specified in a discharge permit renewal and/or via communication, you will know when a FOT is required for your well soon.

Please contact me at (505) 476-3490 on or before June 30, 2012 to schedule your MIT date and time. I will coordinate with the District Staff to finalize the MIT date and time so that an OCD District Office inspector may be present to witness the MIT. Thank you for your cooperation in this matter.

File: UICI-5, 8, 8-0, 8-1 & 9

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Department

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Drive, Santa Fe, New Mexico 87505

Office: (505) 476-3490

E-mail: CarlJ.Chavez@State.NM.US

Website: http://www.emnrd.state.nm.us/ocd/

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Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at

http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental

Robinson, Kelly

From:

Kuehling, Monica, EMNRD [monica.kuehling@state.nm.us]

Sent:

Friday, August 31, 2012 7:05 AM

To:

Robinson, Kelly

Subject:

RE: Bradenhead and MIT Testing Schedule - Bloomfield Refinery

Good morning Kelly,

Yes it will.

See you on Thursday at 9 a.m.

Monica Kuehling

Advanced Compliance Officer New Mexico Oil Conservation Division Aztec New Mexico monica.kuehling@state.nm.us

From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Thursday, August 30, 2012 4:24 PM

To: Kuehling, Monica, EMNRD

Subject: Re: Bradenhead and MIT Testing Schedule - Bloomfield Refinery

Good Afternoon Monica,

I just talked with the contractor. I have them scheduled to arrive on-site at 9am on Thursday, September 6th. Will that work for you?

-Kelly

From: Kuehling, Monica, EMNRD [mailto:monica.kuehling@state.nm.us]

Sent: Thursday, August 30, 2012 02:54 PM

To: Robinson, Kelly

Subject: RE: Bradenhead and MIT Testing Schedule - Bloomfield Refinery

Hello Kelly,

Right now I am clear on the 6th of September, which is next Thursday. What time would you like to schedule it.

Thank you

Monica Kuehling

Advanced Compliance Officer New Mexico Oil Conservation Division Aztec New Mexico monica.kuehling@state.nm.us

From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Wednesday, August 29, 2012 1:03 PM

To: Kuehling, Monica, EMNRD **Cc:** Powell, Brandon, EMNRD

Subject: Bradenhead and MIT Testing Schedule - Bloomfield Refinery

Good Morning Monica,

As you may know, the contractor (Woods Group Pressure Control) with whom I have contracted with in past years to conduct the MIT test on our well at the Bloomfield Refinery has just recently gone out of business. Just recently I have been able to contract with WSI Enterprise, and they informed me that they would be available as early as next week to help conduct the MIT testing at our facility. I wanted to check with you to see if you had availability to next week to witness the MIT, Bradenhead, and High-Pressure Shut-Down test. Depending on your availability, my initial hopes was to schedule this testing to be done Thursday, September 6th, 2012. If this day does not work with your schedule, please let me know of some alternative times that would best work for you.

Also, pending approval from Mr. Chavez (OCD – Santa Fe), I have scheduled Tefteller to be on-site on Monday, September 10th to install the memory gauges in the injection well in order to conduct the Annual Fall-Off Test. At this time, the tentative schedule is to install the gauges Monday morning (9/10/2012). Assuming the gauges are installed without a problem and the well operates steadily, we would plan on shutting-in the well Wednesday afternoon (9/12/2012). We will likely keep the well shut-in for at least 10 days.

I will confirm the schedule for the MIT testing with the contractor after I confirm with you your availability. As always, I appreciate your time. If there are any questions, please do not hesitate to contact me at your convenience.

Sincerely,

Kelly R. Robinson Environmental Supervisor

Western Refining Southwest, Inc.

111 County Road 4990 Bloomfield, NM87413

- (o) 505-632-4166
- (c) 505-801-5616
- (f) 505-632-4024
- (e) kelly.robinson@wnr.com



NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

MECHANICAL INTEGRITY TEST REPORT

	(TA QR UIC)~	
Date of Test 9-6-12 Op	perator <u>SanJuan</u> ?	Location: Unit I See Twn 19Rge (1
Property Name Disposal	Well #/	Location: Unit SeeTwn
Land Type: State Federal Private Indian	Well T	
Temporarily Abandoned Well (Y/N):	TA Exp	pires:
Casing Pres. Bradenhead Pres. Tubing Pres. Int. Casing Pres.	Tbg. SI Pres	
Pressured annulus up to 495	_psi. for	mins. Test passed failed
Puckersut 3221	· · · · · · · · · · · · · · · · · · ·	
for 32.76	-32.08	
	witness / My	Lucid Object clown at auchield at 500 lbs
(Operator Representative) (Position)		(NMOCD) Revised 02-11-02
		•

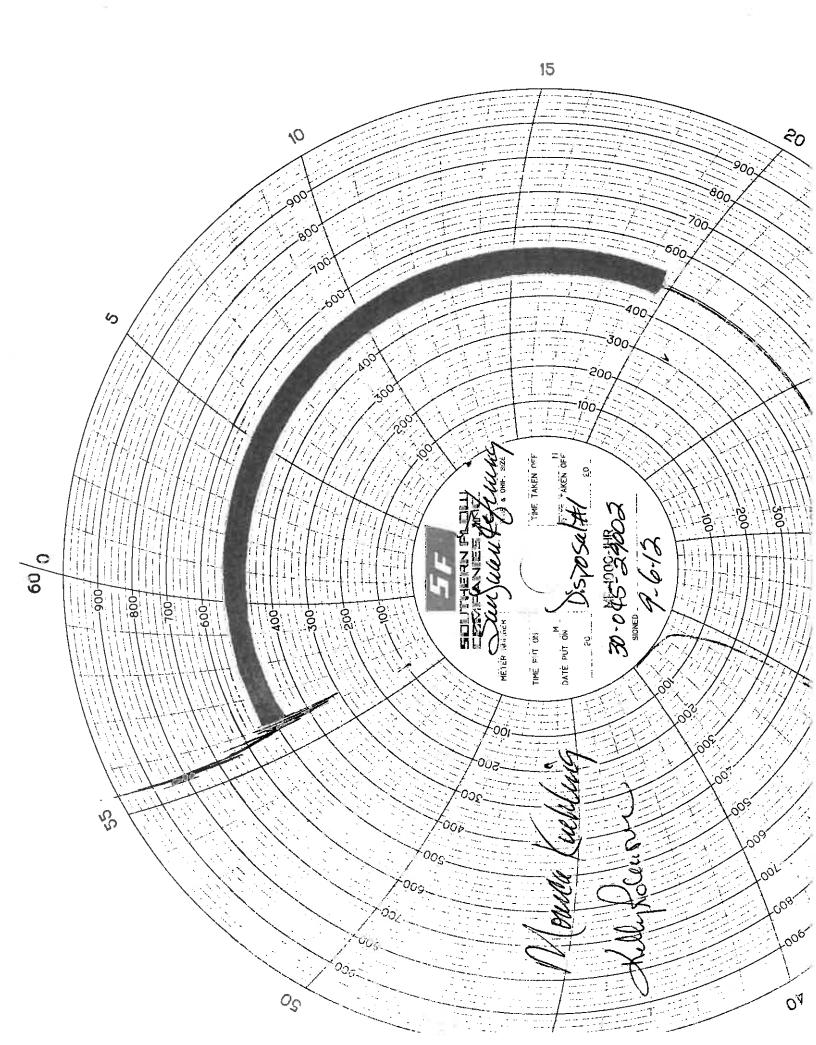


NEW MEXICO ENERGY, MINERALS & NATURAL RESOURCES DEPARTMENT

Oil CONSERVATION DIVISION
AZTEC DISTRICT OFFICE
1000 RIO BRAZOS ROAD
AZTEC NM 87410
(505) 334-6178 FAX: (505) 334-6170
http://emnrd.state.nm.us/ocd/District.lt/3distric.htm

BRADENHEAD TEST REPORT

	1 copy to above address)
Date of Test 9-6-12 Operator	Den wan John 45 29002
Property Name Well No	Location: Unit L Section 27 Township 29 Range //
Well Status(Shut-In or Producing) Initial PSI: Tu	ubing MoIntermediate //A Casing /20Bradenhead
OPEN BRADENHEAD AND INTERMEDIATE	TO ATMOSPHERE INDIVIDUALLY FOR 15 MINUTES EACH
PRESSURE Testing Bradenhead INTERM BH Int Csg Int Csg	FLOW CHARACTERISTICS BRADENHEAD INTERMEDIATE
TIME 5 min 2 120	Steady Flow
10 min 0 /20	Surges_
15 min 0 /20	Down to Nothing
20 min	Nothing
25 min	Gas
30 min	Gas & Water
•	Water
If bradenhead flowed water, check all of the descriptions	s that apply below:
CLEAR FRESH SALTY	SULFURBLACK
5 MINUTE SHUT-IN PRESSURE BRADENHEAR REMARKS: Duff When & place	
	A VI
By Adylder W	itness / Ouca Juck ling
(Position)	•
E-mail address	



APPENDIX B



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

OrderNo.: 1201473

February 10, 2012

Kelly Robinson

Western Refining Southwest, Inc.

#50 CR 4990

Bloomfield, NM 87413

TEL: (505) 632-4166

FAX (505) 632-3911

RE: Injection Well 1st Qtr 1-17-12

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 1/18/2012 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report unless noted in the Case Narrative. Analytical results designated with a "J" qualifier are estimated and represent a detection above the Method Detection Limit (MDL) and less than the Reporting Limit (PQL). These analytes are not reviewed nor narrated as to whether they are laboratory artifacts.

Quality control data is within laboratory defined or method specified acceptance limits except if noted.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107

L: 505-345-3975 FAX: 505-345-4107 Website: <u>www.hallenvironmental.com</u>

Workorder Sample Summary

WO#: **1201473**

10-Feb-12

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 1st Qtr 1-17-12

					_
Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1201473-001	Injection Well		1/17/2012 8:30:00 AM	1/18/2012 9:40:00 AM	Aqueous
1201473-001	Injection Well		1/17/2012 8:30:00 AM	1/18/2012 9:40:00 AM	Aqueous
1201473-001	Injection Well		1/17/2012 8:30:00 AM	1/18/2012 9:40:00 AM	Aqueous
1201473-001	Injection Well		1/17/2012 8:30:00 AM	1/18/2012 9:40:00 AM	Aqueous
1201473-001	Injection Well		1/17/2012 8:30:00 AM	1/18/2012 9:40:00 AM	Aqueous

Lab Order 1201473

Date Reported: 2/10/2012

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 1st Qtr 1-17-12

Lab ID: 1201473-001

Client Sample ID: Injection Well

Collection Date: 1/17/2012 8:30:00 AM Received Date: 1/18/2012 9:40:00 AM

2011/3 001		AQUEOUS	Receiveu i	Received Date: 1/16/2012 9:40:00 AIM			
Analyses	Result	RL Qu	al Units	DF	Date Analyzed		
EPA METHOD 300.0: ANIONS		,	- ::		Analyst: BRM		
Chloride	710	50	mg/L	100	1/19/2012 5:44:36 AM		
Sulfate	68	5.0	mg/L	10	1/19/2012 5:27:11 AM		
EPA METHOD 7470: MERCURY					Analyst: JLF		
Mercury	ND	0.00020	mg/L	1	1/19/2012 2:53:50 PM		
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst: ELS		
Arsenic	ND	0.020	mg/L	1	1/24/2012 7:59:27 AM		
Barium	0.43	0.020	mg/L	1	1/24/2012 7:59:27 AM		
Cadmium	ND	0.0020	mg/L	1	1/24/2012 7:59:27 AM		
Calcium	120	5.0	mg/L	5	1/24/2012 8:01:20 AM		
Chromium	ND	0.0060	mg/L	1	1/24/2012 7:59:27 AM		
Lead	ND	0.0050	mg/L	1	1/24/2012 7:59:27 AM		
Magnesium	26	1.0	mg/L	3	1/24/2012 7:59:27 AM		
Potassium	10	1.0	mg/L	1	1/24/2012 7:59:27 AM		
Selenium	ND	0.050	mg/L	1	1/24/2012 7:59:27 AM		
Silver	ND	0.0050	mg/L	1	1/24/2012 7:59:27 AM		
Sodium	450	5.0	mg/L	5	1/24/2012 8:01:20 AM		
EPA METHOD 8270C: SEMIVOLATIL	ES		-		Analyst: JDC		
Acenaphthene	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
Acenaphthylene	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
Aniline	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
Anthracene	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
Azobenzene	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
Benz(a)anthracene	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
Benzo(a)pyrene	ND	10	μg/L	12	1/23/2012 7:42:25 PM		
Benzo(b)fluoranthene	ND	10	μg/L	10	1/23/2012 7:42:25 PM		
Benzo(g,h,i)perylene	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
Benzo(k)fluoranthene	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
Benzoic acid	ND	20	μg/L	1	1/23/2012 7:42:25 PM		
Benzyl alcohol	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
Bis(2-chloroethoxy)methane	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
Bis(2-chloroethyl)ether	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
Bis(2-chloroisopropyl)ether	ND	10	µg/L	1	1/23/2012 7:42:25 PM		
Bis(2-ethylhexyl)phthalate	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
4-Bromophenyl phenyl ether	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
Butyl benzyl phthalate	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
Carbazole	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
4-Chloro-3-methylphenol	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
4-Chloroaniline	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
2-Chloronaphthalene	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
2-Chlorophenol	ND	10	μg/L	1	1/23/2012 7:42:25 PM		
			, ,	-			

Matrix: AQUEOUS

Qualifiers:

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Page 2 of 21

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 2/10/2012

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 1st Qtr 1-17-12

Lab ID: 1201473-001

Client Sample ID: Injection Well

Collection Date: 1/17/2012 8:30:00 AM Received Date: 1/18/2012 9:40:00 AM

Dab 1D: 1201475-001	IVIALITA: F	AQUEOUS	Received Date: 1/18/2012 9:40:00 AM			
Analyses	Result	RL Qu	al Units	DF	Date Analyzed	
EPA METHOD 8270C: SEMIVOLAT	ILES				Analyst: JD	
4-Chlorophenyl phenyl ether	ND	10	μg/L	91	1/23/2012 7:42:25 PM	
Chrysene	ND	10	μg/L	:1	1/23/2012 7:42:25 PN	
Di-n-butyl phthalate	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
Di-n-octyl phthalate	ND	10	μg/L	3	1/23/2012 7:42:25 PM	
Dibenz(a,h)anthracene	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
Dibenzofuran	ND	10	μg/L	1	1/23/2012 7;42:25 PN	
1,2-Dichlorobenzene	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
1,3-Dichlorobenzene	ND	10	μg/L	4	1/23/2012 7:42:25 PM	
1,4-Dichlorobenzene	ND	10	μg/L	1	1/23/2012 7:42:25 PN	
3,3'-Dichlorobenzidine	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
Diethyl phthalate	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
Dimethyl phthalate	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
2,4-Dichlorophenol	ND	20	µg/L	1	1/23/2012 7:42:25 PM	
2,4-Dimethylphenol	ND	10	μg/L.	1	1/23/2012 7:42:25 PM	
4,6-Dinitro-2-methylphenol	ND	20	μg/L	1	1/23/2012 7:42:25 PM	
2,4-Dinitrophenol	ND	20	μg/L	3	1/23/2012 7:42:25 PM	
2,4-Dinitrotoluene	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
2,6-Dinitrotoluene	ND	10	μg/L	4	1/23/2012 7:42:25 PN	
Fluoranthene	ND	10	μg/L	4	1/23/2012 7:42:25 PN	
Fluorene	ND	10	μg/L	4		
Hexachiorobenzene	ND	10	μg/L		1/23/2012 7:42:25 PN	
Hexachlorobutadiene	ND	10		4	1/23/2012 7:42:25 PN	
Hexachlorocyclopentadiene	ND	10	μg/L	1	1/23/2012 7:42:25 PN	
Hexachloroethane	ND	10	μg/L		1/23/2012 7:42:25 PN	
Indeno(1,2,3-cd)pyrene	ND	10	µg/L	3.	1/23/2012 7:42:25 PN	
Isophorone	ND	10	μg/L	3	1/23/2012 7:42:25 PM	
1-Methylnaphthalene	ND		µg/L	1	1/23/2012 7:42:25 PM	
•		10	μg/L 	1	1/23/2012 7:42:25 PM	
2-Methylapanel	ND	10	µg/L	1	1/23/2012 7:42:25 PM	
2-Methylphenol	26	10	μg/L	1	1/23/2012 7:42:25 PM	
3+4-Methylphenol	31	10	μg/L	1	1/23/2012 7:42:25 PN	
N-Nitrosodi-n-propylamine	ND	10	μg/L 	1	1/23/2012 7:42:25 PM	
N-Nitrosodimethylamine	ND	10	µg/L	1	1/23/2012 7:42:25 PM	
N-Nitrosodiphenylamine	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
Naphthalene	ND	10	μg/L	10	1/23/2012 7:42:25 PM	
2-Nitroaniline	ND	10	µg/L	1	1/23/2012 7:42:25 PM	
3-Nitroaniline	ND	10	μg/L	15	1/23/2012 7:42:25 PM	
4-Nitroaniline	ND	20	μg/L	*	1/23/2012 7:42:25 PM	
Nitrobenzene	ND	10	µg/∟	(8)	1/23/2012 7:42:25 PM	
2-Nitrophenol	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
4-Nitrophenol	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
Pentachlorophenol	ND	20	μg/L	1	1/23/2012 7:42:25 PM	
Phenanthrene	ND	10	μg/L	1	1/23/2012 7:42:25 PM	

Matrix: AQUEOUS

- *X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Lab Order 1201473

Date Reported: 2/10/2012

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 1st Qtr 1-17-12

Lab ID: 1201473-001

Client Sample ID: Injection Well

Collection Date: 1/17/2012 8:30:00 AM Received Date: 1/18/2012 9:40:00 AM

Lab 19. 1201475-001	manıx.	AQUEOUS	Received Date: 1/18/2012 9:40:00 AM			
Analyses	Result	Result RL Qual U		DF	Date Analyzed	
EPA METHOD 8270C: SEMIVOLATILE	S				Analyst: JDC	
Phenol	14	10	μg/L	1	1/23/2012 7:42:25 PM	
Pyrene	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
Pyridine	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
1,2,4-Trichlorobenzene	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
2,4,5-Trichlorophenol	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
2,4,6-Trichlorophenol	ND	10	μg/L	1	1/23/2012 7:42:25 PM	
Surr: 2,4,6-Tribromophenol	30.1	18.1-138	%REC	1	1/23/2012 7:42:25 PM	
Surr: 2-Fluorobiphenyl	66.1	25.9-101	%REC	1	1/23/2012 7:42:25 PM	
Surr: 2-Fluorophenol	25.0	12.5-93.2	%REC	1	1/23/2012 7:42:25 PM	
Surr: 4-Terphenyl-d14	41.3	29.5-112	%REC	1	1/23/2012 7:42:25 PM	
Surr: Nitrobenzene-d5	69.9	20.5-120	%REC	1	1/23/2012 7:42:25 PM	
Surr: Phenol-d5	31.4	11.5-73.2	%REC	3	1/23/2012 7:42:25 PM	
EPA METHOD 8260B: VOLATILES					Analyst: JDJ	
Benzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM	
Toluene	12	1.0	μg/L	1	1/20/2012 6:00:49 PM	
Ethylbenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM	
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM	
1,2,4-Trimethylbenzene	ND	1.0	µg/L	1	1/20/2012 6:00:49 PM	
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM	
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM	
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM	
Naphthalene	ND	2.0	µg/L	î	1/20/2012 6:00:49 PM	
1-Methylnaphthalene	ND	4.0	μg/L	1:	1/20/2012 6:00:49 PM	
2-Methylnaphthalene	ND	4.0	μg/L	10	1/20/2012 6:00:49 PM	
Acetone	520	100	μg/L	10	1/20/2012 5:32:49 PM	
Bromobenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM	
Bromodichloromethane	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM	
Bromoform	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM	
Bromomethane	ND	3.0	μg/L	÷	1/20/2012 6:00:49 PM	
2-Butanone	24	10	μg/L	1	1/20/2012 6:00:49 PM	
Carbon disulfide	32	10	μg/L	1	1/20/2012 6:00:49 PM	
Carbon Tetrachloride	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM	
Chlorobenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM	
Chloroethane	ND	2.0	μg/L	1	1/20/2012 6:00:49 PM	
Chloroform	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM	
Chloromethane	ND	3.0	μg/L	1	1/20/2012 6:00:49 PM	
2-Chlorotoluene	ND	1.0	μg/L	1967	1/20/2012 6:00:49 PM	
4-Chlorotoluene	ND	1.0	μg/L	2.40	1/20/2012 6:00:49 PM	
cis-1,2-DCE	ND	1.0	μg/L		1/20/2012 6:00:49 PM	
cis-1,3-Dichloropropene	ND	1.0	μg/L	82	1/20/2012 6:00:49 PM	
1,2-Dibrorno-3-chloropropane	ND	2.0	μg/L	048	1/20/2012 6:00:49 PM	

Matrix: AQUEOUS

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Lab Order 1201473

Date Reported: 2/10/2012

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 1st Qtr 1-17-12

Lab ID: 1201473-001

Client Sample ID: Injection Well

Collection Date: 1/17/2012 8:30:00 AM Received Date: 1/18/2012 9:40:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Analyst: JD
Dibromochloromethane	ND	1.0	μg/L	1	1/20/2012 6:00:49 PN
Dibromomethane	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
1,2-Dichlorobenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PN
1,3-Dichlorobenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PN
1,4-Dichlorobenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PN
Dichlorodifluoromethane	ND	1.0	µg/L	1	1/20/2012 6:00:49 PM
1,1-Dichloroethane	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
1,1-Dichloroethene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
1,2-Dichloropropane	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
1,3-Dichloropropane	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
2,2-Dichloropropane	ND	2.0	μg/L	1	1/20/2012 6:00:49 PM
1,1-Dichloropropene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
Hexachlorobutadiene	ND	1.0	μg/L	- 1	1/20/2012 6:00:49 PM
2-Hexanone	ND	10	μg/L	81	1/20/2012 6:00:49 PM
Isopropylbenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PI
4-Isopropyitoluene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
4-Methyl-2-pentanone	ND	10	μg/L	4	1/20/2012 6:00:49 PI
Methylene Chloride	ND	3.0	μg/L	1	1/20/2012 6:00:49 Pf
п-Butylbenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 Pt
n-Propylbenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 Pt
sec-Butylbenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
Styrene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
tert-Butylbenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	1/20/2012 6:00:49 PM
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
trans-1,2-DCE	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
1,1,1-Trichloroethane	ND	1.0	μg/L	7	1/20/2012 6:00:49 PM
1,1,2-Trichloroethane	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
Trichloroethene (TCE)	ND	1.0	μg/L	1	1/20/2012 6:00:49 PN
Trichlorofluoromethane	ND	1.0	μg/L	1	1/20/2012 6:00:49 PM
1,2,3-Trichloropropane	ND	2.0	µg/L	1	1/20/2012 6:00;49 PN
Vinyl chloride	ND	1.0	μg/L	1	1/20/2012 6:00:49 PN
Xylenes, Total	ND	1.5	μg/L	1	1/20/2012 6:00:49 PN
Surr: 1,2-Dichloroethane-d4	75.8	70-130	%REC	1	1/20/2012 6:00:49 PN
Surr: 4-Bromofluorobenzene	91.3	70-130	%REC	1	1/20/2012 6:00:49 PM
Surr: Dibromofluoromethane	85.0	69.8-130	%REC	1	1/20/2012 6:00:49 PM
Surr: Toluene-d8	84.1	70-130	%REC	1	1/20/2012 6:00:49 PM

Matrix: AQUEOUS

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Lab Order 1201473

Date Reported: 2/10/2012

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 1st Qtr 1-17-12

Lab ID: 1201473-001

Client Sample ID: Injection Well

Collection Date: 1/17/2012 8:30:00 AM Received Date: 1/18/2012 9:40:00 AM

Analyses	Result	RL Qua	Units	DF	Date Analyzed
EPA 120.1: SPECIFIC CONDUCTANCE					Analyst: JLF
Conductivity	2,700	0.010	µmhos/cm	1	1/18/2012 9:27:42 PM
SM4500-H+B: PH					Analyst: JLF
рH	7.32	1.68 H	pH units	1	1/18/2012 9:27:42 PM
SM2320B: ALKALINITY					Analyst: JLF
Bicarbonate (As CaCO3)	320	20	mg/L CaCO3	1	1/18/2012 9:27:42 PM
Carbonate (As CaCO3)	ND	2.0	mg/L CaCO3	1	1/18/2012 9:27:42 PM
Total Alkalinity (as CaCO3)	320	20	mg/L CaCO3	1	1/18/2012 9:27:42 PM
SM2540C MOD: TOTAL DISSOLVED SO	OLIDS				Analyst: KS
Total Dissolved Solids	1,770	200	mg/L	1	1/20/2012 2:59:00 PM

Matrix: AQUEOUS

Qualifiers:

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
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- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Page 6 of 21

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Address:

4901 HAWKINS NE SUITE D

ALBUQUERQUE. NM 87109

Attn:

ANDY FREEMAN

Batch #:

120119019

Project Name:

1201473

Analytical Results Report

Sample Number Client Sample ID 120119019-001

1201473-001D / INJECTION WELL

Sampling Date

1/17/2012 8:30 AM

1/19/2012 Date/Time Received

Matrix

Water

Sampling Time Sample Location

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	1	1/31/2012	CRW	SW846 CH7	
Flashpoint	>200	°F		2/2/2012	MAH	EPA 1010	
pН	6.58	ph Units		1/25/2012	KFG	EPA 150,1	
Reactive sulfide	4.80	mg/L	1	1/25/2012	JIT	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL

EPA's Maximum Contaminant Level

ND

Not Detected

Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated.

Soll/solid results are reported on a dry-weight basis unless otherwise noted.

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anatekiabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

120119019

Address:

4901 HAWKINS NE SUITE D **ALBUQUERQUE, NM 87109**

Project Name:

1201473

Attn:

ANDY FREEMAN

Analytical Results Report Quality Control Data

Lab Control Sa Parameter Cyanide (reactive) Reactive sulfide		LCS Result 0.550	Units mg/L	LCS Spik	11	₹ec 0.0	AR %Rec 80-120	1/3	ep Date 31/2012	Analysis Date 1/31/2012
Legiciae adilida		0.200	mg/L	0.2	10	0.0	70-130		25/2012	1/25/2012
Matrix Spike					-					<u>. </u>
Sample Number	Parameter		ample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Archele Date
120119019-001	Reactive sulfide	-	4.80		mg/L	4	70.0	70-130	1/25/2012	Analysis Data 1/25/2012
120119019-001	Cyanide (reactive)		ND		mg/L	0.5	90.2	80-120	1/31/2012	1/31/2012
31							_			
Method Blank										
Parameter			Resu	it	Un	its	PQL		Prep Date	Artalysis Date
Cyanide (reactive)			ND		mg/	L	0.1		1/31/2012	1/31/2012
Reactive suifide			ND		mg/i		1		1/25/2012	1/25/2012

AR

Acceptable Range

ND

Not Detected

PQL **Practical Quantitation Limit**

Relative Percentage Difference

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CC:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00015; OR:ID200001-002; WA:C595 Cartifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0085

Page	#
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Flashpoint Analysis

Sample Matrix - Soil (1), Sludge (2), Oil (3), Water (4), Other (5)

Complex TD	4:				
Sample ID	Analyses Date	Sample Matrix	Analyst Initials	Temp - °C	Temp - °F
111227018-01	[2/30/1	SOIL	97		BIOF
11/222023-001	12.30-11	aL	21	<u> </u>	NO
111228030.001	(L 30-41	4	1/19		ND
120105039.00	1/9/12	415	155-		>200
/ -002		5			Rosmitemp
NA -012		_5	J		>という
12017909-61	2-2-242	4	m/4		7 3.40
<u> </u>					
-			-		
		· · · · · · · · · · · · · · · · · · ·			
 					. "
					
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			<u> </u>		
					
					
		-			

^{*} SAFETY GLASSES REQUIRED.

PH/Alkalinity SM4500H⁺B / SM2320B Carbonate & Bicarbonate

Quality Control Information	Equivalent	Equivalent EPA Methods	150.1 & 310.1
Standards	Concentration	Expires	Amount Spiked (mg/L)
Matrix Spike Solution # M637-04	IN	11/18/2012	100

Method QC Requirements: LFB/Blank Every 10 samples MS/MSD Every 20 samples % Recovery AR 90-110%

pH 7 within 0.1 pH units Slope 95-102%

	Reagents Solution #		Expires
•	0.02N H ₂ SO ₄ Titrant		04440
	H ₂ SO ₄	Fisher, Lot # 000781	211116
	pH Buffer 4 (Red) M797-03	BDH,BDH5018-500	JAN 2013
	pH Buffer 7 (Yellow) M797-04	BDH,BDH5046-500	JAN 2013
	pH Buffer 10 (Blue) M797-05	BDH,BDH5072-500	AUG 2012
	E	COORES 17 O-3	- 1-1 /AVY UV20ED

Equipment: Contributenc: CAI 10th 600000; pH meter: Orion model 620A 007858

122	271		127		120		120		120		120	LFB	718	
12012204-001 16.8	120119019-001 19,0		20120005-001		120126018-001 15,4		120120017-001		121 100-110521021		5.2 1000-11.001/02	9	下	Sample
20-49	19-00	-002	30-6	100	8-00	-002	7-00	20-	14-0	-0024	7-00			iple
10		2 16	27 72	7.34 200-	31-	2/		-002 169	0/ /	1 09	3	<i>u</i>	2	
8/8	0					ar	15.6			8		27/20	22,7	Temp (°C)
6,03	658	5,95	57.81	86-9	6,02	16.6 5.87	6.68	5,79	X5.68	-002100 18'8 6'33	9,34	154.9	3,43	뫄
1								_					4,01	요물
4			!								_		10,00	pH 10 Cal
4													101,3	Slope
1													7,08	pH 7 Buffer
+					25	100	25	t					001	Sample (mL)
)		1)				1	3,97	3,90	2011		Titrate to 8:3 (mL)
)	1)			1	0.88)	01/10	1,21	10.85	10,58	787		Titrate to 4.5 (mL)
1	1	J)		}	1,06	1	25.1	1.39	1	j	,	Managara.	Titrate to 4.2 (mL)
	J)	J)	1	7,0]	12,4	10,3	125,5	8,501	2.66	0	Alkalinity (mg/L)
										98,5	98,8	93,2		%
													1/23	Date
													125/12	#
										Pa	re f	of	Sept of	init.

Comments: Alkalinity = mL of titrant x 10 if 100 mL sample was used.

N:\Bench Sheets\pH.doc

Sulfide by SM 4500-S' F

	Concentration	Date Made/Expires
Iodine	0.025 N	
HCI	6 N	
Starch	1% by weight	12/31/2009
Zinc Acetate	99.9%	

Quality Control Information

- 1. 1 blank per batch, must be < 20 ug/L.
- 2. 1 LFB per batch must be +/- 30%.
- 3. 1ml iodine reacts with 0.4 mg Sulfide

Sample	Sample Volume	lodine amount (50 uL increments)	Concentration (ug/sample)	Concentration (mg/L)	Date	Initials
30124022-1 ME	M: 24.7 50 mL	as	28 us = 0.02 mg	0.4×28.7= 11.5	1-25-12	3
- MS			0310	3-6 ×26.7= 103,3	-	
-145	1000 m2	800	- 6:700	0.200		
-1650		450		081.0	X .	
.87	f	25		0.020		
20119019-1	20.2	600	240 0,240	4.80		
- WS		950	380 0,380	7.60	+	+

Comments_

Total Cyanide by Semi-Automated Colorimetry Method: EPA 335.4\SM-4500-CN-E Distillation Bench Sheet

Weak Acid Dissociable Cyanide by SM 4500-CN-I (check WAD column)

Total Cyanide MS/MSD/LCS Soln: Free Cyanide MS/MSD/LCS Soln:

M825-01 Exp: 1/4/2013

M824-05

Method requirements: All QC +/- 10%

Exp: 12/28/2012 Equipment: Midi-vap

instrument: ALPCHEM FIA 3000

Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	120124029-1	Wwepn	Nall	Soul	×	===		, , , ,
2	30-1							
3	-3	-						
4	15					<u>.</u>		
5	-7							
6	-9							
7	-(1							
8	120120025-13							
9	-14							
10	120120021-1		1	4	4			
11		reactiveum	Natt	Game	[K			· · · · · · · · · · · · · · · · · · ·
12	-Ims			(1		lient	
13	-linso						1	
14	-1.05						1	
15		+						
16	120124035-3	WW PAR						
17	-4			4				· ·
18	120124029-3			25ml	ZX			
19	120126018-1			50ml	(20	-,		
20	19-1	4	4		+			

^{*} If soils this calculation is taken from cyanide extraction bench sheet.

^{**} If soils, mLs of extract used for distillation.

Extraction Reagents: methyl red indicator	
18 N H ₂ SO ₄	A043-08
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% MgCl ₂	A043-06

Analytical Reagerits:	Reagent #
Barbituric Acid	R038-13
Sodium Phosphate	R026-23
Chloramine-t	R048-09
Pyridine	R043-03

Distillation Initials/Date Distilled: 1/2/12

Analyst Initials/Date Analyzed: 0w 1/31/17

File name: T:\DATA1\FLOW4\2012\EPA335.4\013112CN.RST Date: January 31, 2012

Operator: CRW

120131 FIACHEW

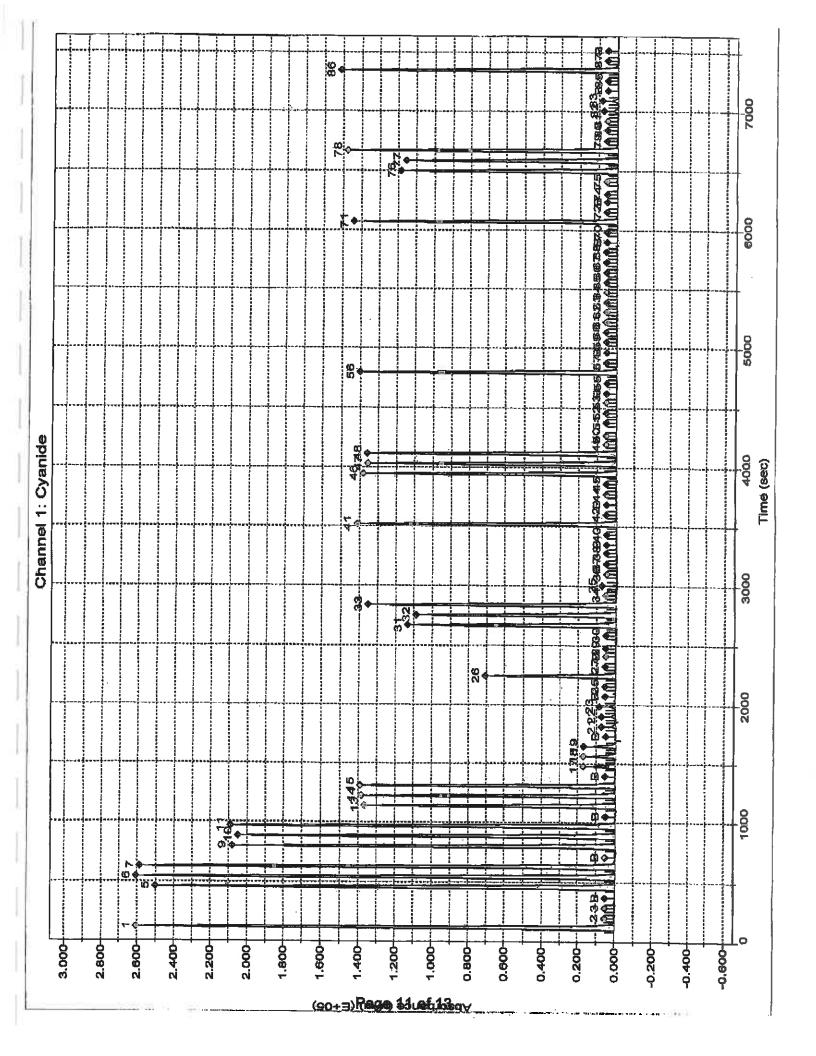
Cpw 1/31/12

	_				(20121174)			
	Peak	Cup	Name	Type	Dil Wt		Area	Calc. (ppm)
	1	2	Sync	SYNC	1	1	5011022	0 026264
11	2	0	Carryover	CO	i	ī	8239	0.976764
	3	0	Carryover	CO	1	ī	3828	0.003383 0.002512
	B	0	Baseline	RB	ī	ī	1088	0.002312
	5	2	Cal 1.00 ppm	C	ī	ī	5134414	1.000421
	6	2	Cal 1.00 ppm	C	1	1	5113915	0.996492
	7	2	Cal 1.00 ppm	C	1	1	5127215	0.999041
	B	0	Baseline	RB	1	1	-833	0.001593
	9	3	Cal 0.80 ppm	¢	1	1	4098498	0.801292
	10	3	Cal 0.80 ppm	C	1	3	4107172	0.802965
- 1	11	3	Cal 0.80 ppm	C	1	1	4110518	0.803610
	B 13	0 4	Baseline	RB	1	1	-209	0.001716
4	1.4	4	Cal 0.50 ppm	C	1	1	2527944	0.497117
	15	4	Cal 0.50 ppm Cal 0.50 ppm	C	1	1	2539596	0.499384
1	В	٥	Cal 0.50 ppm Baseline	C RB	1	1	2539803	0.499424
	17	5	Cal 0.05 ppm	C A	1 1	1	-1513	0.001458
9	18	5	Cal 0.05 ppm	č	i	1 1	229062 235544	0.046935
	19	5	Cal 0.05 ppm	č	î	1	237027	0.048213
H	В	Ö	Baseline	RB	ī	i	.9671	0.048505
	21	6	Cal 0.01 ppm	C	i	1	44975	0.003666 0.010632
1	22	6	Cal 0.01 ppm	C	1	ī	45786	0.010032
-)	23	6	Cal 0.01 ppm	Ç	ī	ĩ	59215	0.013442
	В	O	Baseline	RB	1	1	-1438	0.001473
	25	l	Blank	BLNK	1	1	-4958	0.000778
٦	26	7	ICV 0.25 ppm	CCV	1	1	1275398	0.252564
-1	27	1	Blank	BLNK	1	ı	5769	0.002895
-6	В	0	Baseline	RB	1	1	3279	0.002404
	29		120119013-BL WW	U	3.	1	1888	0.002129
1	30	9	120119013-006	Ŭ	1	1	∽628 9	0.000516
1	31 32	10 11	120119013-006MS	ָ <u></u>	1	1_	2174078	0.428203
- 1	33		120119013-006MSI 120119013-LCS		.1	_1	2134286	
ŧ.	34		120120025-003	ט ט	1	1	2576018	0.506468
1	35		120120025-005	ט	1 1	1	-4267	0.000915
	36		120120025-007	Ü	1	1 1	-9250 -13044	-0.000069
	37		120120025-009	บ	1	1	-4512	-0.000818
Ų	38	17	RINSE	Ü	ī	1	-1957	0.000866 0.001371
-	В	O	Baseline	RB	ī	ī	1425	0.001371
J	40	1	Blank	BLNK	1	ī	2624	0.002036
	41	4	CCV 0.5 ppm	CCV	1	1	2612191	0.513503
	42	1	Blank	BLNK	1	1	75.85	0.003254
	В	0		RB	1	1	-1396	0.001481
	44		120124030-BL WAD		1	1	1219	
	45		120124030-010	Ū	1	1	421	0.001840
	46 47	20	120124030-010MS		1_	1	2670406	0.524821
	4 / 4 8	21 22	120124030-010MSD 120124030-LCS		1	_ 1	2711906	
	49			ប	1	1	2725860	0.535599
	50			U Ų	1	1	11499	0.004026
	51		-	Ŭ	1 1	1	12810	0.004285
	52			U U	1	1	6810	0.003101
	53			ט	i	i	6000 3675	0.002941
	B	0	•	RB	i	î	-591	0.002482 0.001640
П	55	1		BLNK	ī	î	-8955	-0.000011
	56	4		CCV	ī	ī	2577006	0.506660
	57	1		BLNK	ī	1	-1352	0.001490
	B [.]	0		RB	1	1	134	0.001783
	59			ט	1	1	3191	0.002387
	60 63			U) <u>1</u>	1	9504	0.003633
	61 62	_		ט	1	1	8969	0.003527
	62 63			ס	1	1	2566	0.002263
	64			U	1	1	3330	0.002414
	65			บ บ	1	1	1495	0.002052
	56			Ü	1	1 1	1423	0.002038
Ĺ	- -			-	Page 0 of 13	Т	5643	0.002871

Page 9 of 13

Ì	Peak	Cup	Name	Туре	Dil	Wt	Area	Calc.	(ppm)
	67	36	*120120025-014	U	1	1	6558		0.003051
	68	37	+120120021-001	Ü	1	ī	8193		0.003031
1	В	0	Baseline	RB	1	า	359		0.001828
l	70	1	Blank	BLNK	1	ī	-712		0.001616
	71	4	CCV 0.5 ppm	CCV	ĩ	1	2596031		0.510360
	72	1	Blank	BLNK	์ า	ว	-1250		0.001510
l	В	0	Read Baseline	RB	ī	1	~1961		0.001310
l	74	38	120119019-BL	U	1	ī	-2242		0.001314
1	75	3.9	120119019-001	U	ī		2777		0.002305
	76	40	120119019-001MS	Ü	1	ī	2291410		0.451068
١	77	41	120119019-001MSE	ס ס			1 2303223	ž.	0.453370
l	78	42	120119019-LCS	ับ	7	T	2799762	•	0.549957
,	79	43	·120124035-003	Ü	1	ī	872		0.001929
	80	44	* 120124035-004	Ū '	ī	1	-1532		0.001929
ľ	81	45	· 120124029-003	Ū	2	7	-2218		0.001455
l	82	46	4120126018-001	Ū	7	î	40713		0.002038
1	83	47	° 120126019-001	Ū	1	1	57976		0.013197
	В	0	Baseline	RB		1	-4629		0.000843
	85	1	Blank	BLNK	1	า	-5813		0.000610
	86	4	CCV 0.5 ppm	CCV	ี้ ๆ	Ť	2720732		0.534602
	87	1	Blank	BLNK	ī	i	-4225		0.000923
	В	0	Read Baseline	RB	ī	1	226		0.000323

Peak	2	Flags
2 3 5 6	0 0 2 2	BL
7 B 9	2 0 3 3	BL
11 B 13 14	0 4 4	BL
15 B 17 18	4 0 5 5	BL OL
19 B 21	5 0 6	BL
22 23 B 25	6 6 0 1 7	OL BL
26 27 B 29 30	1089	BL
31 32 33 34	10 11 12 13	
35 36 37	14 15 16	TO TO
38 B 40 41	17 0 1 4	BL
42 B 44	1 0 18	BL



File name: T:\DATA1\FLOW4\2012\EPA335.4\013112CN.RST

Date: January 31, 2012

Operator: CRW

*	Name		Conc	Area
_				
*	Cal 1.	00 ppm	1.000000	5134414.000000
*	Cal 1.	00 ppm	1.000000	5113915.000000
*	Çal 1.	00 ppm	1.000000	5127215.000000
*	Cal O.		0.800000	4098498.500000
*	Cal 0.		0.800000	4107171.750000
*	Cal 0.	80 ppm	0.800000	4110518.500000
*	Cal O.	50 ppm	0.500000	2527943.750000
*	Cal O.	50 ppm	0.500000	2539596.250000
*	Cal O.	50 ppm	0.500000	2539803.000000
*	Cal 0.	05 ppm	0.050000	229061.640625
*	Cal 0.	05 ppm	0.050000	235543.875000
*	Cal 0.	05 ppm	0.050000	237027.312500
*	Cal 0.	01 ppm	0.010000	44975.179688
*	Cal 0.	01 ppm	0.010000	45786.214844
*	Cal 0.	01 ppm	0.010000	59215.167969

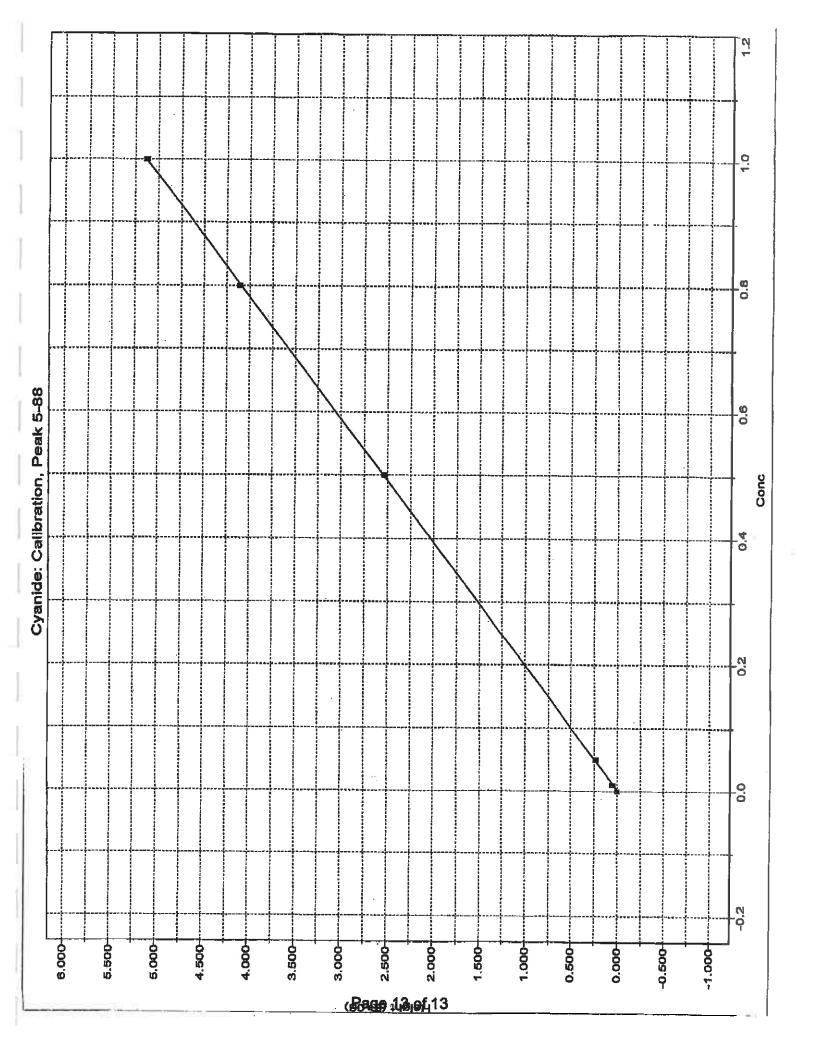
Calib Coef: x=cyy+by+a

a: (intercept) 1.7569e-03 b: 1.9736e-07 c: -5.5618e-16

Corr Coef: 0,999985

Carryover: 0.164%

No Drift Peaks



Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st Qtr 1-17-12

Result

Sample ID MB

SampType: MBLK

TestCode: EPA Method 300.0: Anions

Client ID: PBW

Batch ID: R458

RunNo: 458

Prep Date:

Analysis Date: 1/18/2012

SeqNo: 13150

Units: mg/L HighLimit

Analyte Chloride

PQL ND 0.50 %REC LowLimit

Qual

Sulfate

ND 0.50

SPK value SPK Ref Val

TestCode: EPA Method 300.0: Anions

LowLimit

Sample ID LCS Client ID: LCSW SampType: LCS Batch ID: R458

RunNo: 458

Prep Date:

HighLimit

Analyte

Analysis Date: 1/18/2012

SeqNo: 13151

Units: mg/L

ř.	Chloride
	Sulfate

Result **PQL** SPK value SPK Ref Val %REC 4.7 0.50 5.000 0 94.6 9.7 0.50 10.00 0 96.9

90 90 110 110

%RPD

%RPD

RPDLimit

RPDLimit Qual

Qualifiers:

R

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

Analyte detected below quantitation limits J RPD outside accepted recovery limits

Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

RLReporting Detection Limit Page 7 of 21

Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st Qtr 1-17-12

Client ID: PBW	Sample ID 5ml rb	Samp1	ype: MI	BLK	Tes	tCode: E	PA Method	8260B: VOL	ATILES		
Analyte	Client ID: PBW	Batcl	h ID: R4	86	F	RunNo: 4	86				
Banzane	Prep Date:	Analysis D)ate: 1/	20/2012	9	SeqNo: 1	3958	Units: µg/L			
Toluene ND 1.0 Ethylberzene ND 1.0 Methyl terk-tudyl eider (MTBE) ND 1.0 1.2.4-Trimethylbenzene ND 1.0 1.3.5-Trimethylbenzene ND 1.0 1.2-Dichloroefhane (EDD) ND 1.0 N.D. 1.0 ND 2.0 1-Methylaphthalene ND 4.0 2-Methylaphthalene ND 1.0 Bromodorbane ND 1.0 Bromodorbane ND 1.0 Bromoderane ND 1.0 Bromoderane ND 1.0 Bromoderane ND 1.0 Bromoderane ND 1.0 Carbon disulfide ND 1.0 Carbon disulfide ND 1.0 Carbon disulfide ND 1.0 Chloroefhane ND 1.0 Chloroefhane ND 1.0 Chloroefhane ND 1.0 Chloroefhane ND 1.0	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Ethylbazzene ND 1.0 Mathyl Nerbuyl ether (MTBE) ND 1.0 1.24-Frimethybenzene ND 1.0 1.35-Frimethybenzene ND 1.0 1.2-Dichhoredhane (EDC) ND 1.0 1.2-Dichhoredhane (EDB) ND 1.0 Naphthalene ND 4.0 4-Methylnaphthalene ND 4.0 Acetone ND 1.0 Bromodichorenethane ND 1.0 Carbon feurachloride ND 1.0 Carbon feurachloride ND 1.0 Carbon feurachloride ND 1.0 Chlorodicure ND 1.0 Chlorodicure ND 1.0 Chlorodicure ND 1.0 cis-1.3-Dichloropropene ND 1.0 Dibromoch											
Methyl terb utyle ther (MTBE) ND 1.0 1.24-Trimethylberuzene ND 1.0 1.35-Trimethylberuzene ND 1.0 1.2-Dibromoethane (EDB) ND 1.0 Nphithalene ND 2.0 1-Medhylnaphthalene ND 4.0 2-Methylnaphthalene ND 1.0 Rorondorm ND 1.0 Bromoderane ND 1.0 Bromodifhormethane ND 1.0 Bromodermene ND 1.0 Carbon disulfide ND 1.0 Carbon disulfide ND 1.0 Chlorodermene ND 1.0 Chlorodermene ND 3.0 2-Chlorodubuse ND 1.0 4-Chlorodubuse ND 1.0 4-L-Dichloropropane ND <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>											
1,2,4-Trimethylbenzene ND 1,0 1,3,5-Trimethylbenzene ND 1,0 1,2-Delchorechene (ECD) ND 1,0 1,2-Dibromoeshane (EDB) ND 1,0 Naphthalene ND 2,0 1-Meditylinaphthalene ND 4,0 2-Methylnaphthalene ND 1,0 Romodelkhormethane ND 1,0 Bromoform ND 1,0 Bromoform ND 1,0 Bromoform ND 1,0 Carbon festabloride ND 1,0 Carbon festabloride ND 1,0 Chlorobenzene ND 1,0 Chlorobloropene ND 1,0 Chlorobloropene ND 1,0 Est-1,3-Dichloropene ND 1,0 Elybromoesthane ND	1 .										
1.3.5-Trinedryblenzene ND 1.0 1.2-Dichronoethane (EDC) ND 1.0 1.2-Dichronoethane (EDC) ND 1.0 Naphthalene ND 2.0 1-Methylnaphthalene ND 4.0 2-Methylnaphthalene ND 1.0 Bromoberne ND 1.0 Bromodichloromethane ND 1.0 Bromomethane ND 1.0 Bromomethane ND 1.0 Carbon alsulfide ND 1.0 Carbon siguifide ND 1.0 Chlorodenzene ND 1.0 Chlorodoluene ND 1.0 Chlorodoluene ND 1.0 Chlorodoluene ND 1.0 Chlorodoloromethane ND 1.0 <td></td> <td></td> <td>1.0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>			1.0								
1.2-Dichioroethane (EDC) ND 1.0 1.2-Dibromoethane (EDB) ND 1.0 ND 2.0 1-Methylinaphthalene ND 2.0 1-Methylinaphthalene ND 4.0 2-Methylinaphthalene ND 1.0 Bromobenzene ND 10 Bromobenzene ND 1.0 Bromodelhormethane ND 1.0 Bromodelhormethane ND 1.0 Bromodelhormethane ND 1.0 Bromomethane ND 1.0 Bromodelhormethane ND 1.0 Carbon disulfiel ND 10 Carbon disulfiel ND 1.0 Chlorobenzene ND 1.0 Ch											
1,2-Dibromethane (EDB) ND 1,0 Naphthalene ND 4,0 2-Methylnaphthalene ND 4,0 2-Methylnaphthalene ND 1,0 Bromobezne ND 1,0 Bromodichloromethane ND 1,0 Bromoform ND 1,0 Bromoform ND 1,0 Bromoform ND 1,0 Bromoform ND 1,0 Carbon disulfide ND 1,0 Carbon Tetrachloride ND 1,0 Chloroform ND 1,0 Chloroform ND 1,0 Chloroform ND 1,0 4-Chlorofoluene ND 1,0 4-Chlorofoluene ND 1,0 64-1,3-Dichloropropene ND 1,0 1bbromocal-taloropropene ND 1,0 1bbromocal-taloropropene ND 1,0 1bbromocal-taloropropene ND 1,0 1bbromocal-taloropropene ND		ND									
Naphthalene ND 2.0 1-Methylnaphthalene ND 4.0 2-Methylnaphthalene ND 4.0 Acetone ND 1.0 Bromobenzene ND 1.0 Bromoform ND 1.0 Bromonethane ND 3.0 2-Butanone ND 1.0 Carbon disulfide ND 1.0 Chlorobenzene ND 1.0 Chlorotoluene ND 1.0 chlorotoluene ND 1.0 ch-1,2-DCE ND 1.0 dis-1,3-Dictiloropropane ND 1.0 Dibromomethiane ND 1.0 1,2-Dibrimosezane ND 1.0 1,4-Dichl											
1-Methyinaphthalene ND 4,0 2-Methyinaphthalene ND 4,0 Acetane ND 10 Bromobenzene ND 1,0 Bromodelhlomethane ND 1,0 Bromofem ND 3,0 2-Butanone ND 10 Carbon disulfide ND 10 Carbon disulfide ND 1,0 Chlorobenzene ND 1,0 Chlorobenzene ND 1,0 Chlorotethane ND 3,0 Chlorotomethane ND 1,0 Chlorotomethane ND 1,0 Chlorotomethane ND 1,0 Chlorotomethane ND 1,0 cis-1,2-DCE ND 1,0 cis-1,2-DCE ND 1,0 Dibromo-A-chloropropane ND 1,0 Dibromo-Schoropropane ND 1,0 1,2-Dichlorobenzene ND 1,0 1,4-Dichlorobenzene ND 1,0	1,2-Dibromoethane (EDB)	ND	1.0								
2-Methylnaphthalene ND 4.0 Acetone ND 1.0 Bromodichloromethane ND 1.0 Bromodichloromethane ND 1.0 Bromodichloromethane ND 1.0 Bromomethane ND 1.0 2-Butanone ND 1.0 Carbon disulfide ND 1.0 Carbon Tetrachloride ND 1.0 Chlorobenzene ND 1.0 Chloroform ND 1.0 Chloroform ND 3.0 2-Chlorofoluene ND 1.0 4-Chlorotoluene ND 1.0 4-Chlorotoluene ND 1.0 6s-1,3-Dichloropropene ND 1.0 cis-1,3-Dichloropropene ND 1.0 Dibromochloromethane ND 1.0 1,2-Dichlorobenzene ND 1.0 1,1-Dichlorobenzene ND 1.0 1,1-Dichlorobenzene ND 1.0 1,1-Dichloroethane ND <td>Naphthalene</td> <td>ND</td> <td>2.0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Naphthalene	ND	2.0								
Acetone ND 10 Bromoberzene ND 1.0 Bromodichloromethane ND 1.0 Bromonethane ND 1.0 Bromonethane ND 3.0 2-Butanone ND 10 Carbon disulide ND 10 Carbon Tetrachloride ND 1.0 Chlorobenzene ND 1.0 Chloroethane ND 1.0 Chloroethane ND 1.0 Chlorotoluene ND 1.0 Chlorotoluene ND 1.0 cis-1,2-DCE ND 1.0 cis-1,2-DCE ND 1.0 ch-1,2-Dichloropropene ND 2.0 Dibromochioromethane ND 1.0 1,2-Dichlorobenzene ND 1.0 1,4-Dichlorobenzene ND 1.0 1,4-Dichloroethane ND 1.0 1,1-Dichloroethane ND 1.0 1,2-Dichloropethane ND 1.0	1-Methylnaphthalene	ND	4.0								
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1,1-Dichloropropene ND 1.0											
TIGAQUIIOTOVULQUIGITO IND 1.0											
	I IONACTIOI ODULAUIETTE	ND	1.0								

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st Qtr 1-17-12

Sample ID 5ml rb	SampT	ype: Mi	BLK	TestCode: EPA Method 8260B: VOLATILES							
Client ID: PBW	Batch	1 ID: R 4	186	F	RunNo: 486						
Prep Date:	Analysis D	ate: 1	/20/2012	8	eqNo: 1	3958	Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Quai	
2-Hexanone	ND	10									
Isopropylbenzene	ND	1.0									
4-Isopropyltoluene	ND	1.0									
4-Methyl-2-pentanone	ND	10									
Methylene Chloride	ND	3.0									
n-Butylbenzene	ND	1.0									
n-Propylbenzene	ND	1.0									
sec-Butylbenzene	ND	1.0									
Styrene	ND	1.0									
ert-Butylbenzene	ND	1.0									
1,1,1,2-Tetrachloroethane	ND	1.0									
1,1,2,2-Tetrachloroethane	ND	2.0									
Tetrachloroethene (PCE)	ND	1.0									
rans-1,2-DCE	ND	1.0									
rans-1,3-Dichloropropene	ND	1.0									
1,2,3-Trichlorobenzene	ND	1.0									
1,2,4-Trichlorobenzene	ND	1.0									
1,1,1-Trichloroethane	ND	1.0									
1,1,2-Trichloroethane	ND	1.0									
Frichloroethene (TCE)	ND	1.0									
richlorofluoromethane	ND	1.0									
,2,3-Trichloropropane	ND	2.0									
/inyl chloride	ND	1.0									
(ylenes, Total	ND	1.5									
Surr: 1,2-Dichloroethane-d4	7.3		10.00		72.8	70	130				
Surr: 4-Bromofluorobenzene	8.3		10.00		82.8	70	130				
Surr: Dibromofluoromethane	8.0		10.00		80.3	69.8	130				
Surr: Toluene-d8	8.3		10.00		83.4	70	130				
Sample ID 100ng Ics	SampTy	/pe: LC	 S	Test	Code: EF	A Method	8260B: VOL	ATILES			
Client ID: LCSW	Batch	ID: R 4	86	R	unNo: 48	36					
Prep Date:	Analysis Da	ate: 1/2	20/2012	s	eqNo: 13	3959	Units: µg/L				
Analyte	Result	PQL	CDKk.	SPK Ref Val		LowLimit	HighLimit	%RPD	RPDLimit	Qual	

Ou	alifie	rs:

Benzene

Toluene

Chlorobenzene

1,1-Dichloroethene

Trichloroethene (TCE)

Surr: 1,2-Dichloroethane-d4

Surr: 4-Bromofluorobenzene

Value exceeds Maximum Contaminant Level.

21

21

21

23

20

7.3

9.3

1.0

1.0

1.0

1.0

1.0

20.00

20.00

20.00

20.00

20.00

10.00

10.00

Е Value above quantitation range

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

81.1

82.3

83.1

67.4

70

70

70

130

122

130

126

137

130

130

Not Detected at the Reporting Limit

106

105

105

113

99.1

73.3

93.1

0

0

0

0

Reporting Detection Limit

Page 9 of 21

Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

SampType: MBLK

Project:

Sample ID b9

Injection Well 1st Qtr 1-17-12

	Sample ID 100ng ics	SampType:	LCS	Tes	tCode: El	PA Method	8260B: VOL	ATILES			
J	Client ID: LCSW	: LCSW Batch ID: R486				RunNo: 486					
ŀ	Prep Date:	Analysis Date:	1/20/2012	S	SeqNo: 1	3959	Units: µg/L				
ì	Analyte	Result PQ	L SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
1	Surr: Dibromofluoromethane	8.0	10.00		80.4	69.8	130				
1	Surr: Toluene-d8	9.2	10.00		91.8	70	130				

I	Sample ID 100ng ics	SampT	ype: LC	s	Tes	tCode: El	PA Method	8260B: VOL	ATILES			
ļ	Client ID: LCSW	Batch	1D: R4	86	F	RunNo: 4	86					
1	Prep Date:	Analysis D	ate: 1/	20/2012	SeqNo: 14361			Units: µg/L				
l	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
	Benzene	22	1.0	20.00	0	109	81.1	130				
ï	Toluene	22	1.0	20.00	0	110	82.3	122				
ı	Chlorobenzene	21	1.0	20.00	0	107	70	130				
ŀ	1,1-Dichloroethene	23	1.0	20.00	0	116	83.1	126				
	Trichloroethene (TCE)	21	1.0	20.00	0	106	67.4	137				
1	Surr: 1,2-Dichloroethane-d4	8.1		10.00		81.1	70	130				
L	Surr: 4-Bromofluorobenzene	9.5		10.00		95.2	70	130				
	Surr: Dibromofluoromethane	8.3		10.00		82.8	69.8	130				
ĺ	Surr: Toluene-d8	9.1		10.00		91.1	70	130				

	Client ID: PBW	Batch	ID: R4	86	F	RunNo: 4	B6				
l	Prep Date:	Analysis D	ate: 1/	20/2012	S	SeqNo: 1	5528	Units: µg/L			
p	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
ï	Benzene	ND	1.0			_					
l	Toluene	ND	1.0								
P.	Ethylbenzene	ND	1.0								
v	Methyl tert-butyl ether (MTBE)	ND	1.0								
l	1,2,4-Trimethylbenzene	ND	1.0								
ł	1,3,5-Trimethylbenzene	ND	1.0								
	1,2-Dichloroethane (EDC)	ND	1.0								
T	1,2-Dibromoethane (EDB)	ND	1.0								
ľ	Naphthalene	ND	2.0								
	1-Methylnaphthalene	ND	4.0								
i	2-Methylnaphthalene	ND	4.0								
ľ	Acetone	ND	10								
ŀ	Bromobenzene	ND	1.0								
	Bromodichloromethane	ND	1.0								
ı	Bromoform	ND	1.0								
l	Bromomethane	ND	3.0								
	2-Butanone	ND	10								
i	Carbon disulfide	ND	10								
L	Carbon Tetrachloride	ND	1.0								

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded

TestCode: EPA Method 8260B: VOLATILES

- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st Qtr 1-17-12

Analysis D Result ND ND	ID: R4 ate: 1/ PQL 1.0	20/2012		RunNo: 4	86					
Result ND ND	PQL		8	Souther 4						
ND ND		SPK value		bedino. 1	5528	Units: µg/L				
ND	1.0	01 11 10100	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
NID	2.0									
ND	1.0									
ND	3.0									
ND										
ND										
ND	1.0									
ND	1.0									
ND	2.0									
ND	1.0									
ND	1.0									
ND	1.0									
ND	1.0									
ND	1.0									
ND	1.0									
ND	1.0									
ND	1.0									
ND	1.0									
ND	1.0									
ND	2.0									
ND	1.0									
ND	1.0									
ND	10									
ND	1.0									
ND	1.0									
ND	10									
ND										
ND										
ND										
ND										
ND										
	ND N	ND 1.0 ND	ND 1.0	ND 1.0	ND 1.0	ND 1.0 ND 1.0 ND 1.0 ND 1.0 ND 1.0 ND 2.0 ND 1.0	ND 1.0 ND 1.0 ND 1.0 ND 1.0 ND 1.0 ND 2.0 ND 1.0	ND 1.0 ND 1.0 ND 1.0 ND 1.0 ND 1.0 ND 2.0 ND 1.0	ND 1.0 ND 1.0 ND 1.0 ND 1.0 ND 2.0 ND 1.0	

Qualifiers:

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st Qtr 1-17-12

Sample ID b9	SampT	ype: ME	BLK	Tes	TestCode: EPA Method 8260B: VOLATILES						
Client ID: PBW	Batch	ID: R4	86	F	RunNo: 4	86					
Prep Date:	Analysis D	Analysis Date: 1/20/2012			SeqNo: 1	5528	Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Trichloroethene (TCE)	ND	1.0									
Trichlorofluoromethane	ND	1.0									
1,2,3-Trichloropropane	ND	2.0									
Vinyl chloride	ND	1.0									
Xylenes, Total	ND	1.5									
Surr: 1,2-Dichloroethane-d4	7.8		10.00		77.8	70	130				
Surr: 4-Bromofluorobenzene	9.3		10.00		92.9	7 0	130				
Surr: Dibromofluoromethane	8.3		10.00		83.4	69.8	130				
Surr: Toluene-d8	8.1		10.00		81.4	70	130				

Qualifiers:

- *X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Page 12 of 21

Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st Qtr 1-17-12

Sample ID mb-389	SampT	ype: MBLK	Tes	stCode: El	PA Method	8270C: Semi	volatiles		
Client ID: PBW	Batch	n ID: 389		RunNo: 5	38				
Prep Date: 1/23/2012	Analysis D	ate: 1/23/2012		SeqNo: 1	5303	Units: µg/L			
Analyte	Result	PQL SPK v	alue SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10							
Acenaphthylene	ND	10							
Aniline	ND	10							
Anthracene	ND	10							
Azobenzene	ND	10							
Benz(a)anthracene	ND	10							
Benzo(a)pyrene	ND	10							
Benzo(b)fluoranthene	ND	10							
Benzo(g,h,i)perylene	ND	10							
Benzo(k)fluoranthene	ND	10							
Benzoic acid	ND	20							
Benzyl alcohol	ND	10							
Bis(2-chloroethoxy)methane	ND	10							
Bis(2-chloroethyl)ether	ND	10							
Bis(2-chloroisopropyl)ether	ND	10							
Bis(2-ethylhexyl)phthalate	ND	10							
4-Bromophenyl phenyl ether Butyl benzyl phthalate	ND	10							
Carbazole	ND ND	10 10							
4-Chloro-3-methylphenol	ND	10							
4-Chloroaniline	ND	10							
2-Chloronaphthalene	ND	10							
2-Chlorophenol	ND	10							
4-Chlorophenyl phenyl ether	ND	10							
Chrysene	ND	10							
Di-n-butyl phthalate	ND	10							
Di-n-octyl phthalate	ND	10							
Dibenz(a,h)anthracene	ND	10							
Dibenzofuran	ND	10							
1,2-Dichlorobenzene	ND	10							
1,3-Dichlorobenzene	ND	10							
1,4-Dichlorobenzene	ND	10							
3,3'-Dichlorobenzidine	ND	10							
Diethyl phthalate	ND	10							
Dimethyl phthalate	ND	10							
2,4-Dichlorophenol	ND	20							
2,4-Dimethylphenol	ND	10							
1,6-Dinitro-2-methylphenol	ND	20							
2,4-Dinitrophenol	ND	20							
2,4-Dinitrotoluene	ND	10							
2,6-Dinitrotoluene	ND	10							

Qualifiers:

- *X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st Qtr 1-17-12

Sample ID mb-389	SampT	ype: MI	BLK	Tes	tCode: El	PA Method	8270C: Sem	ivolatiles		
Client ID: PBW	Batch	ID: 38	9	F	RunNo: 5	38				
Prep Date: 1/23/2012	Analysis D	ate: 1/	/23/2012	5	SeqNo: 1	5303	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoranthene	ND	10								
Fluorene	ND	10								
Hexachlorobenzene	ND	10								
Hexachlorobutadiene	ND	10								
Hexachlorocyclopentadiene	ND	10								
Hexachloroethane	ND	10								
Indeno(1,2,3-cd)pyrene	ND	10								
Isophorone	ND	10								
1-Methylnaphthalene	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
3+4-Methylphenol	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodimethylamine	ND	10								
N-Nitrosodiphenylamine	ND	10								
Naphthalene	ND	10								
2-Nitroaniline	ND	10								
3-Nitroaniline	ND	10								
4-Nitroaniline	ND	20								
Nitrobenzene	ND	10								
2-Nitrophenol	ND	10								
4-Nitrophenol	ND	10								
Pentachlorophenol	ND	20								
Phenanthrene	ND	10								
Phenol	ND	10								
Pyrene	ND	10								
Pyridine	ND	10								
1,2,4-Trichlorobenzene	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
Surr: 2,4,6-Tribromophenol	140		200.0		69.4	18.1	138			
Surr: 2-Fluorobiphenyl	75		100.0		74.8	25.9	101			
Surr: 2-Fluorophenol	92		200.0		46.0	12.5	93.2			
Surr: 4-Terphenyl-d14	73		100.0		73.2	29.5	112			
Surr: Nitrobenzene-d5	77		100.0		76.6	20.5	120			
Sum: Phenol-d5	80		200.0		39.9	11.5	73.2			
			_00.0		55.5	11.5	10,2			

Qualifiers:

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st Qtr 1-17-12

	Sample ID Ics-389	SampT	ype: LC	s	Tes	Code: EF	A Method	8270C: Semi	volatiles		
]	Client ID: LCSW	Batch	ID: 38	9	R	lunNo: 5 3	38				
	Prep Date: 1/23/2012	Analysis D	ate: 1/	23/2012	S	eqNo: 1	5304	Units: µg/L			
ï	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1	Acenaphthene	59	10	100.0	0	58.6	37.7	119			
ì	4-Chioro-3-methylphenol	110	10	200.0	0	55.3	48.8	104			
	2-Chlorophenol	98	10	200.0	0	48.8	38.2	109			
ı	1,4-Dichlorobenzene	50	10	100.0	0	50.3	33.7	99.1			
ŀ	2,4-Dinitrotoluene	68	10	100.0	0	67.9	39.9	125			
	N-Nitrosodi-n-propylamine	65	10	100.0	0	65.0	43.8	95.1			
ī	4-Nitrophenol	61	10	200.0	0	30.3	21.7	68.6			
l	Pentachlorophenol	96	20	200.0	0	48.2	26.7	107			
1	Phenol	66	10	200.0	0	33.2	23.9	65.8			
ı	Pyrene	61	10	100.0	0	61.0	45.7	107			
l	1,2,4-Trichlorobenzene	57	10	100.0	0	57.2	30.8	104			
ľ	Surr: 2,4,6-Tribromophenol	130		200.0		66.0	18.1	138			
	Surr: 2-Fluorobiphenyl	72		100.0		72.1	25.9	101			
ŧ	Surr: 2-Fluorophenol	70		200.0		35.0	12.5	93.2			
l	Surr: 4-Terphenyl-d14	67		100.0		67.3	29.5	112			
	Surr: Nitrobenzene-d5	72		100.0		71.8	20.5	120			
Y.	Surr: Phenol-d5	70		200.0		34.9	11.5	73.2			

Sample ID Icsd-389	SampT	ype: LC	SD	Tes	tCode: El	PA Method	8270C: Semi	volatiles	<u> </u>	
Client ID: LCSS02	Batch	ID: 38	9	F	RunNo: 5	38				
Prep Date: 1/23/2012	Analysis D	ate: 1/	23/2012	S	SeqNo: 1	5305	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	63	10	100.0	0	62.6	37.7	119	6.54	20	
4-Chloro-3-methylphenol	130	10	200.0	0	62.7	48.8	104	12.6	20	
2-Chlorophenol	90	10	200.0	0	44.8	38.2	109	8.56	20	
1,4-Dichlorobenzene	56	10	100.0	0	55.8	33.7	99.1	10.4	20	
2,4-Dinitrotoluene	75	10	100.0	0	75.0	39.9	125	10.0	20	
N-Nitrosodi-n-propylamine	70	10	100.0	0	69.7	43.8	95.1	6.98	20	
4-Nitrophenol	46	10	200.0	0	23.2	21.7	68.6	26.8	20	R
Pentachlorophenol	64	20	200.0	0	32.2	26.7	107	39.7	20	R
Phenol	66	10	200.0	0	33.2	23.9	65.8	0.120	20	
Pyrene	65	10	100.0	0	65.0	45.7	107	6.41	20	
1,2,4-Trichlorobenzene	59	10	100.0	0	58.6	30.8	104	2.28	20	
Surr: 2,4,6-Tribromophenol	97		200.0		48.5	18.1	138	0	0	
Surr: 2-Fluorobiphenyl	75		100.0		75.2	25.9	101	0	0	
Surr: 2-Fluorophenol	59		200.0		29.6	12.5	93.2	0	0	
Surr: 4-Terphenyl-d14	70		100.0		70.0	29.5	112	0	0	
Surr: Nitrobenzene-d5	74		100.0		74.4	20.5	120	0	0	
Surr: Phenol-d5	68		200.0		34.1	11.5	73.2	0	0	

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range
- Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st Qtr 1-17-12

Sample ID 1201473-001B DUP

SampType: DUP

TestCode: EPA 120.1: Specific Conductance

Client ID: Injection Well

Batch ID: R459

RunNo: 459

Prep Date:

Analysis Date: 1/18/2012

PQL

SeqNo: 13287

Units: µmhos/cm

Analyte

Result

SPK value SPK Ref Val

%REC LowLimit

RPDLimit

Qual

20

Conductivity

HighLimit

%RPD

2,700 0.010 0.404

Qualifiers:

 $^{\circ\prime}\mathbf{X}$ Value exceeds Maximum Contaminant Level.

Value above quantitation range E

Analyte detected below quantitation limits

R RPD outside accepted recovery limits Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Reporting Detection Limit

Page 16 of 21

Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st Qtr 1-17-12

Sample ID MB-352

SampType: MBLK

TestCode: EPA Method 7470: Mercury

Client ID: PBW

Batch ID: 352

RunNo: 468

Prep Date: 1/19/2012

Analysis Date: 1/19/2012

SeqNo: 13837

Units: mg/L

Analyte

Result **PQL** SPK value SPK Ref Val ND 0.00020

%REC LowLimit

HighLimit

Qual

Mercury

Sample ID LCS-352

SampType: LCS

TestCode: EPA Method 7470: Mercury

Client ID: LCSW Prep Date: 1/19/2012

Batch ID: 352

RunNo: 468

Analysis Date: 1/19/2012

SeqNo: 13838

Units: mg/L

RPDLimit

Analyte

Result

Result

SPK value SPK Ref Val

%REC LowLimit

HighLimit

%RPD

%RPD

Mercury

0.005000

RPDLimit

Qual

PQL 0.0053 0.00020

107

120

Sample ID 1201473-001CMS

Client ID: Injection Well

Client ID: Injection Well

SampType: MS Batch ID: 352

TestCode: EPA Method 7470: Mercury

RunNo: 468

Units: mg/L

%RPD

Analyte Mercury

1/19/2012

Analysis Date: 1/19/2012 PQL

SeqNo: 13842

SPK value SPK Ref Val %REC LowLimit

HighLimit 125

RPDLimit

Qual

Prep Date:

Prep Date:

Sample ID 1201473-001CMSD

SampType: MSD

0.0045 0.00020

TestCode: EPA Method 7470: Mercury

0.005000 0.0001518

RunNo: 468

86.4

Analyte Mercury

1/19/2012

Batch ID: 352 Analysis Date: 1/19/2012

SeqNo: 13843

Units: mg/L

POL SPK value SPK Ref Val 0.0045 0.00020 0.005000 0.0001518

%REC 86.3

LowLimit 75 HighLimit 125 %RPD **RPDLimit** 0.104

Qual 20

Qualifiers:

E

* X Value exceeds Maximum Contaminant Level.

Value above quantitation range R RPD outside accepted recovery limits В Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

Not Detected at the Reporting Limit ND

Page 17 of 21

J Analyte detected below quantitation limits

Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

WO#:

RPDLimit

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st Qtr 1-17-12

Sample ID MB-371

SampType: MBLK

TestCode: EPA 6010B: Total Recoverable Metals

Client ID: **PBW** Batch ID: 371

RunNo: 534

Prep Date: 1/20/2012

Analysis Date: 1/24/2012

SeqNo: 15206

Units: mg/L

%RPD

HighLimit

Qual

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit
Arsenic	ND	0.020				
Barium	ND	0.020				
Cadmium	ND	0.0020				
Calcium	ND	1.0				
Chromium	ND	0.0060				
Lead	ND	0.0050				
Magnesium	ND	1.0				
Potassium	ND	1.0				
Selenium	ND	0.050				
Silver	ND	0.0050				
Sodium	ND	1.0				

	Sample ID LCS-371	Samp	Type: LC	S	Tes	tCode: El	PA 6010B: 1	Total Recover	able Meta	als	
I	Client ID: LCSW	Bate	ch ID: 37	1	F	tunNo: 5	34				
ł	Prep Date: 1/20/2012	Analysis	Date: 1/	24/2012	S	eqNo: 1	5207	Units: mg/L			
ì	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
ı	Arsenic	0.48	0.020	0.5000	0	96.7	80	120			
, 9	Barium	0.46	0.020	0.5000	0	92.2	80	120			
í	Cadmium	0.46	0.0020	0.5000	0	91.6	80	120			
l	Calcium	50	1.0	50.00	0	100	80	120			
ŀ	Chromium	0.46	0.0060	0.5000	0	92.7	80	120			
	Lead	0.45	0.0050	0.5000	0	90.4	80	120			
Ī	Magnesium	51	1.0	50.00	0	102	80	120			
l	Potassium	48	1.0	50.00	0	96.9	80	120			
•	Selenium	0.46	0.050	0.5000	0	91.8	80	120			
ï	Silver	0.094	0.0050	0.1000	0	94.5	80	120			
l	Sodium	50	1.0	50.00	0	99.4	80	120			

Qualifiers:

Reporting Detection Limit

Page 18 of 21

Value exceeds Maximum Contaminant Level,

Value above quantitation range

Analyte detected below quantitation limits

R RPD outside accepted recovery limits

В Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st Qtr 1-17-12

Sample ID 1201473-001b dup

SampType: DUP

TestCode: SM4500-H+B: pH

Client ID: Injection Well

Batch ID: R459

RunNo: 459

Prep Date:

Analysis Date: 1/18/2012

PQL

Kullino: 439

SeqNo: 13243

Units: pH units

Analyte

Result

SPK value SPK Ref Val

%REC LowLimit

PIT EINE

HighLimit

RPDLimit

Qual

pН

7.31 1.68

%RPD 0.137

Qualifiers:

* X Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

B Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client: Project:

Prep Date:

Western Refining Southwest, Inc.

Injection Well 1st Qtr 1-17-12

Sample ID mb-1

SampType: MBLK

Batch ID: R459

TestCode: SM2320B: Alkalinity

Client ID: **PBW**

RunNo: 459

Analysis Date: 1/18/2012

SeqNo: 13288

Units: mg/L CaCO3

Analyte

Result POL SPK value SPK Ref Val %REC LowLimit ND 20

RPDLimit

Qual

Total Alkalinity (as CaCO3)

Sample ID Ics-1

Client ID: LCSW

SampType: LCS

Batch ID: R459

TestCode: SM2320B: Alkalinity

Analysis Date: 1/18/2012

20

RunNo: 459 SeqNo: 13289

Units: mg/L CaCO3

HighLimit

RPDLimit

Analyte

Prep Date:

PQL

SPK value SPK Ref Val

%REC LowLimit

HighLimit

Total Alkalinity (as CaCO3)

Result 81

80.00 5.680

94.0

88.1 104 %RPD

%RPD

Qual

Sample ID mb-2

PBW

SampType: MBLK Batch ID: R459

TestCode: SM2320B: Alkalinity RunNo: 459

Units: mg/L CaCO3

RPDLimit

Prep Date: Analyte

Sample ID Ics-2

Client ID: LCSW

Client ID:

Analysis Date: 1/18/2012 Result **PQL**

SPK value SPK Ref Val %REC LowLimit

SeqNo: 13312

HighLimit

%RPD **RPDLimit**

Qual

Total Alkalinity (as CaCO3)

ND

TestCode: SM2320B: Alkalinity

RunNo: 459

%REC

101

%RPD

%RPD

Prep Date:

Batch ID: R459 Analysis Date: 1/18/2012

SampType: LCS

SPK value SPK Ref Val

80.00

SeqNo: 13313

Units: mg/L CaCO3

104

Qual

Analyte Total Alkalinity (as CaCO3)

POL

TestCode: SM2320B: Alkalinity

HighLimit

Sample ID 1201473-001b ms

Client iD: Injection Well

SampType: MS

RunNo: 459

Batch ID: R459

37.1

LowLimit

88.1

Prep Date:

Analysis Date: 1/18/2012

390

Result

81

80.00

SeqNo: 13315

Units: mg/L CaCO3

121

Analyte

PQL Result

SPK value SPK Ref Val

316.2

%REC LowLimit 88.1

HighLimit

RPDLimit Qual

Total Alkalinity (as CaCO3) Sample ID 1201473-001b msd

SampType: MSD

TestCode: SM2320B: Alkalinity RunNo: 459

Client ID: Injection Well Prep Date:

Batch ID: R459

380

20

SeqNo: 13316

Units: mg/L CaCO3

Qual

Total Alkalinity (as CaCO3)

Analysis Date: 1/18/2012 Result PQL

80.00

SPK value SPK Ref Val

316.2

%REC

81.9

LowLimit 37.1

HighLimit 121

%RPD

1.30

RPDLimit 7.21

Qualifiers:

R

- Value exceeds Maximum Contaminant Level.
 - Value above quantitation range
- Analyte detected below quantitation limits RPD outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded Not Detected at the Reporting Limit ND
- Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1201473

10-Feb-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st Qtr 1-17-12

Sample ID MB-349

SampType: MBLK

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: PBW

Batch ID: 349

RunNo: 491

Prep Date: 1/19/2012

Analysis Date: 1/20/2012

SeqNo: 14052

Units: mg/L

Analyte

Result **PQL** SPK value SPK Ref Val

%REC LowLimit HighLimit

Qual

Total Dissolved Solids

ND 20.0

SampType: LCS

TestCode: SM2540C MOD: Total Dissolved Solids

Sample ID LCS-349 Client ID: LCSW

1/19/2012

Batch ID: 349

RunNo: 491

Units: mg/L

RPDLimit

Analyte

Prep Date:

Analysis Date: 1/20/2012

PQL

SPK value SPK Ref Val 0

%REC LowLimit 100

SeqNo: 14053

HighLimit

%RPD

%RPD

Result

120

Total Dissolved Solids

20.0

RPDLimit

1,000

1,000

Qual

Qualifiers:

*,'X Value exceeds Maximum Contaminant Level.

Value above quantitation range

Analyte detected below quantitation limits J

Analyte detected in the associated Method Blank Η Holding times for preparation or analysis exceeded

Not Detected at the Reporting Limit

RLReporting Detection Limit Page 21 of 21

R RPD outside accepted recovery limits



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87105 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name:	Western Refining Southwe	st Inc Bloomfield	Work Order	Number 12	201473	***************************************
Logged by:	Anne Thorne	1/18/2012 9:40:00 Al				
Loggod by,	Allie Holle	1710/2012 9.40.00 A	41	Um	u Sham	
Completed By:	Anne Thorne	1/18/2012		Om	u	
Reviewed By:	KIMIZ	8		2,47		
Chain of Cust	tody		70			
1. Were seals	Intact?		Yes 🗌	No 🗆	Not Present 🗹	
2. Is Chain of (Custody complete?		Yes 🗹	No 🗆	Not Present	
3. How was the	sample delivered?		<u>UPS</u>			
Log In						
4. Coolers are	present? (see 19. for cooler s	pecific Information)	Yes 🗹	No 🗆	NA 🗌	
5. Was an atte	mpt made to cool the samples	97	Yes 🗹	No 🗆	NA 🗆	
6. Were all san	nples received at a temperatu	re of >0° C to 6.0°C	Yes 🔽	No 🗆	NA 🗌	
7. Sample(s) in	proper container(s)?		Yes 🗹	No 🗆		
8. Sufficient sa	mple volume for indicated test	(s)?	Yes 🗹	No 🗌		
9. Are samples	(except VOA and ONG) prop	erly preserved?	Yes 🗹	No 🗆		
10, Was preserv	rative added to bottlea?		Yes 🗌	No 🗹	NA 🗆	
4.4 (o the hander	naan in the MOA winin loop the	n 4/4 leab as 6 as 0	٠ المُ	No 🗆 N	10.340A.34I-I-	
	pace in the VOA vials less tha imple containers received brol			No ☑ N	o VOA Viais	
	vork match bottle labels?	(A1) (=	No 🗆	# of preserved	
	pancies on chain of custody)				for pH:	2
14. Are matrices	correctly identified on Chain of	of Custody?	Yes 🔽	No 🗔	(420	(12 unless noted)
15. Is it clear who	at analyses were requested?		Yes 🗹	No 🗆	Adjusted?	
	ling times able to be met? customer for authorization.)		Yes 🗹	No 🗆	Checked by:	
Special Handle	ing (if applicable)					
17, Was client no	otified of all discrepancies with	this order?	Yes 🗌	No 🗆	NA 🗹	
Person	Notified:	Date				
By Who	ım:	Via:	□ eMail □	Phone	Fax In Person	
Regardi	ing:					•
Client In	netructions:				_• н	'
18. Additional ren	marks:	····				
19. Cooler Information Cooler No	1 .		Seal Date	Signed i	Бу	

	HALL ENVIRONMENTAL	S	4901 Hawkins NE - Albuqueroue, NM 87109		Analysis	()() ()()()()()()()()()()()()()()()()()	S on	(Ga	15H (C)	40/ 40/ 40/ 40/ 40/ 40/ 40/ 40/	TEX + MTE TH Method TH (Method TH (Meth	8 × 8 × 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	×	×	×	×,	メ・	×	X			Imegy & Bomarks:		ner accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.
Turn-Around Time:	X Standard □ Rush		ction well	Project#:	2	Project Manager;			Sample: Est + Terry	Samue as persuate	Container Preservative Type and # Type	3-10A HCI	1-Liter Amber	1-500m1	1-540.ml	1-350ml H250y	1-seemy HNO3	1-Sam Wholf	1-Septed Zu Actor			I Now NOTIFELL	Received by: Date Time	ntracted to other accredited laboratories. This serves as notice
Chain-of-Custody Record	Client Western Refining		Mailing Address: #50 CR 4990	413	Phone #: 505-632-#135	email or Fax#:	QA/QC Package:	☐ Standard X Level 4 (Full Validation)	Accreditation	□ EDD (Type)	Date Time Matrix Sample Request ID	1-17-12 8:30 1/20 Injection Well									-	25:00 Robot Krallon	Date: Time: Relinquished by:	If necessary, samples submitted to Hall Environmental may be subconfracted to other



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

OrderNo.: 1204158

April 26, 2012

Kelly Robinson

Western Refining Southwest, Inc.

#50 CR 4990

Bloomfield, NM 87413

TEL: (505) 632-4135

FAX (505) 632-3911

RE: Injection Well 2nd Qtr 4-3-12

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 2 sample(s) on 4/4/2012 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman

Laboratory Manager

andyl

4901 Hawkins NE

Albuquerque, NM 87109



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com Workorder Sample Summary

WO#:

1204158

26-Apr-12

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 2nd Qtr 4-3-12

					_
Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1204158-001	Injection Well		4/3/2012 1:20:00 PM	4/4/2012 10:15:00 AM	Aqueous
1204158-001	Injection Well		4/3/2012 1:20:00 PM	4/4/2012 10:15:00 AM	Aqueous
1204158-001	Injection Well		4/3/2012 1:20:00 PM	4/4/2012 10:15:00 AM	Aqueous
1204158-001	Injection Well		4/3/2012 1:20:00 PM	4/4/2012 10:15:00 AM	Aqueous
1204158-001	Injection Well		4/3/2012 1:20:00 PM	4/4/2012 10:15:00 AM	Aqueous
1204158-001	Injection Well		4/3/2012 1:20:00 PM	4/4/2012 10:15:00 AM	Aqueous
1204158-002	Trip Blank			4/4/2012 10:15:00 AM	Aqueous

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/26/2012

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 2nd Qtr 4-3-12

Lab ID: 1204158-001 Client Sample ID: Injection Well

Collection Date: 4/3/2012 1:20:00 PM

Received Date: 4/4/2012 10:15:00 AM

Analyses	Result	RL	Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: SRM
Chloride	850	50	mg/L	100	4/4/2012 4:00:45 PM
Sulfate	77	5.0	mg/L	10	4/4/2012 3:48:20 PM
EPA METHOD 7470: MERCURY					Analyst: JLF
Mercury	0.00038	0.00020	mg/L	1	4/17/2012 10:00:05 AM
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst: RAG
Arsenic	ND	0.020	mg/L	1	4/12/2012 4:24:27 PM
Barium	0.46	0.020	mg/L	1	4/12/2012 4:24:27 PM
Cadmium	ND	0.0020	mg/L	1	4/12/2012 4:24:27 PM
Calcium	110	5.0	mg/L	5	4/12/2012 4:26:24 PM
Chromium	ND	0.0060	mg/L	1	4/12/2012 4:24:27 PM
Lead	ND	0.0050	mg/L	4	4/12/2012 4:24:27 PM
Magnesium	35	1.0	mg/L	4	4/12/2012 4:24:27 PM
Potassium	15	1.0	mg/L	4	4/12/2012 4:24:27 PM
Selenium	ND	0.050	mg/L	1	4/12/2012 4:24:27 PM
Silver	ND	0.0050	mg/L	,	4/12/2012 4:24:27 PM
Sodium	800	10	mg/L	10	4/23/2012 2:38:11 PM
EPA METHOD 8270C: SEMIVOLATILE			···•	10	Analyst: JDC
Acenaphthene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Acenaphthylene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Aniline	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Anthracene	ND	50	µg/L	1	4/9/2012 8:10:20 PM
Azobenzene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Benz(a)anthracene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Benzo(a)pyrene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Benzo(b)fluoranthene	ND	50	μg/L	*	4/9/2012 8:10:20 PM
Benzo(g,h,i)perylene	ND	50	μg/L	3	
Benzo(k)fluoranthene	ND	50	μg/L	A)	4/9/2012 8:10:20 PM
Benzoic acid	ND	100	μg/L	4	4/9/2012 8:10:20 PM
Benzyl alcohol	ND	50	μg/L		4/9/2012 8:10:20 PM 4/9/2012 8:10:20 PM
Bis(2-chloroethoxy)methane	ND	50		1	
Bis(2-chloroethyl)ether	ND	50	μg/L	* *	4/9/2012 8:10:20 PM
Bis(2-chloroisopropyl)ether	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Bis(2-ethylhexyl)phthalate	ND	50	μg/L μg/L		4/9/2012 8:10:20 PM
4-Bromophenyl phenyl ether	ND	50		1	4/9/2012 8:10:20 PM
Butyl benzyl phthalate	ND	50	μg/L μg/L	10	4/9/2012 8:10:20 PM
Carbazole	ND	50	μg/L	1	4/9/2012 8:10:20 PM
4-Chloro-3-methylphenol	ND	50		1	4/9/2012 8:10:20 PM
4-Chloroaniline	ND	50 50	μg/L	1	4/9/2012 8:10:20 PM
2-Chloronaphthalene	ND	50 50	μg/L	1	4/9/2012 8:10:20 PM
2-Chlorophenol	ND	50 50	μg/L μg/L	1 1	4/9/2012 8:10:20 PM

Matrix: AQUEOUS

Qualifiers:

- *X Value exceeds Maximum Contaminant Level.
- Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

- Analyte detected in the associated Method Blank В
- Н Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit ND
- Reporting Detection Limit

Analytical Report

Lab Order 1204158

Date Reported: 4/26/2012

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 2nd Qtr 4-3-12

Lab ID: 1204158-001

Client Sample ID: Injection Well

Collection Date: 4/3/2012 1:20:00 PM

Received Date: 4/4/2012 10:15:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLA	TILES				Analyst: JD0
4-Chlorophenyl phenyl ether	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Chrysene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Di-n-butyl phthalate	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Di-n-octyl phthalate	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Dibenz(a,h)anthracene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Dibenzofuran	ND	50	μg/L	Ť	4/9/2012 8:10:20 PM
1,2-Dichlorobenzene	ND	50	μg/L	Ť	4/9/2012 8:10:20 PM
1,3-Dichlorobenzene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
1,4-Dichlorobenzene	ND	50	µg/L	1	4/9/2012 8:10:20 PM
3,3'-Dichlorobenzidine	ND	50	µg/L	1	4/9/2012 8:10:20 PM
Diethyl phthalate	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Dimethyl phthalate	ND	50	μg/L	1	4/9/2012 8:10:20 PM
2,4-Dichlorophenol	ND	100	µg/L	1	4/9/2012 8:10:20 PM
2,4-Dimethylphenol	ND	50	μg/L	1	4/9/2012 8:10:20 PM
4,6-Dinitro-2-methylphenol	ND	100	µg/∟	1	4/9/2012 8:10:20 PM
2,4-Dinitrophenol	ND	100	μg/L	1	4/9/2012 8:10:20 PM
2,4-Dinitrotoluene	ND	50	µg/L	1	4/9/2012 8:10:20 PM
2,6-Dinitrotoluene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Fluoranthene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Fluorene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Hexachlorobenzene	ND	50	μg/L	a a	4/9/2012 8:10:20 PM
Hexachlorobutadiene	ND	50	μg/L	1:	4/9/2012 8:10:20 PM
Hexachlorocyclopentadiene	ND	50	μg/L	10	4/9/2012 8:10:20 PM
Hexachloroethane	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Indeno(1,2,3-cd)pyrene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Isophorone	ND	50	μg/L	1	4/9/2012 8:10:20 PM
1-Methylnaphthalene	ND	50	μg/L	40	4/9/2012 8:10:20 PM
2-Methylnaphthalene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
2-Methylphenol	ND	50	μg/L	1	4/9/2012 8:10:20 PM
3+4-Methylpheпol	81	50	μg/L	1	4/9/2012 8:10:20 PM
N-Nitrosodi-n-propylamine	ND	50	μg/L	1	4/9/2012 8:10:20 PM
N-Nitrosodimethylamine	ND	50	μg/L	1	4/9/2012 8:10:20 PM
N-Nitrosodiphenylamine	ND	50	μg/L	1	4/9/2012 8:10:20 PM
Naphthalene	ND	50	μg/L	1	4/9/2012 8:10:20 PM
2-Nitroaniline	ND	50	µg/L	:010	4/9/2012 8:10:20 PM
3-Nitroaniline	ND	50	μg/L	50 1	4/9/2012 8:10:20 PM
4-Nitroaniline	ND	100	μg/L	243	4/9/2012 8:10:20 PM
Nitrobenzene	ND	50	μg/L	24	4/9/2012 8:10:20 PM
2-Nitrophenol	ND	50	μg/L	=4	4/9/2012 8:10:20 PM
4-Nitrophenol	ND	50	μg/L	9	4/9/2012 8:10:20 PM
Pentachlorophenol	ND	100	μg/L	1	4/9/2012 8:10:20 PM
Phenanthrene	ND	50	μg/L	4	4/9/2012 8:10:20 PM

Matrix: AQUEOUS

Qualifiers:

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/26/2012

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 2nd Qtr 4-3-12

Lab ID: 1204158-001 Client Sample ID: Injection Well

Collection Date: 4/3/2012 1:20:00 PM

Received Date: 4/4/2012 10:15:00 AM Analyses Result **RL Qual Units** DF Date Analyzed **EPA METHOD 8270C: SEMIVOLATILES** Analyst: JDC ND 50 µg/L 1 4/9/2012 8:10:20 PM Pyrene ND 50 μg/L 1 4/9/2012 8:10:20 PM Pyridine ND 50 μg/L 4 4/9/2012 8:10:20 PM 1,2,4-Trichlorobenzene ND 50 µg/L 1 4/9/2012 8:10:20 PM 2,4,5-Trichlorophenol ND 50 1 μg/L 4/9/2012 8:10:20 PM 2,4,6-Trichlorophenol ND 50 μg/L 1 4/9/2012 8:10:20 PM Surr: 2,4,6-Tribromophenol 86.3 18.1-138 %REC 1 4/9/2012 8:10:20 PM Surr: 2-Fluorobiphenvi 68.2 25.9-101 %REC 1 4/9/2012 8:10:20 PM Surr: 2-Fluorophenol 56.9 12.5-93.2 %REC 1 4/9/2012 8:10:20 PM Surr: 4-Terphenyl-d14 74.6 29.5-112 %REC 1 4/9/2012 8:10:20 PM Surr: Nitrobenzene-d5 73.9 20.5-120 %REC 1 4/9/2012 8:10:20 PM Surr: Phenol-d5 50.1 11.5-73.2 %REC 1 4/9/2012 8:10:20 PM **EPA METHOD 8260B: VOLATILES** Analyst: JDJ Benzene ND 1.0 μg/L 1 4/6/2012 4:13:22 PM Toluene ND 1.0 μg/L 1 4/6/2012 4:13:22 PM Ethylbenzene ND 1.0 μg/L 1 4/6/2012 4:13:22 PM Methyl tert-butyl ether (MTBE) ND 1.0 μg/L 4/6/2012 4:13:22 PM 1 1,2,4-Trimethylbenzene ND 1.0 µg/L 4/6/2012 4:13:22 PM 1,3,5-Trimethylbenzene ND 1.0 μg/L 4/6/2012 4:13:22 PM 1,2-Dichloroethane (EDC) ND 1.0 μg/L 4/6/2012 4:13:22 PM 1,2-Dibromoethane (EDB) ND 1.0 μg/L 1 4/6/2012 4:13:22 PM Naphthalene ND 2.0 µg/L 1 4/6/2012 4:13:22 PM 1-Methylnaphthalene ND 4.0 µg/L 1 4/6/2012 4:13:22 PM 2-Methylnaphthalene ND 4.0 μg/L 1 4/6/2012 4:13:22 PM Acetone 78 10 μg/L 1 4/6/2012 4:13:22 PM Bromobenzene ND 1.0 μg/L 1 4/6/2012 4:13:22 PM Bromodichloromethane ND 1.0 µg/L 1 4/6/2012 4:13:22 PM Bromoform ND 1.0 μg/L 1 4/6/2012 4:13:22 PM Bromomethane ND 3.0 µg/L 1 4/6/2012 4:13:22 PM 2-Butanone ND 10 μg/L 1 4/6/2012 4:13:22 PM Carbon disulfide ND 10 μg/L 4/6/2012 4:13:22 PM Carbon Tetrachloride ND 1.0 μg/L 4/6/2012 4:13;22 PM Chlorobenzene ND 1.0 μg/L 4/6/2012 4:13:22 PM Chloroethane ND 2.0 μg/L 1 4/6/2012 4:13:22 PM Chloroform ND 1.0 μg/L 1 4/6/2012 4:13:22 PM Chloromethane ND 3.0 μg/L 4/6/2012 4:13:22 PM 2-Chlorotoluene ND 1.0 μg/L 4/6/2012 4:13:22 PM 4-Chlorotoluene ND 1.0 μg/L 4/6/2012 4:13:22 PM cis-1,2-DCE ND 1.0 μg/L 4/6/2012 4:13:22 PM cis-1,3-Dichloropropene ND 1.0 μg/L 4/6/2012 4:13:22 PM 1,2-Dibromo-3-chloropropane ND 2.0 μg/L 4/6/2012 4:13:22 PM

Matrix: AQUEOUS

Qualifiers:

- * X Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- T Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Analytical Report

Lab Order 1204158

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/26/2012

CLIENT: Western Refining Southwest, Inc.

Injection Well 2nd Qtr 4-3-12 Project:

Lab ID: 1204158-001 Client Sample ID: Injection Well

Collection Date: 4/3/2012 1:20:00 PM Received Date: 4/4/2012 10:15:00 AM

Analyses Result **RL Qual Units** DF Date Analyzed **EPA METHOD 8260B: VOLATILES** Analyst: JDJ Dibromochloromethane ND 1.0 μg/L 1 4/6/2012 4:13:22 PM Dibromomethane ND 1.0 μg/L 1 4/6/2012 4:13:22 PM 1,2-Dichlorobenzene ND 1.0 μg/L 1 4/6/2012 4:13:22 PM 1,3-Dichlorobenzene ND 1.0 µg/L 1 4/6/2012 4:13:22 PM 1,4-Dichlorobenzene ND 1.0 µg/L 1 4/6/2012 4:13:22 PM Dichlorodifluoromethane ND 1.0 μg/L 1 4/6/2012 4:13:22 PM 1,1-Dichloroethane ND 1.0 μg/L 1 4/6/2012 4:13:22 PM 1.1-Dichloroethene ND 1.0 μg/L 1 4/6/2012 4:13:22 PM 1,2-Dichloropropane ND 1.0 μg/L 1 4/6/2012 4:13:22 PM 1,3-Dichloropropane ND 1.0 μg/L 1 4/6/2012 4:13:22 PM 2,2-Dichloropropane ND 2.0 μg/L 1 4/6/2012 4:13:22 PM 1,1-Dichloropropene ND 1.0 4/6/2012 4:13:22 PM μg/L 1 Hexachlorobutadiene ND 1.0 μg/L 1 4/6/2012 4:13:22 PM 2-Hexanone ND 10 µg/L 1 4/6/2012 4:13:22 PM Isopropylbenzene ND 1.0 μg/L 1 4/6/2012 4:13:22 PM 4-isopropyltoluene ND 1.0 μg/L 4/6/2012 4:13:22 PM 4-Methyl-2-pentanone ND 10 μg/L 4/6/2012 4:13:22 PM Methylene Chloride ND 3.0 μg/L 1 4/6/2012 4:13:22 PM n-Butylbenzene ND 1.0 μg/L 1 4/6/2012 4:13:22 PM n-Propylbenzene ND 1.0 μg/L 1 4/6/2012 4:13:22 PM sec-Butylbenzene ND 1.0 μg/L 1 4/6/2012 4:13:22 PM Styrene ND 1.0 μg/L 1 4/6/2012 4:13:22 PM tert-Butylbenzene ND 1.0 µg/L 1 4/6/2012 4:13:22 PM 1.1.1.2-Tetrachloroethane ND 1.0 μg/L 1 4/6/2012 4:13:22 PM 1,1,2,2-Tetrachloroethane ND 2.0 µg/L 1 4/6/2012 4:13:22 PM Tetrachloroethene (PCE) ND 1.0 μg/L 1 4/6/2012 4:13:22 PM trans-1,2-DCE ND 1.0 μg/L 1 4/6/2012 4:13:22 PM trans-1,3-Dichloropropene ND 1.0 μg/L 1 4/6/2012 4:13:22 PM 1,2,3-Trichlorobenzene ND 1.0 μg/L 4/6/2012 4:13:22 PM 1,2,4-Trichlorobenzene ND 1.0 μg/L 4/6/2012 4:13:22 PM 1,1,1-Trichloroethane ND 1.0 μg/L 4/6/2012 4:13:22 PM 1,1,2-Trichloroethane ND 1.0 μg/L 4/6/2012 4:13:22 PM Trichloroethene (TCE) ND 1.0 μg/L 1 4/6/2012 4:13:22 PM Trichlorofluoromethane ND 1.0 μg/L 1 4/6/2012 4:13:22 PM 1,2,3-Trichloropropane ND 2.0 µg/L 4/6/2012 4:13:22 PM Vinyl chloride ND 1.0 µg/L 4/6/2012 4:13:22 PM Xylenes, Total ND 1.5 µg/L 4/6/2012 4:13:22 PM Surr: 1,2-Dichloroethane-d4 104 70-130 %REC 4/6/2012 4:13:22 PM Surr: 4-Bromofluorobenzene 118 70-130 %REC 4/6/2012 4:13:22 PM Surr: Dibromofluoromethane 114 69.8-130 %REC 4/6/2012 4:13:22 PM Surr: Toluene-d8 96.3 70-130 %REC 4/6/2012 4:13:22 PM

Matrix: AQUEOUS

Oualifiers:

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits

Spike Recovery outside accepted recovery limits

- R RPD outside accepted recovery limits
- S

- Analyte detected in the associated Method Blank В
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Analytical Report Lab Order 1204158

Date Reported: 4/26/2012

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 2nd Qtr 4-3-12

Lab ID: 1204158-001

Client Sample ID: Injection Well

Collection Date: 4/3/2012 1:20:00 PM

Received Date: 4/4/2012 10:15:00 AM

Result	RL Qua	al Units	DF	Date Analyzed
E				Analyst: JLF
2,900	0.010	µmhos/cm	1	4/6/2012 1:58:29 PM
				Analyst: JLF
6.91	1.68 H	pH units	1	4/6/2012 1:58:29 PM
				Analyst: JLF
330	20	mg/L CaCO3	1	4/6/2012 1:58:29 PM
ND	2.0	mg/L CaCO3	1	4/6/2012 1:58:29 PM
330	20	mg/L CaCO3	1	4/6/2012 1:58:29 PM
SOLIDS				Analyst: KS
2,120	200	mg/L	1	4/5/2012 5:03:00 PM
	E 2,900 6.91 330 ND 330 SOLIDS	E 2,900 0.010 6.91 1.68 H 330 20 ND 2.0 330 20 SOLIDS	E 2,900 0.010 µmhos/cm 6.91 1.68 H pH units 330 20 mg/L CaCO3 ND 2.0 mg/L CaCO3 330 20 mg/L CaCO3	E 2,900 0.010 µmhos/cm 1 6.91 1.68 H pH units 1 330 20 mg/L CaCO3 1 ND 2.0 mg/L CaCO3 1 330 20 mg/L CaCO3 1 OND 2.0 mg/L CaCO3 1 OND 2.0 mg/L CaCO3 1

Matrix: AQUEOUS

Qualifiers:

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Page 6 of 20

Analytical Report Lab Order 1204158

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 4/26/2012

CLIENT: Western Refining Southwest, Inc.

Injection Well 2nd Qtr 4-3-12

Lab ID: 1204158-002

Project:

Client Sample ID: Trip Blank

Collection Date:

Matrix: AQUEOUS Received Date: 4/4/2012 10:15:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Analyst: JD.
Benzene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Toluene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Ethylbenzene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Naphthalene	ND	2.0	μg/L	1	4/6/2012 4:41:46 PM
1-Methylnaphthalene	ND	4.0	μg/L	1	4/6/2012 4:41:46 PM
2-Methylnaphthalene	ND	4.0	μg/L	1	4/6/2012 4:41:46 PM
Acetone	ND	10	μg/L	1	4/6/2012 4:41:46 PM
Bromobenzene	ND	1.0	µg/L	1	4/6/2012 4:41:46 PM
Bromodichloromethane	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Bromoform	ND	1.0	μg/L	11	4/6/2012 4:41:46 PM
Bromomethane	ND	3.0	μg/L	1	4/6/2012 4:41:46 PM
2-Butanone	ND	10	μg/L	1	4/6/2012 4:41:46 PM
Carbon disulfide	ND	10	μg/L	1	4/6/2012 4:41:46 PM
Carbon Tetrachloride	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Chlorobenzene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Chloroethane	ND	2.0	μg/L	1	4/6/2012 4:41:46 PM
Chloroform	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Chloromethane	ND	3.0	μg/L	1	4/6/2012 4:41:46 PM
2-Chlorotoluene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
4-Chlorotoluene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
cis-1,2-DCE	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	4/6/2012 4:41:46 PM
Dibromochloromethane	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Dibromomethane	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,2-Dichlorobenzene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,3-Dichlorobenzene	ND	1.0	μg/L	Ť	4/6/2012 4:41:46 PM
1,4-Dichlorobenzene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Dichlorodifluoromethane	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,1-Dichloroethane	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,1-Dichloroethene	ND	1.0	μg/L	11	4/6/2012 4:41:46 PM
1,2-Dichloropropane	ND	1.0	μg/L	10	4/6/2012 4:41:46 PM
1,3-Dichloropropane	ND	1.0	μg/L	16	4/6/2012 4:41:46 PM
2,2-Dichloropropane	ND	2.0	μg/L	1	4/6/2012 4:41:46 PM
1,1-Dichloropropene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Hexachlorobutadiene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
2-Hexanone	ND	10	μg/L	1	4/6/2012 4:41:46 PM

Qualifiers:

- [®]/X Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Reporting Detection Limit

Analytical Report

Lab Order 1204158

Date Reported: 4/26/2012

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Trip Blank **Collection Date:**

Project: Injection Well 2nd Qtr 4-3-12

Lab ID: 1204158-002 Matrix: AQUEOUS Received Date: 4/4/2012 10:15:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	 }				Analyst: JD
Isopropylbenzene	ND	1.0	μg/L	- 11	4/6/2012 4:41:46 PM
4-Isopropyltoluene	ND	1.0	µg/L	3	4/6/2012 4:41:46 PM
4-Methyl-2-pentanone	ND	10	μg/L	1	4/6/2012 4:41:46 PM
Methylene Chloride	ND	3.0	μg/L	4	4/6/2012 4:41:46 PM
n-Butylbenzene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
n-Propylbenzene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
sec-Butylbenzene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Styrene	ND	1.0	µg/L	1	4/6/2012 4:41:46 PM
tert-Butylbenzene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L	1	4/6/2012 4:41:46 PM
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	4/6/2012 4:41:46 PM
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
trans-1,2-DCE	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,1,1-Trichloroethane	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,1,2-Trichloroethane	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Trichloroethene (TCE)	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
Trichlorofluoromethane	ND	1.0	μg/L	1	4/6/2012 4:41:46 PM
1,2,3-Trichloropropane	ND	2.0	μg/L	1	4/6/2012 4:41:46 PM
Vinyl chloride	ND	1.0	µg/L	1	4/6/2012 4:41:46 PM
Xylenes, Total	ND	1.5	μg/L	.1	4/6/2012 4:41:46 PM
Surr: 1,2-Dichloroethane-d4	103	70-130	%REC	1	4/6/2012 4:41:46 PM
Surr: 4-Bromofluorobenzene	105	70-130	%REC	1	4/6/2012 4:41:46 PM
Surr: Dibromofluoromethane	117	69.8-130	%REC	1	4/6/2012 4:41:46 PM
Surr: Toluene-d8	103	70-130	%REC	1	4/6/2012 4:41:46 PM

Qualifiers:

- */X Value exceeds Maximum Contaminant Level.
- Value above quantitation range
- J Analyte detected below quantitation limits

Spike Recovery outside accepted recovery limits

- R RPD outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit
- Reporting Detection Limit

CASE NARRATIVE

April 23, 2012

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com FL NELAP

E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM

Project Tracking No.: 120406030

Anatek Batch: 1204158

Project Summary: One (1) water sample was received on 4/6/2012 for metals (EPA 6020A) analysis. The sample was received in good condition and with the appropriate chain of custody The sample was received at 1.5C.

Client Sample ID

Anatek Sample ID Method/Prep Method SW846 Ch7/EPA 1010/EPA 150.1

1204158-001E / Injection Well 120406030-001

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Υ	NA
Tune(s) Valid?	NA	NA
Internal Standard Responses Valid?	NA	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Υ	NA
Comments:	Υ	NA

1. Holding Time Requirements

No problems encountered.

2. GC/MS Tune Requirements

N/A.

3. Calibration Requirements

No problems encountered.

4. Surrogate Recovery Requirements

N/A

5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

6. Method Blank Requirements

The method blanks were non-detect (<MDL) for all analytes. No problems encountered.

7. Int	lemai S	Standard	(8)	Respons	e Regui	rements
--------	---------	----------	-----	---------	---------	---------

N/A.

8. Comments

No problems encountered.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by:

Page 2 of 14

Nolw. Cost

Anatek Labs, Inc.

1282 Alturas Drive · Moscow, ID 83843 · (208) 883-2839 · Fax (208) 882-9246 · email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: Address: HALL ENVIRONMENTAL ANALYSIS LAB

4901 HAWKINS NE SUITE D

Project Name:

120406030

ALBUQUERQUE, NM 87109

Batch #:

1204158

Attn:

ANDY FREEMAN

Analytical Results Report

Sample Number

120406030-001

Sampling Date Sampling Time 4/3/2012 1:20 PM Date/Time Received

4/6/2012

10:25 AM

Client Sample ID Matrix

1204158-001E / INJECTION WELL Water

Sample Location

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	0.1	4/17/2012	CRW	SW846 CH7	
Flashpoint	>200	°F		4/9/2012	KFG	EPA 1010	
pH	6.58	ph Units		4/11/2012	KFG	EPA 150.1	
Reactive sulfide	4.07	mg/L	1	4/9/2012	गा	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL

EPA's Maximum Contaminant Level Not Detected

ND

Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.

The results reported relate only to the samples indicated.

Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Anatek Labs, Inc.

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Client: Address: HALL ENVIRONMENTAL ANALYSIS LAB

4901 HAWKINS NE SUITE D

ALBUQUERQUE, NM 87109

Attn:

ANDY FREEMAN

Batch #:

120406030

Project Name:

1204158

Analytical Results Report Quality Control Data

Lab Control Sa	mpie								-		
Parameter		LCS Result	Units	LCS	Spike	%Rec	AR	%Rec	Prep	Date	Analysis Date
Cyanide (reactive)		0.524	mg/L	. 0	.5	104.8	80	-120	4/17/	2012	4/17/2012
Reactive sulfide		0.180	mg/L	. 0	.2	90.0	70	-130	4/9/2	2012	4/9/2012
Matrix Spike			_	·							
Sample Number	Parameter		Sample Result	MS Result	Unii	_	MS	4/ Dan	AR	Been Dete	
120406030-001	Reactive sulfide		4.07	7.33		_	Spike 4.07	%Rec 80.1	%Rec 70-130	Prep Date 4/9/2012	
120406030-001	Cyanide (reactive)		ND	7.33 0.484	mg/		4.07 0.5	96.8	70-130 80-120	4/9/2012 4/17/2012	4/9/2012
				0.707	mg/		0.0	30.0	00-120	4/1//2012	4/17/2012
Matrix Spike Du	plicate										M
Parameter		MSD Result	Units	MSD Spike	%R	ec.	%RPD	AR %RPD) Pre	p Date	Analysis Date
Cyanide (reactive)		0.487	mg/L	0.5	97	.4	0.6	0-25		7/2012	4/17/2012
Method Blank			 _							-	 .
Parameter			Res	sult	Ur	nits		PQL	Pr	ep Date	Analysis Date
Cyanide (reactive)			N	D	m	g/L		0.1		7/2012	4/17/2012
Reactive sulfide			M	D		J/kg		1	AH	3/2012	4/9/2012

AR ND Acceptable Range

PQL

Not Detected **Practical Quantitation Limit**

Relative Percentage Difference

Certifications held by Anatek Labs ID: EPA:/D00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0026; NM: ID00013; OR:ID200001-002; WA:C995 Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C995; MT:Cert0095

Anatek Labs, Inc.

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Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB

Order ID:

120406030

4901 HAWKINS NE SUITE D

Order Date:

4/6/2012

ALBUQUERQUE

NM 87109

Contact Name; ANDY FREEMAN

Project Name: 1204158

Comment:

Sample #: 120406030-001 Customer Sample #:

1204158-001E / INJECTION WELL

Recv'd:

M

Collector:

Date Collected:

4/3/2012

Quantity:

3

Water Matrix:

Date Received:

4/6/2012 10:25:00 A

Comment

Test	Lab	Method	Due Date	Priority
CYANIDE REACTIVE	М	SW846 CH7	4/18/2012	Normal (6-10 Days)
FLASHPOINT	М	EPA 1010	4/18/2012	Normal (6-10 Days)
pH	M	EPA 150.1	4/18/2012	Normal (6-10 Days)
SULFIDE REACTIVE	M	SW846 CH7	4/18/2012	Normal (6-10 Days)

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	1.5
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes



CHAIN OF CUSTODY RECORD PAGE:

120406 030 HALL List al december Tahandaru 4/18/2012

1204158 1st SAMP

4/3/2012 1st RCVD 4/6/2012

φ : œ [[] HEI 10 CITY, STATE, ZD: MOSCOW, ID 83843 sus commarce: Anatek Labs ø, 1204158-001E Injection Well SAMPLE 1282 Alturas Dr CLENT SAMPLE ID MUBS COMPANY: Anatek Labs, Inc. MICHIEN BOTTLE TYPE Aqueous: 4/3/2012 1:20:00 PM MATRIX COLLECTION DATE HOM ACCOUNT #: 13 RCI, PLEASE PROVIDE LEVEL 4 DATA PACKAGE Ö T CONTAINERS 0 0 0 0 0 (208) 883-2839 ANALYTICAL COMMENTS Y.X HAME: (208) 882-9246

TAT	Relinquisted By:	Refreguend By	To the state of th	ioe. Thank you.
State of C	Dutez	Dute	D	DATA PACKAGE
RUSH	These:		182 1821 2017	Please include t
Next HD 🗆	Received By:	Received By:	Received By:	he LAB ID and the
NUMBER OF CONTAINERS: 2 SHIPPED VIA: DATE & TIME: 4/6//2 /0/25 INSPECTED BY:	NO HEADSPACE	RECEIVED INTACT TEMP: (ANATEK LABS RECEIVING LIST	PLHANE PROVIDE QC DATA PACKAGE, Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please countly to inhallenvironmental.com. Please return all coolers and blue ice. Thank you.
NSPECTED BY: 37	y Seed w	15 °C		lab@balleuviromnen

THE ALLEGED TO SEE THE STREET OF THE SECONDARY OF THE SEC

Peak Table: Cyanide

File name: T:\DATA1\FLOW4\2012\EPA335.4\041712CN.RST \ \%

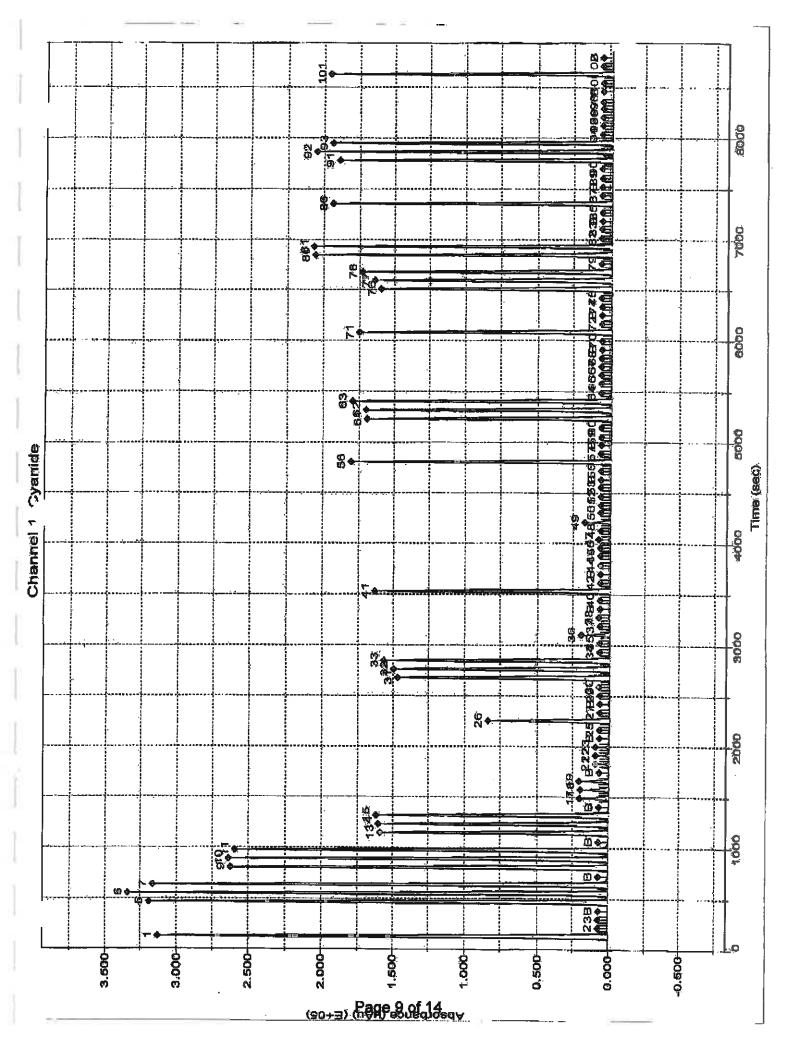
120417FIAGNR

Date: Unknown Operator: CRW

1									
ď	Pøsk -	Cup	Name	Type	Dil Wt		Area	Calc.	(ppm)
q	1	2	Sync	SYNC	1	1	7.340982		0.993448
1	2	Q.	Carryover	CO	1	1	20703		0.004003
2	3	0	Carryover	CO	1	1	3005		0.001611
	B	Ö	Baseline	RB	1	1	-85		0.001193
٦	5	2:	Cal 1.00 ppm	Œ	1	1	7341324		0.993494
Н	6	2	Cal 1.00 ppm	C	1	1	7423772		1.004638
ň	7	2	Cal 1,00 ppm	C	1	1	7353090		0.995085
	В	Ö	Baseline	RB.	1	1	2192		0.001501
1	9	3	Cal 0.80 ppm	E	1	1	5925124		0.802074
Н	10	3	Cal 0.80 ppm	C	1	1	5922326		0.801696
4.0	11	3.	Cal 0.80 ppm	C	1	1	5958631		0.806603
	B	O.	Baseline	RB	1	1	2137		0.001494
7	13	4	Cal 0.50 ppm	Ċ.	1	1	3660841		0.496022
ı	14	4	Cal 0.50 ppm	e e	1	1	3657522		0.495574
	15 ⁻ B	<u>4</u> 0	Cal 0.50 ppm Baseline	C RB	1	1	3609600		0.489096
	17	5	Cal 0.05 ppm	C.	1.	1	748 328263		0.001306
1	18	5 5			1 1	1			0.045575
ı	1.9	-7 -5	Cal 0.05 ppm Cal 0.05 ppm	<u> </u>	i	1	326642 308151		0.045355
ė.	8	Ö	Baseline	RB	1	1	-634		0.042856
	21	16	Cal 0.01 ppm	C	i	1	64563		0.001119 0.009932
ï	22	6	Cal 0.01 ppm	C	i	1	67778		0.009932
1	23	6	Cal 0.01 gpm	Ö	i	i	65516		0.010060
	B	ã	Baseline	RB	i	i	1296		0.001380
	25	1	Blank	BLNK	i	ī	807		0.001314
1	26	7	ICV 0.25 ppm	ÇCV	ī	î	1845790		0.250691
ı	27	1	Blank	BLNK	ī	î	-1678		0.000978
	.— · 186	ā	Baseline	RB	ī	ī	-77		0.001194
	29	8	120406012-BL WW	U	ī	ī	-3082		0.000788
ſ	.3t i		120406012-001	Ū	<u>-</u>	ī	3990		0.001744
l	31	10	120406012-001MS	Ū	<u>.</u>	ī	3561078		0.482538
7	32	11	120406012-001MSt		1	~ 1	3567900		0.483460
	3.3	12	120406012-LCS	U	1 ¯	1	3647397		0.494205
Ī	34		120406018-005	U	1	1	3.683		0.001703
ſ.	3:5		120406019-001	U	.i	i	4553		0.001820
٠.	36	15	120410036-001	Ù	1	1	299712		0.041716
5	37	16	120410036-002	घ	1	1	3173		0.001634
II.	3.8	17	r120410096-004	Ú	1	1	24165		0.004471
Ĺ	B	Ø	Baseline	RB	i	1	-3.68		0.001155
	4,0	1	Blank	BLNK	1	1	983		0.001338
	41	4	CCV 0.5 ppm	CCV	1	1	3714273		0.503244
	42	1	Blank	BLNK	<u>1</u>	1	431		0.001263
	В	O	Read Baseline	RB.	<u>.</u> 1 1	1	1.398		0.001394
	44		120410036-005	Ų	1	1	-1573		0.000992
	45		120410036-006	U	1	1	-1532		0.000998
	4.6		120410036-007	U	1 1	1	2194		0.001501
	47		120410036-008	ਧੁ	1	111111111	28664		0.005079
	48 49		120410026-001	Ŭ	1	7	2741		0.001575
	4. 9 50		120406005-002 120413009-001	Ū	<u>1</u> 1	.1	237933		0.033365
	50 51		120413009-001	Ų Ų	1. -	1	-226		0.001174
	51 52		120413009-002	U	1	1 1 1 1 1 1 1	385		0.001257
	53.		120413034-002	.D	+	7	140		0.001224
	B.	Ō,	Baseline	RB	1 1 1	+	1089		0.001352
П	- 55	ì		BLNK	า๋	1	1830 1672		0.001452
ŀ.	56	4		CCV	· - i	4	3719207		0.001431
	57	ī		BLNK	1 1 1	i	1762		0.503911
	Ē.	ō		RB	† 1	ī	-73		0.001443
	59	28	120410034-BL s	บ	1	1	-/3 -/649		0.001193
	60	29		ū	ī	ī	1710		0.001117
	61	30		Ū	1.	1	3575736		0.484519
	62	31	120410034-001MSD		1	ī	3623661		0.490997
	63	32		p	1	1	3705408		0.502046
	64	33		ប៊	ī	ī	9088		0.002433
	65	34	· · · · · · · · · · · · · · · · · · ·	ט	ī	1	9813		0.002531
	66	35		U	1	ī	9256		0.002331
		-		•	Page 7 of 14	_			
					U				

?eak	Cup	Name	Туре	Dil	Wt	A	rea	Calc.	(ppm)
57	3,6	120410034-005	U		1	1	9152		0.002442
58	37	120410034-006	Ų		i	1	4183		0.001770
3	Ó	Baseline	RB		1	1	-748		0.001104
10	1	Blank	BLNK		1	1	-1817		0.000959
7:	4	CCV 0.5 ppm	CCV		1	1	3747205		0.507696
12	1.	Blank	BLNK		1	1	-2994		0.000800
3	Ø.	Read Baseline	RB		1.	1	1278		0.001378
74	3.8	120406030-BL R	U.		1	1	-3049		0.000793
75	39	120406030-001	Ū		1	1	5701		0.001976
16	40	120406030-001MS	U		1	1.	3575297		0.484460
17	41	120406030-001MSE	U		1	1	3597145		0.487413
7.8	42	120406030-LCS	Ų		1	1	3866508		0.523821
79.	43	+120406011-001 SP	ŧ IJ		1	1,	5924		0.002006
3.0	44		U		1	1.	3678616		0.498425
11	45	4120406011-001MSE	Ŭ		1	1	3,678327		0.498386
3.2	4.6	1,20410034-007	U		ĭ	1	5933		0.002007
13:	47	120410034-008	Ų.		1	1	4419		0.001802
3	Ø.	Baseline	RB		1.	1.	215		0.001234
3,5	1	Blank	BLNK		i.	1	-427		0.001147
16	4	GGV Ö.5 ppm	CCV		1	1	3741463		0.506919
17	1	Blank	BLNK		1	1	-1737		0.000970
3	Q	Read Baseline	RB		1	1	1272		0.001377
39	48	120406004-BL F	U.		1	1	-2388		0.000882
10	49	120406004-001	U		1	1	-1760		0.000967
31	5.0	120406004-001MS	U		1	1	3604604		0.488421
32	51	120406004-001MSD	TJT		1	. 1	3904438		0.528948
13	52		Ú		1	1 1	3686414		0.499479
34	53		U.		1	ï	-2654		0.000846
≱ 5	5.4		\mathbf{v}		1	1	-2148		0.000915
36	55	120416014-001	U		1	1	-6720		0.000297
37/	56		ប		1	1	-7727		0.000160
38	57		U.		1 1	1	-3664		0.000710
3	O.		RB		1	1	1221		0.001370
١c	ì		BLNK		1	1	764		0.001308
LC	4		CCV		1	1	3692458		0.500296
L02	1		BĽNK		1	Ĩ.	-473		0.001141
3	Ö	Read Baseline	RB		.ı	1	1515		0.001410

	eak	Cup	Flags
	L	2	
	<u>3</u> :	0.	
	3	O	
	š 5	Ό	BL
	5	2	
	5	2	
	7	2	£
	3	Ö.	BL
	3	3	
	LO.	.5 ~	
	<u>[1</u>	2 2 2 0 3 3 3 0	BL
		4	DL
	L3: L4	4	
J	15	4	
	35.		BL
	Ĺ7	0 5 5 0	
	L·B.	.5	
j	L9	5	OI,
	3:	ô	BL
	2.1	-6	
	21 22 2;	6 6	OL
	3.	6	
	3	,O	BĻ
i	25	1	
	2:6	7 1 0	25
	27	1	
	3		BL
ļ	29	8	



Cyanade: Caribration, reak b-105

File name: T:\DATA1\FLOW4\2012\EPA335.4\041712CN.RST

Date: Unknown Operator: CRW

*	mė		Conc	Area
_				
*	Cal 1.00	mag (1.000000	7341324.500000
*	Cal 1.05	ppm	1.000000	7423772.000000
*	Cal 1.00	ppm	1.000000	7353090.000000
÷	Cal .0.86	ppm (0.800000	5925124.500000
*	Cal 0.50	mgg (0.800000	5922325.500000
*	Cal 0.80	mag	0.800000	5958631.000000
dr	Cal 0.50	mqq	0.500000	3660840.750000
*	Cal 0.50	ingga i	0.500000	3657522.500000
.4	Cal 0.50	ppm	0.500000	3609599.750000
Ŕ	Cal 0.D5	ppm	0.050000	328263.187500
*	Cal 0.05	ppm	0.050000	326642.125000
*	Cal 0.05	ppm	0.050000	308151.312500
*	Cal 0.01	ppm	0.010000	64563.222656
ric.	gal 0.01	ppm	0.010000	67778.046875
*	Cal 0.01		0.010000	65516.265625
		- -		•

Calib Coef:

yabx+a

a: (intercept) -8.9144e+03 b: 7.3984e+06

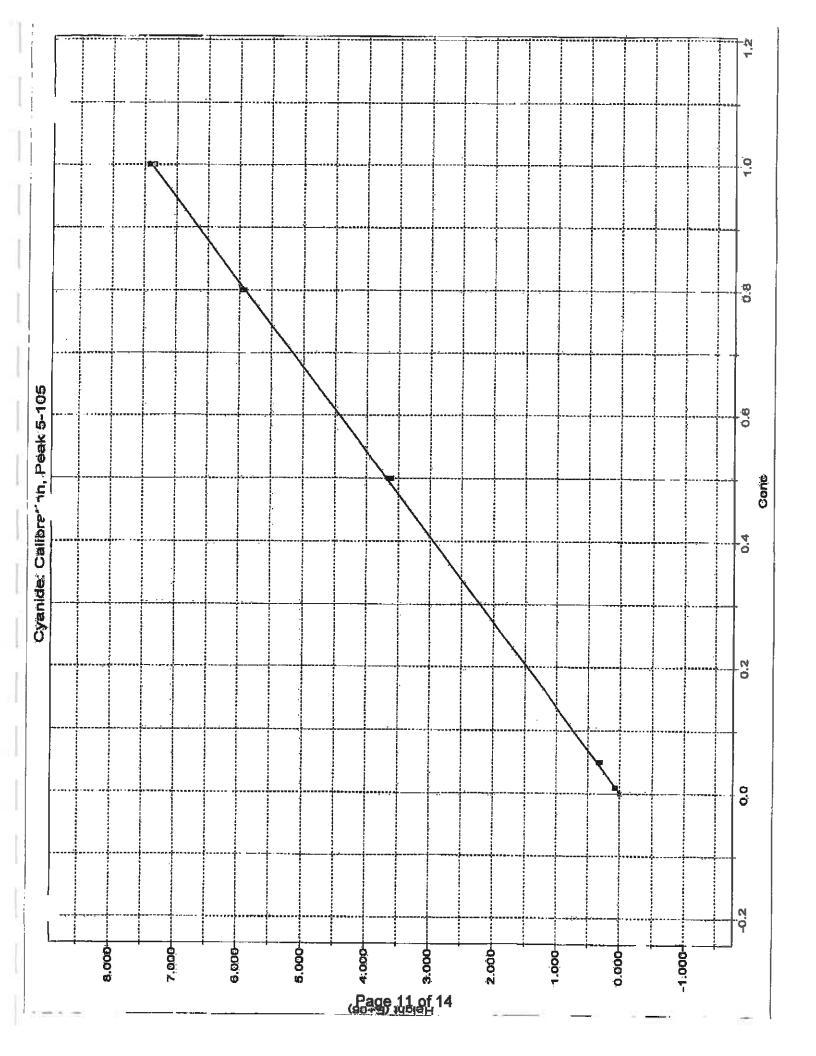
Corr Coef:

0.999935

Carryover:

0.282%

No Drift Peaks



Flashpoint Analysis

, ž ,

Sample Matrix - Soil (1), Sludge (2), Oil (3), Water (4), Other (5)

Sample ID	Analyses Date	Sample Matrix	Analyst Initials	Temp - °C	Temp - °F
11127915-01	1430/11	SOIL	70		BI°F
/1/222023-04	12-38-11	Or L	21		NO
(11221030.41	12-20-41	4	149		NO
120105039-0-1	1/9/12	415	15,-		>200
1 -052		5			Resmitemp
-0:2		5	140		7:20:
1201909-01	2-2-242	4	m/H		7346
1301260110	1.7.12	· · ·	2		775
- / -		y y	1		1841
(12 m) 20 c	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	liq.	R,		12.17
1202 0036-01	1 - 1 - 12	5 buter	Jan-		134°F
17.0773015-001	3/6/12	Waterly	hh		>200°F
-002	3 02 (1)	· · · · · · · · · · · · · · · · · · ·	+		>200°F
12022 7016-001	3/7/12		12		15°F
1202280%-001	2/1/12	Liquid/5	Person		1515
	3/1/12	Whta/4			1447/2
120708037-00	3/14/12	- 14 M / 5	non		> 10005
120378059001		1441/2			7 00°F
1'03 3.024-0g		Lagd/5	1-	· .	1375
23215059-201	3/27/12	Lipsed/49			7200°F
-002	21 2/162	4/H20	M		>300gf
-003		 			7106°F
[20406030-00]	19/12	E/120	1/2	•.	7200°F
20418734-00			M		72000F
120413/36-002					
113036 00.4		5/Liguid			
					

^{*} SAFETY GLASSES REQUIRED.

Reagent	Solution #	Expires	Method	Method QC Requirements:
pH Buffer 4 (Red)	M826-05	Jan 2013	IpH 7 within 0.1 pH units	B LFB/Blank even 10
pH Buffer 7 (Yellow)	M826-04	Jan 2013	Slope 95-102%	
pH Buffer 10 (Blue)	M827-01	Aug 2012		% Recovery 85-115%
0.02N H2SO4 Titrant	A040-03	Oct-12		
Standard	Solution #	Corre.	Expires	Amount Spiked (mg/L)
atrix Spike Solution	M637-04	N.	11/18/2012	100
Contrib	irette: CAT 10uL, si	n 600055 - pH Metr	Contriburette: CAT 10uL, sn 600055 - pH Meter: Orion Model 620A, sn 007858	007858

				1			·				(4/)	<u>.</u>			 	
	. %															
	Hydroxide							\parallel								
y (mg/L)	BI- carbonate						1									
Alkalinity (mg/L)	Carbonate													T		
	Total															
(mL)	4.2											/		1		
Titrant vol to pH (mL)	4.5										X					
Titran	85 55	_					Ų			/						
	Sample Vol. (mL)	がか	53.1.25			4				25m2			-	Sa in Sal		
	pH 7 Buffer	80%				7				7,04				1		
	Slope	9/10				-1				ある			1	},		
	pH 10 Cal	00'01				1				16,00				1		
	pH 4 Cal	4,00				7				907,			-	-1		
		10,74	0,70	8,8	8,37	8,54				213	853	7,49		6,66		
	Temp (°C)	0,8)	9'2]	(78	14,0	(8,5	T			00/2	20,7	7002				
	Sample	120306027-00	-002	700-07070802	720-	R0308040-00/	DOUGHOSS-001	12041/1030-1201	Calbon and	100-860504071	120405030-001	120HODDH-ODI	1204/10 Hg-001	120409015-06/ 20,8		

Analysis Date: 3/|U//2| - U/|U/|2 C. Documents and SettingskrisgibeskloppH-AW Bench Sheet with Calcs-protection.xis

Analyst

Sulfide by SM 4500-S' F

	Concentration	Date Made/Expires
Iodine	0.025 N	
HCI	6 N	
Starch Indicator	1% by weight	12/31/2009
Zinc Acetate 99.9%	99.9%	

Quality Control Information

- 1. 1 blank per batch, must be < 20 ug/L.
- 2. 1 LFB per batch must be +/- 30%.
- 3. Iml iodine reacts with 0.4 mg Sulfide

Sample	Sample Volume	ledine amount (50 uL increments)	Concentration (ug/sample)	Concentration (mg/L)	Date	Initials
1-1204-25021-1	579.1	2	700 - 0.02	O. W. 309	4.4.13	
186	-	254		_	-	V . V
577.	1000	05h	(48) 6.180	0,190		
-6150		450	180 0.130	0.180		
-27	P	50	20 8.02	0.02		
1-12.000h	47.1	500	2000 0.200	4.07		
-1/45	1	200	360 0.360	7.33		+

Comments 120409 1125 R

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1204158

26-Apr-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-3-12

Result

Sample ID MB

SampType: MBLK

TestCode: EPA Method 300.0: Anions

LowLimit

Client ID: **PBW**

Batch ID: R1922

RunNo: 1922

PQL

Prep Date: Analyte

Analysis Date: 4/4/2012

SeqNo: 53441

Units: mg/L

Chloride

ND 0.50 %REC

LowLimit HighLimit %RPD

%RPD

RPDLimit

Qual

Sulfate

ND 0.50

Sample ID LCS

SampType: LCS

TestCode: EPA Method 300.0: Anions

Client ID: LCSW

Batch ID: R1922

RunNo: 1922

Prep Date:

Analysis Date: 4/4/2012

9.8

SPK value SPK Ref Val

SeqNo: 53442

Units: mg/L

L	Analyte
	Chloride

Result PQL SPK value SPK Ref Val 4.8

%REC 95.5

HighLimit 110 **RPDLimit** Qual

Sulfate

0.50 5.000 10.00 0.50

97.6

0

90 110

Qualifiers:

R

*/X Value exceeds Maximum Contaminant Level.

Ε Value above quantitation range

J Analyte detected below quantitation limits RPD outside accepted recovery limits

RL

Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit Reporting Detection Limit

Page 9 of 20

Hall Environmental Analysis Laboratory, Inc.

WO#:

1204158

26-Apr-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-3-12

Ī	Sample ID 5ml rb	SampT	уре: Мі	BLK	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
H	Client ID: PBW	Batch	ID: R1	980	F	RunNo: 1	980				
H	Prep Date:	Analysis D	ate: 4/	6/2012	\$	SeqNo: 5	5138	Units: µg/L			
ıL	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
В	enzene	ND	1.0								
T	oluene	ND	1.0								
E	thylbenzene	ND	1.0								
M	ethyl tert-butyl ether (MTBE)	ND	1.0								
1,	2,4-Trimethylbenzene	ND	1.0								
_ 1,	3,5-Trimethylbenzene	ND	1.0								
	2-Dichloroethane (EDC)	ND	1.0								
1,	2-Dibromoethane (EDB)	ND	1.0								
	aphthalene	ND	2.0								
1-	Methylnaphthalene	ND	4.0								
2-	Methylnaphthaiene	ND	4.0								
A	cetone	ND	10								
В	romobenzene	ND	1.0								
Bı	romodichloromethane	ND	1.0								
В	omoform	ND	1.0								
Bi	omomethane	ND	3.0								
2-	Butanone	ND	10								
Ca	arbon disulfide	ND	10								
C	arbon Tetrachloride	ND	1.0								
CI	nlorobenzene	ND	1.0								
CI	nloroethane	ND	2.0								
CI	nloroform	ND	1.0								
Cl	loromethane	ND	3.0								
2-	Chlorotoluene	ND	1.0								
4-	Chlorotoluene	ND	1.0								
Cis	-1,2-DCE	ND	1.0								
cis	-1,3-Dichloropropene	ND	1.0								
1,	2-Dibromo-3-chloropropane	ND	2.0								
Di	bromochloromethane	ND	1.0								
Di	bromomethane	ND	1.0								
1,2	2-Dichlorobenzene	ND	1.0								
1,3	3-Dichlorobenzene	ND	1.0								
1,4	1-Dichlorobenzene	ND	1.0								
Di	chlorodifluoromethane	ND	1.0								
1,	I-Dichloroethane	ND	1.0								
1,	l-Dichloroethene	ND	1.0								
1,2	2-Dichloropropane	ND	1.0								
1,3	3-Dichloropropane	ND	1.0								
2,2	?-Dichloropropane	ND	2.0								
1,′	-Dichloropropene	ND	1.0								
He	xachlorobutadiene	ND	1.0								

Qualifiers:

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Page 10 of 20

Hall Environmental Analysis Laboratory, Inc.

WO#:

1204158

26-Apr-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-3-12

Sample ID 5ml rb	Samp1	Type: ME	BLK	Tes	tCode: El	PA Method	8260B: VOL	ATILES		<u> </u>
Client ID: PBW	Batcl	h ID: R1	1980	F	RunNo: 1	980				
Prep Date:	Analysis D)ate: 4/	/6/2012	8	SeqNo: 5	5138	Units: µg/L			
Analyte	Result	PQL		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Hexanone	ND	10								_
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Buty/benzene	ND	1.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	10		10.00		104	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		115	70	130			
Surr: Dibromofluoromethane	11		10.00		107	69.8	130			
Surr: Toluene-d8	8.7		10.00		87.1	70	130			
Sample ID 100ng Ics	Tame2	ype: LC:		Top!	2-4-: EE					
Sample in Toung ics	Sampi	ype. Lu.	5	1621	Code: Er	'A Methou	8260B: VOLA	ATILES		

1000		3,50		TOTOGO. E. A MIGHIOG DECED. FOLATIELD						
Client ID: LCSW	Batcl	h ID: R1	980	F	RunNo: 1	980				
Prep Date:	Analysis D	Date: 4/	6/2012	8	SeqNo: 5	5139	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	19	1.0	20.00	0	97.3	84.1	126			
Toluene	19	1.0	20.00	0	97.2	80	120			
Chlorobenzene	21	1.0	20.00	0	104	70	130			
1,1-Dichloroethene	20	1.0	20.00	0	97.9	83	130			
Trichloroethene (TCE)	18	1.0	20.00	0	90.2	76.2	119			
Surr: 1,2-Dichloroethane-d4	9.3		10.00		92.6	70	130			
Surr: 4-Bromofluorobenzene	13		10.00		127	70	130			

Qualifiers:

- */X Value exceeds Maximum Contaminant Level,
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

RPDLimit

1204158

26-Apr-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-3-12

Sample ID 100ng ics

SampType: LCS

TestCode: EPA Method 8260B: VOLATILES

LowLimit

70

Client ID:

Batch ID: R1980

LCSW

RunNo: 1980

%REC

Prep Date:

Analysis Date: 4/6/2012

SeqNo: 55139

Units: µg/L

Analyte Surr: Dibromofluoromethane Surr: Toluene-d8

Result SPK value SPK Ref Val 10 10.00 9.4 10.00

103 69.8 93.5

HighLimit 130 130 %RPD

Qual

Qualifiers:

°/X Value exceeds Maximum Contaminant Level.

Value above quantitation range Ε

Analyte detected below quantitation limits

R RPD outside accepted recovery limits В Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1204158

26-Apr-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-3-12

Sample ID mb-1425	SampT	ype: ME	3LK	TestCode: EPA Method 8270C: Semivolatiles						
Client ID: PBW	Batch	ID: 14	25	RunNo: 1991						
Prep Date: 4/9/2012	Analysis D	ate: 4/	9/2012	\$	SeqNo: 5	5578	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10	-		_					
Acenaphthylene	ND	10								
Aniline	ND	10								
Anthracene	ND	10								
Azobenzene	ND	10								
Benz(a)anthracene	ND	10								
Benzo(a)pyrene	ND	10								
Benzo(b)fluoranthene	ND	10								
Benzo(g,h,i)perylene	ND	10								
Benzo(k)fluoranthene	ND	10								
Benzoic acid	ND	20								
Benzyl alcohol	ND	10								
Bis(2-chloroethoxy)methane	ND	10								
Bis(2-chloroethyl)ether	ND	10								
Bis(2-chloroisopropyl)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	10								
4-Bromophenyl phenyl ether	ND	10								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								
4-Chloro-3-methylphenol	ND	10								
4-Chloroaniline	ND	10								
2-Chloronaphthalene	ND	10								
2-Chlorophenol	ND	10								
4-Chlorophenyl phenyl ether	ND	10								
Chrysene	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Dibenz(a,h)anthracene	ND	10								
Dibenzofuran	ND	10								
1,2-Dichlorobenzene	ND	10								
1,3-Dichlorobenzene	ND	10								
1,4-Dichlorobenzene	ND	10								
3,3'-Dichlorobenzidine	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
2,4-Dichlorophenol	ND	20								
2,4-Dimethylphenol	ND	10								
4,6-Dinitro-2-methylphenol	ND	20								
2,4-Dinitrophenol	ND	20								
2,4-Dinitrotoluene	ND	10								
2,6-Dinitrotoluene	ND	10								

Qualifiers:

- *X Value exceeds Maximum Contaminant Level.
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1204158

26-Apr-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-3-12

Sample ID mb-1425	SampTy	pe: ME	BLK	Tes	tCode: El	PA Method	8270C: Semi	volatiles		
Client ID: PBW	Batch	ID: 14	25	F	RunNo: 19	991				
Prep Date: 4/9/2012	Analysis Da	ite: 4/	9/2012	\$	SeqNo: 5	5578	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoranthene	ND	10								
Fluorene	ND	10								
Hexachlorobenzene	ND	10								
Hexachlorobutadiene	ND	10								
Hexachlorocyclopentadiene	ND	10								
Hexachloroethane	ND	10								
Indeno(1,2,3-cd)pyrene	ND	10								
Isophorone	ND	10								
1-Methylnaphthalene	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
3+4-Methylphenol	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodimethylamine	ND	10								
N-Nitrosodiphenylamine	ND	10								
Naphthalene	ND	10								
2-Nitroaniline	ND	10								
3-Nitroaniline	ND	10								
4-Nitroaniline	ND	20								
Nitrobenzene	ND	10								
2-Nitrophenol	ND	10								
4-Nitrophenol	ND	10								
Pentachlorophenol	ND	20								
Phenanthrene	ND	10								
Phenol	ND	10								
Pyrene	ND	10								
Pyridine	ND	10								
1,2,4-Trichlorobenzene	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
Surr: 2,4,6-Tribromophenol	180		200.0		92.2	18.1	138			
Surr: 2-Fluorobiphenyl	92		100.0		91.7	25.9	101			
Surr: 2-Fluorophenol	140		200.0		69.0	12.5	93.2			
Surr: 4-Terphenyl-d14	89		100.0		88.8	29.5	112			
Surr: Nitrobenzene-d5	95		100.0		95.0	20.5	120			
Surr: Phenol-d5	110		200.0		55.1	11.5	73.2			

Qualifiers:

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1204158

26-Apr-12

Client:

Western Refining Southwest, Inc.

SampType: LCSD

Project:

Sample ID Icsd-1425

Injection Well 2nd Qtr 4-3-12

Sample ID Ics-1425	SampType: LCS TestCode: EPA Method 8270C: Semivolatiles									
Client ID: LCSW	Batch	n ID: 14	25	F	RunNo: 1	991				
Prep Date: 4/9/2012	Analysis D	ate: 4/	9/2012	S	eqNo: 5	5579	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	79	10	100.0	0	79.0	37.7	119			
4-Chloro-3-methylphenol	170	10	200.0	0	85.8	48.8	104			
2-Chlorophenol	170	10	200.0	0	86.6	38.2	109			
1,4-Dichlorobenzene	71	10	100.0	0	71.3	33.7	99.1			
2,4-Dinitrotoluene	90	10	100.0	0	90.2	39.9	125			
N-Nitrosodi-n-propylamine	83	10	100.0	0	83.0	43.8	95.1			
4-Nitrophenol	94	10	200.0	0	47.0	21.7	68.6			
Pentachlorophenol	140	20	200.0	0	72.0	26.7	107			
Phenol	110	10	200.0	0	54.6	23.9	65.8			
Pyrene	82	10	100.0	0	81.9	45.7	107			
1,2,4-Trichlorobenzene	77	10	100.0	0	77.3	30.8	104			
Surr: 2,4,6-Tribromophenol	190		200.0		95.9	18.1	138			
Surr: 2-Fluorobiphenyl	85		100.0		85.3	25.9	101			
Surr: 2-Fluorophenol	140		200.0		69.8	12.5	93.2			
Surr: 4-Terphenyl-d14	86		100.0		85.7	29.5	112			
Surr: Nitrobenzene-d5	87		100.0		86.9	20.5	120			
Surr: Phenol-d5	110		200.0		55.9	11.5	73.2			

•	•	,								
Client ID: LCSS02	Batcl	h ID: 14	25	F	RunNo: 1	991				
Prep Date: 4/9/2012	Analysis E	Date: 4/	9/2012	5	SeqNo: 5	5580	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	75	10	100.0	0	75.3	37.7	119	4.77	20	
4-Chloro-3-methylphenol	180	10	200.0	0	88.5	48.8	104	3.06	20	
2-Chlorophenol	160	10	200.0	0	82.2	38.2	109	5.23	20	
1,4-Dichlorobenzene	71	10	100.0	0	71.3	33.7	99.1	0.0561	20	
2,4-Dinitrotoluene	91	10	100.0	0	91.0	39.9	125	0.795	20	
N-Nitrosodi-n-propylamine	82	10	100.0	0	82.3	43.8	95.1	0.871	20	
4-Nitrophenol	85	10	200.0	0	42.4	21.7	68.6	10.1	20	
Pentachlorophenol	150	20	200.0	0	73.2	26.7	107	1.57	20	
Phenol	110	10	200.0	0	52.5	23.9	65.8	3.96	20	
Pyrene	82	10	100.0	0	82.1	45.7	107	0.317	20	
1,2,4-Trichlorobenzene	81	10	100.0	0	80.9	30.8	104	4.57	20	
Surr: 2,4,6-Tribromophenol	200		200.0		97.8	18.1	138	0	0	
Surr: 2-Fluorobiphenyl	80		100.0		80.2	25.9	101	0	0	
Surr: 2-Fluorophenol	130		200.0		66.1	12.5	93.2	0	0	
Surr: 4-Terphenyl-d14	84		100.0		84.2	29.5	112	0	0	
Surr: Nitrobenzene-d5	86		100.0		85.9	20.5	120	0	0	
Surr: Phenol-d5	110		200.0		52.6	11.5	73.2	0	0	

Qualifiers:

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded

TestCode: EPA Method 8270C: Semivolatiles

- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1204158 26-Apr-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-3-12

Result

Sample ID MB-1543

SampType: MBLK

TestCode: EPA Method 7470: Mercury

Client ID: **PBW** Batch ID: 1543

RunNo: 2165

Prep Date: 4/16/2012

HighLimit

Analyte

Analysis Date: 4/17/2012 **PQL**

SeqNo: 60357

%REC LowLimit

Units: mg/L

Qual

Mercury

ND 0.00020

Sample ID LCS-1543

SampType: LCS

TestCode: EPA Method 7470: Mercury

Client ID: LCSW Prep Date: 4/16/2012

Batch ID: 1543

RunNo: 2165 SeqNo: 60358

Units: mg/L

RPDLimit

Analyte

Analysis Date: 4/17/2012

0.0053 0.00020

PQL

SPK value SPK Ref Val

SPK value SPK Ref Val

%REC LowLimit 105

HighLimit

%RPD **RPDLimit**

%RPD

Qual

Mercury

Sample ID LCSD-1543

SampType: LCSD

TestCode: EPA Method 7470: Mercury RunNo: 2165

Prep Date: 4/16/2012

Client ID: LCSS02

Batch ID: 1543

Analysis Date: 4/17/2012

SeqNo: 60359

Units: mg/L

Analyte

SPK value SPK Ref Val

0.005000

0

%REC LowLimit

HighLimit %RPD 120

RPDLimit

Qual

Mercury

0.0053 0.00020 0.005000

107

1.13

Qualifiers:

Value exceeds Maximum Contaminant Level.

Ε Value above quantitation range

Analyte detected below quantitation limits

RPD outside accepted recovery limits R

В Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Reporting Detection Limit

Page 16 of 20

Hall Environmental Analysis Laboratory, Inc.

WO#:

1204158

26-Apr-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-3-12

	Sample ID MB-1477	Samp	Type: ME	BLK	Tes	TestCode: EPA 6010B: Total Recoverable Me					
J	Client ID: PBW	Bato	ch ID: 14	77	F	RunNo: 2	113				
	Prep Date: 4/11/2012	Analysis	Date: 4/	12/2012	8	SeqNo: 5	B542	Units: mg/L			
ì	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
l	Arsenic	ND	0.020		-				_		
1	Barium	ND	0.020								
į	Cadmium	ND	0.0020								
1	Calcium	ND	1.0								
ļ	Chromium	ND	0.0060								
	Lead	ND	0.0050								
İ	Magnesium	ND	1.0								
l	Potassium	ND	1.0								
ì	Selenium	ND	0.050								
ĺ	Silver	ND	0.0050								
l	Sample ID LCS-1477	Samp	Type: LC	S	Tes	Code: EF	PA 6010B: 1	Total Recover	able Meta	ils	
	Client ID: 1 CRM	Data		-	_						

ì	Client ID: LCSW	ch ID: 14	77	F	RunNo: 2	113						
1	Prep Date: 4/11/2012	Analysis	Date: 4/	12/2012	S	SeqNo: 5	B544	Units: mg/L				
	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
ì	Arsenic	0.51	0.020	0.5000	0	101	80	120				_
1	Barium	0.49	0.020	0.5000	0	98.1	80	120				
1	Cadmium	0.50	0.0020	0.5000	0	100	80	120				
ŝ	Calcium	51	1.0	50.00	0	101	80	120				
	Chromium	0.49	0.0060	0.5000	0.0008200	98.2	80	120				
J	Lead	0.50	0.0050	0.5000	0	99.2	80	120				
	Magnesium	52	1.0	50.00	0	103	80	120				
Ì	Potassium	50	1.0	50.00	0	100	80	120				
ı	Selenium	0.51	0.050	0.5000	0	103	80	120				
	Silver	0.10	0.0050	0.1000	0	102	80	120				

Sample ID LCS-1477	Tes	tCode: El	PA 6010B: `	Total Recove	rable Meta	als				
Client ID: LCSS02	Bato	ch ID: 14	77	R	RunNo: 2	113				
Prep Date: 4/11/2012	Analysis	Date: 4/	12/2012	S	eqNo: 5	8546	Units: mg/l	-		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.51	0.020	0.5000	0	101	80	120	0.274	20	
Barium	0.49	0.020	0.5000	0	98.4	80	120	0.301	20	
Cadmium	0.50	0.0020	0.5000	0	99.7	80	120	0.395	20	
Calcium	52	1.0	50.00	0	103	80	120	1.73	20	
Chromium	0.49	0.0060	0.5000	0.0008200	98.2	80	120	0.00610	20	
Lead	0.50	0.0050	0.5000	0	99.4	80	120	0.226	20	
Magnesium	52	1.0	50.00	0	104	80	120	0.931	20	
Potassium	50	1.0	50.00	0	101	80	120	0.683	20	
Selenium	0.53	0.050	0.5000	0	106	80	120	3.31	20	
Silver	0.10	0.0050	0.1000	0	102	80	120	0.343	20	

Qualifiers:

- */X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Page 17 of 20

Hall Environmental Analysis Laboratory, Inc.

WO#:

1204158

26-Apr-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-3-12

Sample ID MB-1477

SampType: MBLK

TestCode: EPA 6010B: Total Recoverable Metals

Client ID: PBW

Batch ID: 1477

RunNo: 2176

Prep Date: 4/11/2012

Analysis Date: 4/17/2012

SeqNo: 60600

Units: mg/L

Analyte

Result **PQL** SPK value SPK Ref Val %REC

LowLimit

HighLimit

RPDLimit

Qual

Sodium

ND

Result

Result

51

1.0

TestCode: EPA 6010B: Total Recoverable Metals

Client ID: LCSW

Sample ID LCS-1477

Prep Date: 4/11/2012

Batch ID: 1477

SampType: LCS

RunNo: 2176

Units: mg/L

Analyte

Analysis Date: 4/17/2012

SPK value SPK Ref Val

SeqNo: 60601 %REC LowLimit

102

HighLimit

%RPD **RPDLimit**

%RPD

Qual

Sample ID LCS-1477

SampType: LCSD

1.0

RunNo: 2176

TestCode: EPA 6010B: Total Recoverable Metals

120

Client ID: LCSS02

Batch ID: 1477

Units: mg/L

Prep Date: 4/11/2012

Analysis Date: 4/17/2012

SeqNo: 60602

RPDLimit

Qual

SPK value SPK Ref Val

50.00

97.7

HighLimit 120

Analyte Sodium

Sodium

1.0 50.00

0

%REC LowLimit

80

%RPD

4.68

20

Qualifiers:

Value exceeds Maximum Contaminant Level. * X

Value above quantitation range

J Analyte detected below quantitation limits

Analyte detected in the associated Method Blank

Holding times for preparation or analysis exceeded Η ND Not Detected at the Reporting Limit

Reporting Detection Limit

Page 18 of 20

R

RPD outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

WO#:

1204158

26-Apr-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-3-12

Sample ID mb-1

SampType: MBLK

TestCode: SM2320B: Alkalinity

Client ID: PBW

Batch ID: R1996

RunNo: 1996

Prep Date:

Analysis Date: 4/6/2012

SeqNo: 55665

Units: mg/L CaCO3

Analyte

PQL

Result

SPK value SPK Ref Val %REC LowLimit

%RPD

Qual

Total Alkalinity (as CaCO3)

ND 20

SampType: LCS

TestCode: SM2320B: Alkalinity

Sample ID Ics-1 Client ID: LCSW

Batch ID: R1996

RunNo: 1996

Prep Date:

SeqNo: 55666

Units: mg/L CaCO3

RPDLimit

Analysis Date: 4/6/2012

HighLimit

Analyte Total Alkalinity (as CaCO3) Result PQL 79

Result

Result

80

SPK value SPK Ref Val 80.00

%REC 98.6

LowLimit HighLimit 88.1 104 %RPD **RPDLimit** Qual

Sample ID mb-1

Client ID:

SampType: MBLK Batch ID: R1996

Analysis Date: 4/10/2012

PQL

20

TestCode: SM2320B: Alkalinity RunNo: 1996

SeqNo: 56416

HighLimit

Units: mg/L CaCO3

RPDLimit

Qual

Prep Date: Analyte

Total Alkalinity (as CaCO3) Sample ID Ics-1

Client ID: LCSW

ND SampType: LCS

TestCode: SM2320B: Alkalinity

Batch ID: R1996

RunNo: 1996

Prep Date:

Analysis Date: 4/10/2012

SeqNo: 56417

Units: mg/L CaCO3

Analyte

POL

SPK value SPK Ref Val

SPK value SPK Ref Val %REC LowLimit

%REC LowLimit HighLimit

RPDLimit

Qual

Total Alkalinity (as CaCO3)

80.00

90.9

88.1

104

%RPD

20

6.880

%RPD

Qualifiers:

R

- * X Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- J Analyte detected below quantitation limits RPD outside accepted recovery limits
- В
- Analyte detected in the associated Method Blank
 - Η Holding times for preparation or analysis exceeded Not Detected at the Reporting Limit ND
 - Reporting Detection Limit

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1204158

26-Apr-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-3-12

Sample ID MB-1382

SampType: MBLK

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: PBW

Batch ID: 1382

RunNo: 1941

Prep Date: 4/4/2012

Analysis Date: 4/5/2012

SeqNo: 54076

Units: mg/L

Analyte

Result **PQL** SPK value SPK Ref Val

%REC LowLimit

HighLimit

Qual

Total Dissolved Solids

Client ID: LCSW

ND 20.0

TestCode: SM2540C MOD: Total Dissolved Solids

Sample ID LCS-1382

Prep Date: 4/4/2012

SampType: LCS Batch ID: 1382

RunNo: 1941

Analyte

Analysis Date: 4/5/2012

SeqNo: 54077

Units: mg/L

Result PQL

SPK value SPK Ref Val %REC LowLimit

HighLimit 120 **RPDLimit**

RPDLimit

Qual

Total Dissolved Solids

1,010

20.0

1,000

101

%RPD

%RPD

Qualifiers:

Value exceeds Maximum Contaminant Level.

Value above quantitation range

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits Analyte detected in the associated Method Blank

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

RLReporting Detection Limit Page 20 of 20



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87105 TEL: 505-345-3975 FAX: 505-345-410; Website: www.hallenvironmental.com

Sample Log-In Check List

	Work Order Number: 1204158
Received by/date: 04/04/12	
Logged By: Ashley Gallegos 4/4/2012 10:15:00 AM	
Completed By: Ashley Gallegos 4/4/2012 11:45:12 AM	Ag
Reviewed By: Mg Oulouliz	
Chain of Custody	
1. Were seals intact?	Yes 🗌 No 🗀 Not Present 🗹
2. Is Chain of Custody complete?	Yes 🗹 No 🗔 Not Present 🗔
3. How was the sample delivered?	<u>ups</u>
<u>Log in</u>	
4. Coolers are present? (see 19. for cooler specific information)	Yes 🗹 No 🗀 NA 🗀
-	· · · · · · · · · · · · · · · · · · ·
5. Was an attempt made to cool the samples?	Yes 🗹 No 🛄 NA 🗌
6. Were all samples received at a temperature of >0° C to 8.0°C	Yes 🗹 No 🗌 NA 🗀
7 Sample(s) in proper container(s)?	Yes ₩ No □
8. Sufficient sample volume for indicated test(s)?	Yes V No
Are samples (except VOA and ONG) properly preserved?	Yes V Nc 🗆
10. Was preservative added to bottles?	Yes No 🗹 NA 🗀
11. VOA vials have zero headspace?	Yes ☐ No ☐ No VOA Vīais ☑
12. Were any sample containers received broken? 13. Does paperwork match bottle labels?	Yes ✓ No ✓ # of preserved
(Note discrepancies on chain of custody)	bottles checked Z Z for pH:
14, Are matrices correctly Identified on Chain of Custody?	Yes ☑ No ☐ ②or ×12_unless noted)
15, is it clear what analyses were requested?	Yes V No Adjusted?
16. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑ No ☐ Checked by:
Special Handling (If applicable)	
17. Was client notified of all discrepancies with this order?	Yes □ No □ NA ☑ ✓
Person Notified: Date:	
By Whom: Via:	eMail Phone Fax In Person
Regarding:	
Client Instructions:	
18. Additional remarks:	
19. Cooler information	
Cooler No Temp °C Condition Seal Intact Seal No S	Seal Date Signed By
13.3 Good Yes	



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

OrderNo.: 1208093

August 30, 2012

Kelly Robinson

Western Refining Southwest, Inc.

#50 CR 4990

Bloomfield, NM 87413

TEL: (505) 632-4135

FAX (505) 632-3911

RE: Injection Well 3rd Qtr

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 8/1/2012 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr Client Sample ID: Injection Well

Collection Date: 7/31/2012 1:30:00 PM Received Date: 8/1/2012 9:30:00 AM

			Received Date: 8/1/2012 9:30:00 AM				
analyses	Result	RL Qu	al Units	DF	Date Analyzed		
EPA METHOD 300.0: ANIONS					Analyst: SRM		
Chloride	1100	50	mg/L	100	8/2/2012 6:27:10 PM		
Sulfate	15	5.0	mg/L	10	8/2/2012 6:15:56 PM		
EPA METHOD 7470: MERCURY					Analyst: DBD		
Mercury	ND	0.00020	mg/L	1	8/3/2012 3:03:31 PM		
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst: JLF		
Arsenic	ND	0.020	mg/L	1	8/14/2012 11:50:46 AM		
Barium	0.39	0.020	mg/L	1	8/14/2012 11:50:46 AM		
Cadmium	ND	0.0020	mg/L	1	8/14/2012 11:50:46 AM		
Calcium	94	1.0	mg/L	1	8/14/2012 11:50:46 AM		
Chromium	ND	0.0060	mg/L	1	8/14/2012 11:50:46 AM		
Lead	ND	0.0050	mg/L	1			
Magnesium	44	1.0	mg/L	1	8/14/2012 11:50:46 AM		
Potassium	17	1.0	_		8/14/2012 9:53:17 AM		
Selenium	ND	0.050	mg/L	1	8/14/2012 9:53:17 AM		
Silver			mg/L	1 21	8/14/2012 11:50:46 AM		
Sodium	ND 760	0.0050	mg/L	1	8/14/2012 9:53:17 AM		
		10	mg/L	10	8/14/2012 11:53:30 AM		
EPA METHOD 8270C: SEMIVOLATILI					Analyst: JDC		
Acenaphthene	ND	50	μg/L	1.	8/7/2012 12:00:44 PM		
Acenaphthylene	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Aniline	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Anthracene	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Azobenzene	ND	50	μg/L	1.	8/7/2012 12:00:44 PM		
Benz(a)anthracene	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Benzo(a)pyrene	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Benzo(b)fluoranthene	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Benzo(g,h,i)perylene	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Benzo(k)fluoranthene	NĐ	50	μg/L	1	8/7/2012 12:00:44 PM		
Benzoic acid	ND	100	μg/L	1	8/7/2012 12:00:44 PM		
Benzyl alcohol	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Bis(2-chloroethoxy)methane	ND	50	µg/L	1	8/7/2012 12:00:44 PM		
Bis(2-chloroethyl)ether	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Bis(2-chloroisopropyl)ether	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Bis(2-ethylhexyl)phthalate	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
4-Bromophenyl phenyl ether	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Butyl benzyl phthalate	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Carbazole	ND	50	μg/L	1			
4-Chloro-3-methylphenol	ND	50		947	8/7/2012 12:00:44 PM		
4-Chloroaniline	ND	50 50	μg/L		8/7/2012 12:00:44 PM		
2-Chloronaphthalene	ND	50 50	μg/L		8/7/2012 12:00:44 PM		
2-Chlorophenol	ND ND	50 50	μg/L μg/L	-	8/7/2012 12:00:44 PM 8/7/2012 12:00:44 PM		

- В Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded Н
- ND Not Detected at the Reporting Limit
- Reporting Detection Limit
- Value exceeds Maximum Contaminant Level.
- Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits $\begin{array}{c} \text{Page 1 of 18} \end{array}$

Lab Order 1208093

Date Reported: 8/30/2012

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr

Lab ID: 1208093-001 Client Sample ID: Injection Well

Collection Date: 7/31/2012 1:30:00 PM Received Date: 8/1/2012 9:30:00 AM

Analyses	Result	RL O	al Units	DF	Date Analyzed		
EPA METHOD 8270C: SEMIVOLA			-		Analyst: JDC		
4-Chlorophenyl phenyl ether	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Chrysene	ND	50 50	μg/L μg/L	31	8/7/2012 12:00:44 PM		
Di-n-butyl phthalate	ND	50 50	μg/L μg/L	31	8/7/2012 12:00:44 PM 8/7/2012 12:00:44 PM		
Di-n-octyl phthalate	ND	50 50	μg/L μg/L	í	8/7/2012 12:00:44 PM		
Dibenz(a,h)anthracene	ND	50	μg/L	4	8/7/2012 12:00:44 PM		
Dibenzofuran	ND	50 50	μg/L	1	8/7/2012 12:00:44 PM		
1.2-Dichlorobenzene	ND	50	μg/L	4	8/7/2012 12:00:44 PM		
1,3-Dichlorobenzene	ND	50	μg/L	4	8/7/2012 12:00:44 PM		
1,4-Dichlorobenzene	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
3,3'-Dichlorobenzidine	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Diethyl phthalate	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Dimethyl phthalate	ND	50 50	μg/L	1	8/7/2012 12:00:44 PM		
2,4-Dichlorophenol	ND	100	μg/L	1			
2,4-Dimethylphenol	ND	50	μg/L μg/L	1	8/7/2012 12:00:44 PM		
4,6-Dinitro-2-methylphenol	ND	100			8/7/2012 12:00:44 PM		
2,4-Dinitrophenol	ND		μg/L	1	8/7/2012 12:00:44 PM		
2,4-Dinitrophenol	ND ND	100	μg/L	1	8/7/2012 12:00:44 PM		
2,4-Dinitrotoluene 2,6-Dinitrotoluene		50	µg/∟	1	8/7/2012 12:00:44 PM		
· ·	ND	50	μg/L 	1	8/7/2012 12:00:44 PM		
Fluoranthene	ND	50	μg/L 	1	8/7/2012 12:00:44 PM		
Fluorene	ND	50	μg/L 	1	8/7/2012 12:00:44 PM		
Hexachlorobenzene	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Hexachlorobutadiene	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Hexachlorocyclopentadiene	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Hexachloroethane	ND	50	μg/L	3	8/7/2012 12:00:44 PM		
Indeno(1,2,3-cd)pyrene	ND	50	µg/L	3	8/7/2012 12:00:44 PM		
Isophorone	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
1-Methylnaphthalene	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
2-Methylnaphthalene	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
2-Methylphenol	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
3+4-Methylphenol	140	50	μg/L	1	8/7/2012 12:00:44 PM		
N-Nitrosodi-n-propylamine	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
N-Nitrosodimethylamine	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
N-Nitrosodiphenylamine	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Naphthalene	ND	50	μ g/L	1	8/7/2012 12:00:44 PM		
2-Nitroaniline	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
3-Nitroaniline	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
4-Nitroaniline	ND	100	μg/L	1	8/7/2012 12:00:44 PM		
Nitrobenzene	ND	50	µg/∟	1	8/7/2012 12:00:44 PM		
2-Nitrophenol	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
4-Nitrophenol	ND	50	μg/L	1	8/7/2012 12:00:44 PM		
Pentachlorophenol	ND	100	μg/L	1	8/7/2012 12:00:44 PM		
Phenanthrene	ND	50	μg/L	1	8/7/2012 12:00:44 PM		

Matrix: AQUEOUS

- В Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit ND
- Reporting Detection Limit
- Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits $Page \ 2 \ of \ 18$

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr

Lab ID: 1208093-001 Client Sample ID: Injection Well

Collection Date: 7/31/2012 1:30:00 PM Received Date: 8/1/2012 9:30:00 AM

	HULLIA	AQUEOUS	Received Date: 8/1/2012 9:50:00 Alvi					
Analyses	Result RL Qu		Units	DF	Date Analyzed			
EPA METHOD 8270C: SEMIVOLATILES					Analyst: JD0			
Phenol	ND	50	μg/L	35	8/7/2012 12:00:44 PM			
Pyrene	ND	50	μg/L	4	8/7/2012 12:00:44 PM			
Pyridine	ND	50	μg/L	1	8/7/2012 12:00:44 PM			
1,2,4-Trichlorobenzene	ND	50	μg/L	1	8/7/2012 12:00:44 PM			
2,4,5-Trichlorophenol	ND	50	μg/L	1	8/7/2012 12:00:44 PM			
2,4,6-Trichlorophenol	ND	50	μg/L	1	8/7/2012 12:00:44 PM			
Surr: 2,4,6-Tribromophenol	62.9	44.2-126	%REC	1	8/7/2012 12:00:44 PM			
Surr: 2-Fluorobiphenyl	46.7	37-114	%REC	1	8/7/2012 12:00:44 PM			
Surr: 2-Fluorophenol	34.6	23.4-98	%REC	1	8/7/2012 12:00:44 PM			
Surr: 4-Terphenyl-d14	55.4	41.3-116	%REC	1	8/7/2012 12:00:44 PM			
Surr: Nitrobenzene-d5	49.5	39.5-118	%REC	1	8/7/2012 12:00:44 PM			
Surr: Phenol-d5	32.3	20.9-95.9	%REC	1	8/7/2012 12:00:44 PM			
EPA METHOD 8260B: VOLATILES					Analyst: JDJ			
Benzene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM			
Toluene	2.6	1.0	μg/L	1	8/6/2012 11:46:06 AM			
Ethylbenzene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM			
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM			
1,2,4-Trimethylbenzene	ND	1.0	μg/L	4	8/6/2012 11:46:06 AM			
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM			
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	4	8/6/2012 11:46:06 AM			
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM			
Naphthalene	ND	2.0	μg/L	1	8/6/2012 11:46:06 AM			
1-Methylnaphthalene	ND	4.0	μg/L	1	8/6/2012 11:46:06 AM			
2-Methylnaphthalene	ND	4.0	μg/L	1	8/6/2012 11:46:06 AM			
Acetone	590	100	μg/L	10	8/8/2012 10:49:46 AM			
Bromobenzene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM			
Bromodichloromethane	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM			
Bromoform	ND	1.0	µg/∟	1	8/6/2012 11:46:06 AM			
Bromomethane	ND	3.0	µg/L	1	8/6/2012 11:46:06 AM			
2-Butanone	21	10	μg/L	1	8/6/2012 11:46:06 AM			
Carbon disulfide	ND	10	μg/L	1	8/6/2012 11:46:06 AM			
Carbon Tetrachloride	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM			
Chlorobenzene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM			
Chloroethane	ND	2.0	μg/L	1:	8/6/2012 11:46:06 AM			
Chloroform	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM			
Chloromethane	ND	3.0	μg/L	¥.	8/6/2012 11:46:06 AM			
2-Chlorotoluene	ND	1.0	μg/L μg/L	2				
4-Chlorotoluene	ND	1.0		-	8/6/2012 11:46:06 AM			
cis-1,2-DCE	ND	1.0	μg/L	\$	8/6/2012 11:46:06 AM			
cis-1,3-Dichloropropene	ND	1.0	μg/L		8/6/2012 11:46:06 AM			
1,2-Dibromo-3-chloropropane		2.0	μg/L	į.	8/6/2012 11:46:06 AM			
1,2 5,5 ono-o-onioropropane	ND	2.0	μg/L	1	8/6/2012 11:46:06 AM			

Matrix: AQUEOUS

- В Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded Н
- ND Not Detected at the Reporting Limit
- Reporting Detection Limit RL
- Х Value exceeds Maximum Contaminant Level.
- Value above quantitation range
- J Analyte detected below quantitation limits
- RPD outside accepted recovery limits R
 - Spike Recovery outside accepted recovery limits $\begin{array}{c} \text{Page 3 of 18} \end{array}$

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr

Lab ID: 1208093-001

Client Sample ID: Injection Well

Collection Date: 7/31/2012 1:30:00 PM **Received Date:** 8/1/2012 9:30:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed		
EPA METHOD 8260B: VOLATILES	·				Analyst: JDJ		
Dibromochloromethane	ND	1.0	μg/L	31	8/6/2012 11:46:06 AM		
Dibromomethane	ND	1.0	μg/L	4	8/6/2012 11:46:06 AM		
1,2-Dichlorobenzene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
1,3-Dichlorobenzene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
1,4-Dichlorobenzene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
Dichlorodifluoromethane	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
1,1-Dichloroethane	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
1,1-Dichloroethene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
1,2-Dichloropropane	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
1,3-Dichloropropane	ND	1.0	μg/L	(4	8/6/2012 11:46:06 AM		
2,2-Dichloropropane	ND	2.0	μg/L	1	8/6/2012 11:46:06 AM		
1,1-Dichloropropene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
Hexachlorobutadiene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
2-Hexanone	ND	10	μg/L	1	8/6/2012 11:46:06 AM		
Isopropylbenzene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
4-Isopropyltoluene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
4-Methyl-2-pentanone	ND	10	μg/L	1	8/6/2012 11:46:06 AM		
Methylene Chloride	ND	3.0	μg/L	1	8/6/2012 11:46:06 AM		
n-Butylbenzene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
n-Propylbenzene	ND	1.0	µg/L	1	8/6/2012 11:46:06 AM		
sec-Butylbenzene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
Styrene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
tert-Butylbenzene	ND	1.0	μg/L	15	8/6/2012 11:46:06 AM		
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	8/6/2012 11:46:06 AM		
Tetrachloroethene (PCE)	ND	1.0	μ g /L	1	8/6/2012 11:46:06 AM		
trans-1,2-DCE	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
1,1,1-Trichloroethane	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
1,1,2-Trichloroethane	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
Trichloroethene (TCE)	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
Trichlorofluoromethane	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
1,2,3-Trichloropropane	ND	2.0	µg/L	1	8/6/2012 11:46:06 AM		
Vinyl chloride	ND	1.0	μg/L	1	8/6/2012 11:46:06 AM		
Xylenes, Total	ND	1.5	μg/L	1	8/6/2012 11:46:06 AM		
Surr: 1,2-Dichloroethane-d4	99.1	70-130	%REC	1	8/6/2012 11:46:06 AM		
Surr: 4-Bromofluorobenzene	99.1	70-130	%REC	1	8/6/2012 11:46:06 AM		
Surr: Dibromofluoromethane	105	70-130	%REC	1	8/6/2012 11:46:06 AM		
Surr: Toluene-d8	99.7	70-130	%REC	1	8/6/2012 11:46:06 AM		

Matrix: AQUEOUS

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit
- X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits Page 4 of 18

Analytical Report

Lab Order 1208093

Date Reported: 8/30/2012

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr

1208093-001 Lab ID:

Client Sample ID: Injection Well

Collection Date: 7/31/2012 1:30:00 PM

Received Date: 8/1/2012 9:30:00 AM

Analyses	Result	RL Qua	l Units	DF	Date Analyzed
EPA 120.1: SPECIFIC CONDUCTANO	CE				Analyst: DBD
Conductivity	4200	0.010	µmhos/cm	1	8/13/2012 1:40:32 PM
SM4500-H+B: PH					Analyst: DBD
рН	7.95	1.68 H	pH units	1	8/13/2012 1:40:32 PM
SM2320B: ALKALINITY					Analyst: DBD
Bicarbonate (As CaCO3)	510	20	mg/L CaCO3	1	8/13/2012 1:40:32 PM
Carbonate (As CaCO3)	ND	2.0	mg/L CaCO3	1	8/13/2012 1:40:32 PM
Total Alkalinity (as CaCO3)	510	20	mg/L CaCO3	1	8/13/2012 1:40:32 PM
SM2540C MOD: TOTAL DISSOLVED	SOLIDS				Analyst: KS
Total Dissolved Solids	2740	40.0	mg/L	1	8/8/2012 8:46:00 AM

Matrix: AQUEOUS

Qualifiers:

В

- Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Reporting Detection Limit
- Value exceeds Maximum Contaminant Level,
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits $$\operatorname{Page}\ 5$ of $18$$ S

CASE NARRATIVE

August 22, 2012

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM

Project Tracking No.: 1208093 Anatek Batch: 120806003

Project Summary: One (1) water sample was received on 8/3/2012 for total reactive cyanide and sulfide, corrosivity, and flashpoint analysis. The sample was received with appropriate chain of custody at 3.0C.

Client Sample ID 1208093-001E Injection Well Anatek Sample ID 120806003-001

Method/Prep Method

Various

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Υ	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Υ	NA
Tune(s) Valid?	NA	NA
Internal Standard Responses Valid?	NA	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Υ	NA

1. Holding Time Requirements

No problems encountered.

2. GC/MS Tune Requirements

N/A

3. Calibration Requirements

No problems encountered.

4. Surrogate Recovery Requirements

N/A.

5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

6. Method Blank Requirements

No problems encountered.

7. Internal Standard(s) Response Require	ments
--	-------

N/A.

8. Comments

No problems encountered.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by:

Page 2 of 17

John. Cott

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anatekiabs.com 504 E Sprague Ste. D • Spokene WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

120806003

Address:

4901 HAWKINS NE SUITE D **ALBUQUERQUE, NM 87109**

Project Name:

1208093

Attn:

ANDY FREEMAN

Analytical Results Report

Sample Number

120806003-001

Sampling Date

7/31/2012 Date/Time Received 8/3/2012

2:01 PM

Client Sample ID Matrix

1208093-001E / INJECTION WELL

Sampling Time

1:30 PM

Sample Location

Comments

Parameter	Result	Result Units		Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	0.1	8/10/2012	CRW	SW846 CH7	
Flashpoint	>200	°F		8/9/2012	KFG	EPA 1010	
pH	7.55	ph Units		8/10/2012	ETL	EPA 150.1	
Reactive sulfide	10.0	mg/L	5	8/13/2012	JTT	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL.

EPA's Maximum Contaminant Level

ND

Not Detected

PQL

Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated.

Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Anatek Labs, Inc.

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Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

120806003

Address:

4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109

Project Name:

1208093

Attn:

ANDY FREEMAN

Analytical Results Report

Quality Control Data

Lab Control Sample											
Parameter	LCS Result	Unite	LCS	Spike	%Rec	: AR	%Rec	Prep	Date	Analysis Date	
Reactive sulfide	0.180	mg/L	. (0.2		70)-130	8/13/	2012	8/13/2012	
Cyanide (reactive)	0.504	mg/L	. ().5	100.8	80	80-120		2012 ————	8/10/2012	
Matrix Spike	<u> </u>										
Sample Number Parameter		Sample	MS			MS		AR			
120806003-001 Reactive sulfide		Result	Result	Unit		Spike	%Rec	%Rec	Prep Date		
		10.0	28.0	mg/		20 0.5	90.0	70-130	8/13/2012		
120806003-001 Cyanide (reactive)		ND	0.454	mg/	mg/L		90.8	80-120 8/10/20		8/10/2012	
Matrix Spike Duplicate	 							•			
Parameter	MSD Result	Units	MSD Spike	o∕.E	lec	%RPD	AR %RPD	O Prep Date		Analysis Date	
Cyanide (reactive)			0.5			0-25		0/2012	8/10/2012		
Method Blank											
Parameter		Result		Ur	nits		PQL.	Pn	ep Date	Analysis Date	
Cyanide (reactive)		N N			g/L	0.1		8/10/2012		8/10/2012	
Reactive sulfide		N	mg/kg		1		8/13/2012		8/13/2012		

AR

Acceptable Range

ND

Not Detected

PQL RPD Practical Quantitation Limit Relative Percentage Difference

Comments:

Certifications held by Anatek Lebs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E97893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Lebs WA: EPA:WA00189; ID:WA00189; WA:C585; MT:Cert0095

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane VVA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB

Order ID:

120806003

4901 HAWKINS NE SUITE D

Order Date:

8/6/2012

ALBUQUERQUE

NM

Contact Name: ANDY FREEMAN

Project Name: 1208093

Comment:

Sample #:

120806003-001

Customer Sample #:

1208093-001E / INJECTION WELL

87109

Recv'd:

V

Collector: Matrix:

Water

Date Collected:

7/31/2012

Date Received:

8/3/2012 2:01:00 PM

Quantity: Comment:

Test	Lab	Method	Due Date	Priority
CYANIDE REACTIVE	М	SW846 CH7	8/15/2012	Normal (6-10 Days)
FLASHPOINT	М	EPA 1010	8/15/2012	Normal (6-10 Days)
рН	М	EPA 150.1	8/15/2012	Normal (6-10 Days)
SULFIDE REACTIVE	M	SW846 CH7	8/15/2012	Normal (6-10 Days)
	D			
Samples received in a cooler?			Yes	

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	3.0
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes



CHAIN OF CUSTODY RECORD MAGE 1

1208093	1st SAMP	9080ZL1
**	7/31/2012 1st RCVD	003 SALLE Last
	8/3/2012	8/15/20

		TAT: Standard R1/SH Next	-	Maquished By: Line R22012 Time. Received By:		Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return	EXHALINSTERCTIONS / COMMENTS.			10	9	(2)	7	6	5	4	N	1 1208093-001E Injection Well	TEM SAMPLE CLIENT SAMPLE ID	TIV, STATE, ZIP. MOSCOW, ID 83843	CORESS: 1282 Alturas Dr	SUB CONTRATOR: Anatek Labs COMPANY: Anatek	
DATE & TIME: 8/5/12 /4/21 INSPECTE		CUSTODY SEALS PRESENT:	ICE / ICE-PACKS PRESENT:	LABELS & CHAINS AGREE	1	orts. Please e-mail results to lab@hallenvironment		20		The manual view of the state of							married and addressed a second	500HDPE Aqueous 7/31/2012 1:30:00 PM	BOTTLE COLLECTION TYPE MATRIX DATE		ACCOUNT #:	Anatek Labs, Inc. PHONE:	
INSPECTED BY: BY	SHIPPED VIA:	Ma_off C Attempt to Coal?	OR LAB USE ONLY	TEMP: 5-C •C I TRANSMITTAL DESIRED: - FAX EMAIL ONLINE	등	tal.com. Please return all coolers and blue icc. Thank you.		12		0						O HIVOZ	A 08/02/12	3 RCI LEVEL 1 OC	ANALYTICAL COMMENTS	The state of the s	EMAIL	(208) 883-2839 FAX: (208) 882-9246	

Flashpoint Analysis

Sample Matrix - Soil (1), Sludge (2), Oil (3), Water (4), Other (5)

Sample ID	Analyses Date	Sample Matrix	Analyst Initials	Temp - °C	Temp - °F
20727018-01 120727029-001 -002	8/5/2012	4/ Hz8	12		7205° E
120206003-001	8/9/2012	4/ 120			14506
120807043-00: -002		17 195	1000		>2000F
208055-00: 20810057-00	8/10/2012	5/Liquid 4/H30	nu	-	< 50°F >200°F
1 - 0 × 10 0 × 1	8/21/2012	4/ 440	Twn		1200 F
				-	

			-		
		 -			
					

^{*} SAFETY GLASSES REQUIRED.

N:\Bench Sheets\pH-Alk Bench Sheet with Calcs-protection	Analysis Date: 8/4/12	10000022001	- 02 M	100-54000	100000000000000000000000000000000000000	900	Dos	2004	5,00	200	120809049001	Local DOSCOLO	123/07057-301	(CO - £ 2080 8011	120802012-201	120302050-501	Sample								
-Alk Bench S	1	16-3	20.6	20.10	20.7	179	12.52	t°t1	16.5	200,20	78,2	18,3	20.3	101-64	- 50 - 50	(7.6)	Temp (°C)								
heet with Cak	8/13/12	6.516	82.4	2.46	7,55	6.8.2	6.06	6.60	₩. 60.¢	30.F	7.08	7.32	7.00	6.16	326	6.48	함			Matri			0.027	PH PH	
cs-protection											400					4.01	pH 4 Cal			Matrix Spike Solution	Standard		pH Buffer 10 (Blue) 0.02N H2SO4 Titrant	pH Buffer 7 (Yellow)	Reagent
											ς; δ.					10.07	рН 10 Са		Contrib	dution			Blue) Titrant	ellow)	
											129CI					2.101	Slope		Contriburette: CAT 10uL,	M637-04	Solution #	110	M854-03	M854-01 M854-02	Solut
											7209					7.10	pH 7 Buffer			7-04	ion#		7 4-03 7 03	4-02	Solution #
	Analyst: ペンプ																Sample Vol. (mL)		sn 600055 - pH Meter: Orion Model 620A,	ź	Conc.	2 100.0	Sep-12 Apr 2013	Sep-13 Dec-{3	Expires
	ATT.																⁸ ≻	Titrant	pH Meter:		ಣ	2	12	9	
																	4.55 B	Titrant vol to pH (mL)	Orion Mo	11/18/2012	Expires			pH 7 within 0.1 pH units Slope 95-102%	
																	C 4.2	(mL)	del 620A,	2012	res			n 0.1 pH u 102%	Method
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Total	3	sn 007858		Am			गंड	QC Re
		0	0	0	0	0	0	0	٥	0	0	0	0	0	0	0	Carbonate	Alkalini	58	_	Amount Spiked		% Reco	MS/MS	Method QC Requirements:
Pri		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8i- carbonate	Alkalinity (mg/L		100	iked (mg/L		% Recovery 85-115%	LFB/Blank every 10 MS/MSD Every 20	ints:
Printed 8/9/2012		0	0	0	0	0	0	0	0	0	0	0	0	Ð	0	0	Hydraxide				g/L)		115%	20 10	
12	(*								
		8	10-1	I g	7	_						Pa	ge 8	of 17	7			•							

Sulfide by SM 4500-S' F

	Concentration	Date Made/Expires
Iodine	0.025 N	
HCI	6N	
Starch Indicator	1% by weight	12/31/2009
Zinc Acetate	99.9%	

Quality Control Information

- 1. 1 blank per batch, must be < 20 ug/L.
- 2. 1 LFB per batch must be +/- 30%.
- 3. 1ml iodine reacts with 0.4 mg Sulfide

Sample [20731034-1 w: 52.0	Sample Volume	mount uL ents)	nce g/s;		Concentration (mg/L)	Date
20731034-1 m: 52.0	72 QS	as	20 mg = 0.	0.020mg	5.4 X52.0: 70.8	8-13-1
-2 W: 52.4		925		- 1	76 06 : h C3 X h V	
-3 m= 52.2		92			D. 4 FEZA : 1888	
-3M5 W-52.2	+	2005	200	0.200	4.0 X52.4-205.8	
145	020	450	180	0.180	0.(80	
1833-		025	an	0.200	0.200	
-80	+	50		0.020	0.020	
1.15=m 1-810608	1.0	300			120 × 54.1 : 1492	
-2 M:52.7	5.0	250	[ØD	0.100	20 X 52.7 1054	
80 6003-1	10.0	250	(00)	_	0.0	
5W1-	+	ast	280	0.230	28.0	
1-5192	10.0	250	000	0,100	. 0	
`2	8,0	150	60	0,060	6.00	+

Comments_

120 813 H25R

Total Cyanide by Semi-Automated Colorimetry Method: EPA 335.4\SM-4500-CN-E Distillation Bench Sheet

Weak Acid Dissociable Cyanide by SM 4500-CN-I (check WAD column)

Total Cyanide MS/MSD/LCS Soin:

M863-03

Exp:7/9/2013

Method requirements: All QC +/- 10%

Free Cyanide MS/MSD/LCS Soin:

M855-02 Exp:5/17/2013

Equipment: Mldi-vap

Instrument: ALPCHEM FIA 3000

Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	120806003-1	reactiving	NaBH	50ml	l'×			
2	-line			ſ				
3	- lush			4	4			
4	120807045-1			10mL	5×			
5	-7	1		4	+			
6	17.0809018 -1	vendin scil		Cont	54.1			
7	-2	1		1	52.+		1	
8	120809028-1	ow for			lx			
9	-2	1						
9 10	17-1	1	4	4	4			
11	120803018-3	wad	MOH	50m	1.			
12	->ms	1	4	1				
13	- Zurst							
	-W							
14 15	BU							
16	120802038-1	4						
17		dr						
18	-huns							
19 20	/pungs	,						
20	43-6	4	4	4	1	_		

^{*} If soils this calculation is taken from cyanide extraction bench sheet.

^{**} If soils, mLs of extract used for distillation.

Extraction Reagents: methyl red indicator	
18 N H ₂ SO ₄	A050-07
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% MgCl ₂	A050-08

Analytical Reagents: Reagent #:
Barbituric Acid R038-13
Sodium Phosphate R026-23
Chloramine-t R048-09
Pyridine R043-03

Distillation Initials/Date Distilled: 8/10/(2 //mw/

Analyst Initials/Date Analyzed: MW 8/10/12

Total Cyanide by Semi-Automated Colorimetry Method: EPA 335.4\SM-4500-CN-E **Distillation Bench Sheet**

Weak Acid Dissociable Cyanide by SM 4500-CN-I (check WAD column)

Total Cyanide MS/MSD/LCS Soln: Free Cyanide MS/MSD/LCS Soln:

M863-03 Exp:7/9/2013 M855-02

Exp:5/17/2013

Method requirements: All QC +/- 10%

Equipment: Wildl-vap

Instrument: ALPCHEM FIA 3000

Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	120731034-1	reactive soil	NaBis	Soul	52.0			
2	lung	1					Iml	_
3	/imso				+		1	
4	-Us				1>		-	
5	180				ł		1	
6	-2				52.4			
7	-3	+			52.2			
8	120801023-1	ww lah			×			
9	7042-1					***************************************		
10	6002-1	1	1	_ {	1			
11	170802042-2	NW open	Natle	Some	1×			
12	- 5							
13	-3ms						lut	
14	-3mcn					_		
15	-WS						4	<u> </u>
16	-81			·				
17	~4							
18								
19	120806001-2							
20	120731042-	4		4	+			

^{*} If soils this calculation is taken from cyanide extraction bench sheet.

^{**} If soils, mLs of extract used for distillation.

Extraction Reagents: methyl red indicator 18 N H ₂ SO ₄	A051-01 A050-07	Analytical Reagents: Barbituric Acid Sodium Phosphate
sulfamic acid 0.025N NaOH 51% MgCl₂	R009-12 R014-16 A050-06	Chloramine-t Pyridine

Distillation Initials/Date Distilled: \(\frac{\mathcal{MW}}{8/9/12} \)

Analyst Initials/Date Analyzed MW 8/10/12

Reagent#:

R038-13

R026-23 R048-09 R043-03

file name: T:\DATA1\FLOW4\2012\EPA335.4\081012CY.RST

Date: August 10, 2012

Operator: CRW

120810 FTACNR

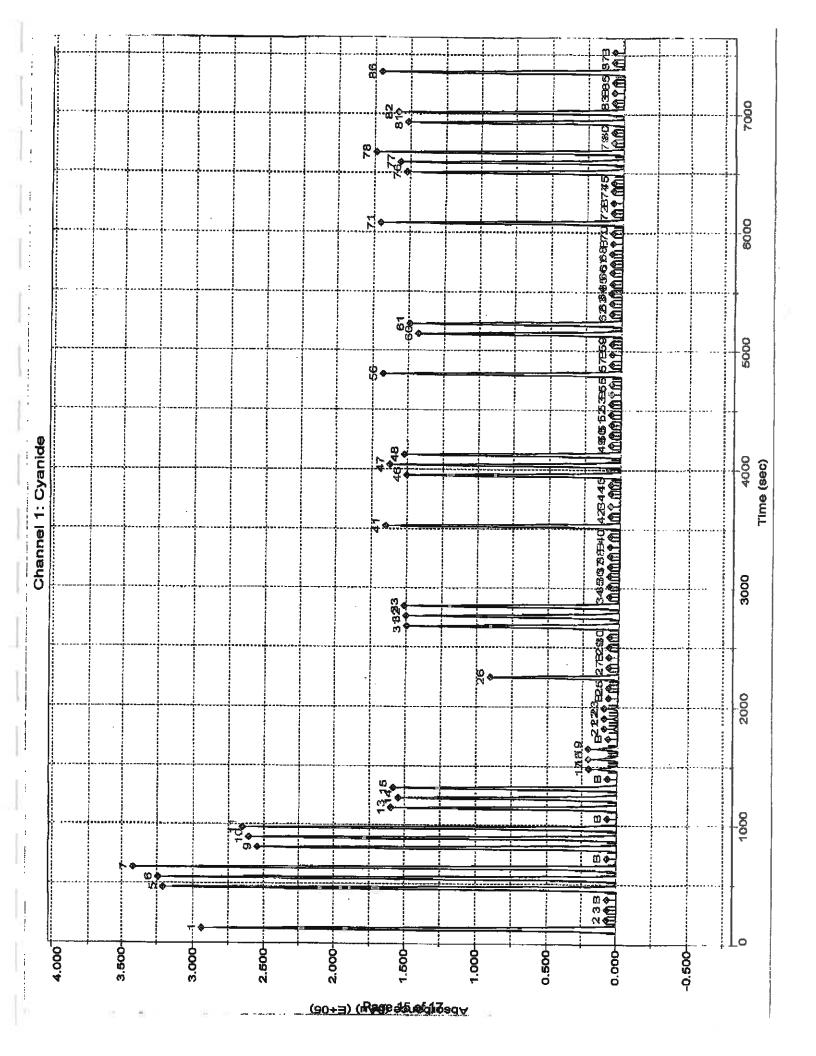
MW 8/13/12

			•				
?eak	Cup	Name	Type	Dil Wt	7	Area	Calc. (ppm)
∷, l	2	Sync	SYNC	1	1	6663245	0.992821
3	O	Carryover	CO	1	1	14306	0.001362
3	٥	Carryover	CO	1	1	994	-0.000623
3	0	Baseline	RB	1	1	3117	-0.000306
- 5	2	Cal 1.00 ppm	C	1	1	6700923	0.998440
3	2	Cal 1.00 ppm	C	1	1	6651245	0.991032
7	2	Cal 1.00 ppm	C	1	1	6511306	0.970165
3	0	Baseline	RB	1	ı	-468	-0.000841
	3	Cal 0.80 ppm	C	1	1	5479693	0.816335
LO	3	Cal 0.80 ppm	C	1	1	5470805	0.815010
11	3	Cal 0.80 ppm	C	1	1	5483462	0.816898
3	0	Baseline	RB	1	1	739	-0.000661
L3	4	Cal 0.50 ppm	C	1	1	3390538	0.504810
L4	4	Cal 0.50 ppm	C	1	1.	3347330	0.498367
15	4	Cal 0.50 ppm	C	1	1	3366900	0.501286
3	0	Baseline	RB	1	1	1201	-0.000592
L7 LB	5	Cal 0.05 ppm	C	1	Ţ	321394	0.047154
LB L9	5 5	Cal 0.05 ppm	C	1	1	318560	0.046731
3	0	Cal 0.05 ppm Baseline	C RB	1	1	323271	0.047434
21	6	Cal 0.01 ppm		1	1	103	-0.000756
122	6	Cal 0.01 ppm	C	<u>1</u> 1	72 1	68145	0.009390
23	6	Cal 0.01 ppm	C	1	1	63259	0.008662
3	o	Baseline	RB	A. C. Committee	1	65909	0.009057
25	1	Blank		1	1	-548 2548	-0.000853
126	7	ICV 0.25 ppm	CCA	1	1	-2549 1797901	-0.001151
27	í	Blank	BLNK	1	1	-1867	0.267324
3	ō	Baseline	RB	1	î	-4633	-0.001049
29	8	120731034-BL R	Ü	1	i	-1626	-0.001462
130	9	+120731034-001	Ü	52	1	-9380	-0.001014 -0.112826
31	10	120731034-001MS		52 52	i	3179464	24.613474
32	11	120731034-001MS		52	~î	3271425	
33	12	120731034-LCS	ָ บ	1	1	3387101	0.504298
34	13	·120731034-002	Ū	52.4	1	-3138	-0.064918
35	14	120731034-003	Ü	52.2	ī	1938	-0.025165
36	15	120801023-001	υ	1	ī	1508	-0.000546
37	16	120802042-001	บ	1	1	-4894	-0.001501
3.8	17	¢120806002-001	U	1	1	-3932	-0.001357
3	0	Baseline	RB	1	1	-3990	-0.001366
10	1	Blank	BLNK	1	1	-6028	-0.001670
11	4	CCV 0.5 ppm	CCV	1	1.	3355048	0.499518
12	1	Blank	BLNK	1	1	-5979	-0.001663
3	0	Read Baseline	RB	1	1	-2215	-0.001101
14	18	120802042-BL WW	Ü	1	1	-4296	-0.001412
15		+120802042-003	Ŭ	1	1	-3281	-0.001260
16	20	120802042-003MS		1	1	3155951	0.469830
17	21	120802042-003MSE		1	1	3260448	
18	22	6 120802042-LCS	U	1	1	3149826	0.468917
19	23	120802042-002	U	1	1	-2211	-0.001101
50	24	* 120802042-004	U	1	1	-2988	-0.001217
51	25	-120803018 003WM		1	1	-6266	-0.001705
52	26	* 120806002-002	u U		1	-4862	-0.001496
53	27	• 120731042-001	U	1	1	-2299	-0.001114
3 55	0	Baseline	RB	1.	1	1128	-0.000603
56	1.	Blank	BLNK	1	1	2166	-0.000448
57	4 1	CCV 0.5 ppm Blank	CCV	1	1	3421294	0.509397
			BLNK	1	1	3812	-0.000203
3	0	Read Baseline	RB	1	1	2616	-0.000381
59 50	28 29	120806003-001 R		1	1	1468	-0.000552
51		120806003-001MS		1	1	3052389	0.454387
52	30 31	120807045-001MSE		į	, 1	3199691	
53	32	~120807045-001 ~120807045-002	ט ט	5 E	1	5103	~0.000051
54	33	* 120809018-001 RS		5	1,	10059	0.003644
55	34	* 120809018-002 KS	ς u	54.1 52.7	, 1	23636	
56	35	a 120809028-001	Ü	52.7 1	1 1	11167	0.047124
	55	+ T20003020-001	5	Page 12 of 17	-	8244	0.000458

Pe	≥ ₹. jç	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
67	7	36	* 120809028-002	U	3	1	-2027	-0.001073
68	3	37	120809017-001	Ū	ī	ī	11843	0.001075
В		0	Baseline	RB	ĩ	1	-3030	-0.001223
70)	1	Blank	BLNK	ī	ī	-5751	-0.001223
71	l.	4	CCV 0.5 ppm	CCV	1	ï	3401767	0.506485
72	2	1	Blank	BLNK	1	ī	-7012	-0.001817
В		0	Baseline	RB	î	ī	-2009	-0.001071
74	1	38	4 -120803018-BL	ט	ī	1.	-3946	-0.001359
75	5	39	120803018-003	Ŭ		1	-7131	-0.001834
76	5	40	120803018-003MS	ט	- 1	ī	3109609	0.462920
77	7	41	120803018-003MS	ט כ	1	. 1	. 3128768	
78	3	42	120803018-LCS	U	1 ~	1	3439192	0.512065
79	€	43	4120802038-001	U	ī	ī	-5414	-0.001578
_ 80)	44	T120807042-006 PM	υ	ī	1	-3586	-0.001378
81		45	120807042-006MS	U	1	ī	3198054	0.476108
32	?	46	. 120807042-006MSI	ט כ	1	_1	3389696	
33	3	47	120807043-006	Ü	1	1	~5382	-0.001574
- 3		0	Baseline	RB	1	ī	-3961	-0.001362
35		1	Blank	BLNK	1	1	-7342	-0.001866
3 6		4	CCV 0.5 ppm	CCV	1	_ 1	3511794	0.522892
37	'	1	Blank	BLNK	ī	1	-7093	-0.001829
3		0	Read Baseline	RB	ī	ī	-1283	-0.001829

1		
Peak	Cup	Flags
1.	2	
1 2	ō	
3	õ	LO
3	0	BL
5	2	
5	2	
7	-2	
3	0	BL
3	3	
10 11	0 3 3 3	
3	Õ	BL
13	4	D11
14	4	
15	4	
3	0	BL
17	5	
18	5	
19	5	
3 21	О б	BL
22	6	OL
23	6	01
3	ŏ	BL
25	1	LO
26	7	
27	1	LO
3	0	BL
29	8	FO.
30 31	9 10	LO
32	11	
33	12	
34	13	LO
35	14	LO
36	15	LO
37	16	LO
38	17	FO
3	0	BL
40 41	1	ro
11 12	4 1	10
3	Ō	LO BL
14	18	FO

Pesk	Cup	Flags
45	19	LO
46	20	
47	21	
48	22	
49 50	23 24	TO TO
51	25	LO
52	26	LO 🌣
53	27	LO
B	0	BL
55 56	1 4	LO
57	i	LO
В	0	BL
59	28	FO
60	29	
61 62	30 31	LO
63	32	TO
64	33	
65	34	
66	35	
67 68	36 37	LO
B	0	ВL
70	1	LO
71	4	
72	1	LO
B	0	BL
74 75	38 39	LO LO
76	40	200
77	41	
7B	42	
79	43	ro
80 81	44 45	LO
82	46	
83	47	LO
В	0	BL
85	1	LO
86 87	4 1	T.O.
B	0	LO BL
	-	



File name: T:\DATA1\FLOW4\2012\EPA335.4\081012CY.RST

Date: August 10, 2012

Operator: CRW

4	Name			Conc	Area
-					
*	Çal	1.00	ppm	1.000000	6700923.000000
*	Ca.1.	1.00	ppm	1.000000	6651245.000000
+	Cal	1.00	ppm	1.000000	6511306.500000
4	Cal	0.80	mag	0.800000	5479693.000000
k	Cal	0.80	mqq	0.800000	5470805.000000
le l	Cal	0.80	mqq	0.800000	5483462.500000
k	Cal	0.50	ppm	0.500000	3390537,500000
¥	Cal	0.50	ppm	0.500000	3347330.250000
ę.	Cal	0.50	ppm	0.500000	3366900.000000
f	Cal	0.05	ppm	0.050000	321394.125000
ŀ	Cal.	0.05	ppm	0.050000	318560.156250
۲	Cal	0.05	ppm	0.050000	323271.312500
k	Cal	0.01	ppm	0.010000	68145.109375
k	Cal	0.01	maga	0.010000	63259.187500
P	Cal	0.01	mag	0.010000	65909.328125

Calib Coef:

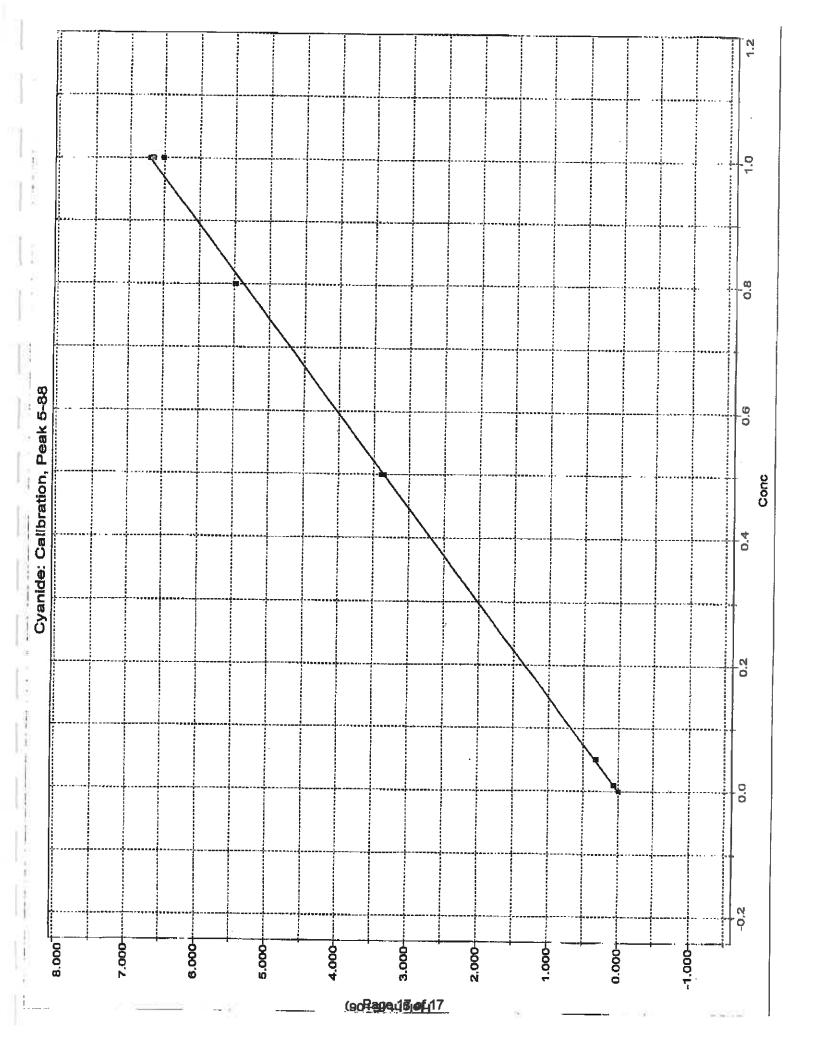
y=bx+a

a: (intercept) 5.1708e+03 b: 6.7062e+06

Corr Coef: 0.999645

Carryover: 0.215%

No Drift Peaks



Hall Environmental Analysis Laboratory, Inc.

WO#:

1208093

30-Aug-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Sample ID	MB
l	

SampType: MBLK

TestCode: EPA Method 300.0: Anions

Client ID: **PBW**

Batch ID: R4626

RunNo: 4626

Prep Date:

Analysis Date: 8/2/2012

PQL

0.50

0.50

SeqNo: 129896

Units: mg/L

Analyte Chloride Sulfate

Result ND ND

Result

SPK value SPK Ref Val

SPK value SPK Ref Val %REC LowLimit

%REC LowLimit HighLimit

%RPD **RPDLimit**

%RPD

Qual

Sample ID MB

Prep Date:

Client ID: **PBW** SampType: MBLK Batch ID: R4626

Analysis Date: 8/2/2012

TestCode: EPA Method 300.0: Anions

RunNo: 4626

SeqNo: 129948

Units: mg/L

HighLimit

RPDLimit

Qual

Analyte Chloride Sulfate

PQL 0.50

ND ND 0.50

Qualifiers:

В Analyte detected in the associated Method Blank

Η Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Reporting Detection Limit

Ε Value above quantitation range

S

Analyte detected below quantitation limits J

Spike Recovery outside accepted recovery limits

R RPD outside accepted recovery limits

Page 6 of 18

Hall Environmental Analysis Laboratory, Inc.

WO#:

1208093

30-Aug-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Sample ID 5ml rb	SampType: MBLK			TestCode: EPA Method 8260: Volatiles Short List								
Client ID: PBW	Batch	n ID: R 4	783	F	RunNo: 4	783						
Prep Date:	Analysis D	ate: 8/	8/2012	S	eqNo: 1	34870	Units: %RE	С				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Surr: 1,2-Dichloroethane-d4	9.0		10.00		89.9	70	130					
Surr: 4-Bromofluorobenzene	10		10.00		104	70	130					
Surr: Dibromofluoromethane	9.6		10.00		96.4	70	130					
Surr: Toluene-d8	9.9		10.00		99.3	70	130					

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

WO#:

1208093

30-Aug-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Sample ID 5ml b	SampT	ype: MI	BLK	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	n ID: R4	693	F	RunNo: 4	693				
Prep Date:	Analysis D	ate: 8/	6/2012	5	SeqNo: 1	31924	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0					•			
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene Bromobenzene	ND ND	4.0 1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

Page 8 of 18

Hall Environmental Analysis Laboratory, Inc.

WO#:

1208093

30-Aug-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Sample ID 5ml b	SampT	ype: Mi	BLK	TestCode: EPA Method 8260B: VOLATILES						
Client ID: PBW	Batch	ID: R4	1693	F	RunNo: 4	693				
Prep Date:	Analysis D	ate: 8/	/6/2012		SeqNo: 1	31924	Units: µg/L			
Analyte	Result	PQL	SDK value	SPK Ref Val	•	LowLimit	-	0/ DDD	DDDL had	
Isopropylbenzene	ND	1.0	OF IT VAIUE	SFR Rei Vai	76REC	LOWLITTIL	HighLimit	%RPD	RPDLimit	Qual
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	1.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.5		10.00		94.5	70	130			
Surr: 4-Bromofluorobenzene	8.7		10.00		86.9	70	130			
Surr: Dibromofluoromethane	10		10.00		101	70	130			
Sum: Toluene-d8	9.4		10.00		94.1	70	130			
Sample ID 1208093-001ams	SampTy	/pe: MS		Test	tCode: EF	PA Method	8260B: VOL	ATILES		
Client ID: Injection Well	Batch	ID: R4	693		lunNo: 40					
Prep Date:	Analysis Da	ate: 8 /0	6/2012	S	eqNo: 1	31927	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	18	1.0	20.00	0	92.1	66.8	128	_		
Tables		4.0								

Qualifiers:

Toluene

Chlorobenzene

1,1-Dichloroethene

Trichloroethene (TCE)

Surr: 1,2-Dichloroethane-d4

Surr: 4-Bromofluorobenzene

Surr: Dibromofluoromethane

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded

23

20

19

18

9.9

9.2

9.8

1.0

1.0

1.0

1.0

20.00

20.00

20.00

20.00

10.00

10.00

10.00

2.589

0

0

0

- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

103

99.0

94.4

92.3

99.2

91.7

98.4

70

70

70

70

70

70

70

130

130

130

130

130

130

130

S Spike Recovery outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1208093

30-Aug-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Sample ID 1208093-001ams

SampType: MS

TestCode: EPA Method 8260B: VOLATILES

Client ID: Injection Well

Batch ID: R4693

RunNo: 4693

Prep Date:

Analysis Date: 8/6/2012

SeqNo: 131927 Units: µg/L

Analyte

Result **PQL** SPK value SPK Ref Val %REC LowLimit

HighLimit

RPDLimit Qual

Surr: Toluene-d8

9.4

10.00

93.8

Sample ID 1208093-001amsd

SampType: MSD

TestCode: EPA Method 8260B: VOLATILES

%RPD

Client ID: Injection Well

Batch ID: R4693

RunNo: 4693

Units: ua/L

130

Prep Date:

Analysis Date: 8/6/2012

SeaNo: 131928

Frep Date.	Allalysis	Jale. o/	0/2012		seqivo: 1	31928	Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	19	1.0	20.00	0	96.2	66.8	128	4.44	16.7		_
Toluene	23	1.0	20.00	2.589	99.8	70	130	2.96	18.7		
Chlorobenzene	19	1.0	20.00	0	96.2	70	130	2.90	19.5		
1,1-Dichloroethene	21	1.0	20.00	0	105	70	130	11.0	16.7		
Trichloroethene (TCE)	18	1.0	20.00	0	91.2	70	130	1.19	17.5		
Surr: 1,2-Dichloroethane-d4	10		10.00		102	70	130	0	0		
Surr: 4-Bromofluorobenzene	8.9		10.00		89.3	70	130	0	0		
Surr: Dibromofluoromethane	10		10.00		102	70	130	0	0		
Surr: Toluene-d8	9.2		10.00		92.0	70	130	0	0		

	Sample ID 5ml rb	SampT	ype: ME	BLK	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
1	Client ID: PBW	Batch	ID: R4	783	F	RunNo: 4	783				
ı	Prep Date:	Analysis D	ate: 8/	8/2012	S	SeqNo: 1	34876	Units: µg/L			
	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
	Acetone	ND	10							·	
	Surr: 1,2-Dichloroethane-d4	9.0		10.00		89.9	70	130			
	Surr: 4-Bromofluorobenzene	10		10.00		104	70	130			
	Surr: Dibromofluoromethane	9.6		10.00		96.4	70	130			
	Surr: Toluene-d8	9.9		10.00		99.3	70	130			

	Sample ID b13	Sampi	ype: ME	BLK	Tes	tCode: El	PA Method	8260B: VOL	ATILES			
	Client ID: PBW	Batch	1D: R4	783	F	RunNo: 4	783					
	Prep Date:	Analysis D	ate: 8/	9/2012	S	SeqNo: 1	35116	Units: µg/L				
ı	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
	Acetone	ND	10						-		.	
ı	Surr: 1,2-Dichloroethane-d4	9.7		10.00		97.1	70	130				
l	Surr: 4-Bromofluorobenzene	9.9		10.00		99.3	70	130				
	Surr: Dibromofluoromethane	10		10.00		100	70	130				
ı	Surr: Toluene-d8	9.4		10.00		93.8	70	130				

Qualifiers:

- Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

- Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
 - Spike Recovery outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1208093

30-Aug-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Sample ID b17	SampT	SampType: MBLK			TestCode: EPA Method 8260B: VOLATILES							
Client ID: PBW	Batch	Batch ID: R4783			RunNo: 4	783						
Prep Date:	Analysis D	ate: 8/	9/2012	s	SeqNo: 1	35117	Units: µg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
Acetone	ND	10										
Surr: 1,2-Dichloroethane-d4	9.2		10.00		91.8	70	130					
Surr: 4-Bromofluorobenzene	9.0		10.00		89.7	70	130					
Surr: Dibromofluoromethane	9.6		10.00		95.5	70	130					
Sur: Toluene-d8	10		10.00		101	70	130					

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

WO#:

1208093

30-Aug-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

1	Sample ID 5ml rb	SampT	ype: Mi	3LK	Tes	tCode: T0	CLP Volatil	es by 8260B			
	Client ID: PBW	Batch	ID: R 4	783	F	RunNo: 4	783				
	Prep Date:	Analysis D	ate: 8/	8/2012	S	SeqNo: 1	34943	Units: %RE	С		
ı	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
	Surr: 1,2-Dichloroethane-d4	0.0090		0.2000		4.50	70	130	_		S
	Surr: 4-Bromofluorobenzene	0.010		0.2000		5.20	73	131			S
ì	Surr: Dibromofluoromethane	0.0096		0.2000		4.82	70	130			S
	Surr: Toluene-d8	0.0099		0.2000		4.96	70	130			S

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
 - S Spike Recovery outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1208093

30-Aug-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Sample ID mb-3177	Samp	ype: MI	BLK	Tes	tCode: El	PA Method	8270C: Semi	volatiles		
Client ID: PBW	Batcl	h ID: 31	77	F	RunNo: 4	706				
Prep Date: 8/3/2012	Analysis D)ate: 8/	7/2012	\$	SeqNo: 1	32557	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10								
Acenaphthylene	ND	10								
Aniline	ND	10								
Anthracene	ND	10								
Azobenzene	ND	10								
Benz(a)anthracene	ND	10								
Benzo(a)pyrene	ND	10								
Benzo(b)fluoranthene	ND	10								
Benzo(g,h,i)perylene	ND	10								
Benzo(k)fluoranthene	ND	10								
Benzoic acid	ND	20								
Benzyl alcohol	ND	10								
Bis(2-chloroethoxy)methane	ND	10								
Bis(2-chloroethyl)ether	ND	10								
Bis(2-chloroisopropyl)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	10								
4-Bromophenyl phenyl ether	ND	10								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								
4-Chloro-3-methylphenol	ND	10								
4-Chloroaniline	ND	10								
2-Chloronaphthalene	ND	10								
2-Chlorophenol	ND	10								
4-Chlorophenyl phenyl ether	ND	10								
Chrysene	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Dibenz(a,h)anthracene	ND	10								
Dibenzofuran	ND	10								
1,2-Dichlorobenzene	ND	10								
1,3-Dichlorobenzene	ND	10								
1,4-Dichlorobenzene	ND	10								
3,3´-Dichlorobenzidine	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
2,4-Dichlorophenol	ND	20								
2,4-Dimethylphenol	ND	10								
4,6-Dinitro-2-methylphenol	ND	20								
2,4-Dinitrophenol	ND	20								
2,4-Dinitrotoluene	ND	10								
2,6-Dinitrotoluene	ND	10								

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1208093

30-Aug-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

	Sample ID mb-3177	SampType	e: ME	BLK	Tes	tCode: El	PA Method	8270C: Semi	olatiles/		
I	Client ID: PBW	Batch ID	: 31	77	F	RunNo: 47	706				
Ţ	Prep Date: 8/3/2012	Analysis Date	: 8/	7/2012		SeqNo: 1		Units: µg/L			
ï	Analyte		QL.	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
ľ	Fluoranthene	ND	10								
-	Fluorene	ND	10								
ř	Hexachlorobenzene	ND	10								
ı	Hexachlorobutadiene	ND	10								
	Hexachlorocyclopentadiene	ND	10								
	Hexachloroethane	ND	10								
1	Indeno(1,2,3-cd)pyrene	ND	10								
I	Isophorone	ND	10								
	1-Methylnaphthalene	ND	10								
	2-Methylnaphthalene	ND	10								
	2-Methylphenol	ND	10								
	3+4-Methylphenol	ND	10								
	N-Nitrosodi-n-propylamine	ND	10								
	N-Nitrosodimethylamine	ND	10								
	N-Nitrosodiphenylamine	ND	10								
	Naphthalene	ND	10								
	2-Nitroaniline	ND	10								
	3-Nitroaniline	ND	10								
	4-Nitroaniline	ND	20								
	Nitrobenzene	ND	10								
	2-Nitrophenol	ND	10								
	4-Nitrophenol	ND	10								
	Pentachlorophenol	ND	20								
	Phenanthrene	ND	10								
l, i	Phenol	ND	10								
-	Pyrene	ND	10								
П	Pyridine	ND	10								
ľ	1,2,4-Trichlorobenzene	ND	10								
	2,4,5-Trichlorophenol	ND	10								
	2,4,6-Trichlorophenol	ND	10								
	Surr: 2,4,6-Tribromophenol	170		200.0		87.4	44.2	126			
	Surr: 2-Fluorobiphenyl	80		100.0		79.9	37	114			
	Surr: 2-Fluorophenol	110		200.0		56.1	23.4	98			
	Surr: 4-Terphenyl-d14	83		100.0		82.8	41.3	116			
	Surr: Nitrobenzene-d5	87		100.0		86.8	39.5	118			
	Surr: Phenol-d5	99		200.0		49.4	20.9	95.9			

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1208093

30-Aug-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Sample ID MB-3160

Prep Date: 8/2/2012

SampType: MBLK

TestCode: EPA Method 7470: Mercury

Client ID: PBW

Batch ID: 3160

RunNo: 4640

Analysis Date: 8/3/2012

SeqNo: 130457

Units: mg/L

Analyte

SPK value SPK Ref Val **PQL**

%REC LowLimit

HighLimit

%RPD

RPDLimit

Qual

Mercury

ND 0.00020

Qualifiers:

- Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded Н
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1208093

30-Aug-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Sample ID MB-3199	-	Type: MI		TestCode: EPA 6010B: Total Recoverable Metals							
Client ID: PBW	Bato	h iD: 31	99	F	RunNo: 4849						
Prep Date: 8/6/2012	Analysis	Date: 8/	14/2012	SeqNo: 136952			Units: mg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Arsenic	ND	0.020									
Barium	ND	0.020									
Cadmium	ND	0.0020									
Calcium	ND	1.0									
Chromium	ND	0.0060									
_ead	ND	0.0050									
/lagnesium	ND	1.0									
Potassium	ND	1.0									
Selenium	ND	0.050									
Silver	ND	0.0050									
Sodium	ND	1.0									

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1208093

30-Aug-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Sample ID mb-1

SampType: MBLK

TestCode: SM2320B: Alkalinity

Client ID: **PBW** Batch ID: R4833

RunNo: 4833

SeqNo: 136497

Units: mg/L CaCO3

Prep Date: Analyte

Analysis Date: 8/13/2012 **PQL**

20

SPK value SPK Ref Val

Result

%REC LowLimit

HighLimit

%RPD

RPDLimit

Qual

Total Alkalinity (as CaCO3)

ND

Qualifiers:

Analyte detected in the associated Method Blank В

Holding times for preparation or analysis exceeded

Not Detected at the Reporting Limit ND

Reporting Detection Limit

Ε Value above quantitation range

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1208093

30-Aug-12

Client:

Western Refining Southwest, Inc.

Project:

Client ID:

Injection Well 3rd Qtr

Sample ID MB-3211

SampType: MBLK

Batch ID: 3211

RunNo: 4720

PBW

Sample ID 1208093-001CMS

Prep Date: 8/6/2012

Analysis Date: 8/8/2012

SeqNo: 132985

Units: mg/L

Analyte

Result **PQL** ND 20.0 SPK value SPK Ref Val

%REC LowLimit HighLimit

TestCode: SM2540C MOD: Total Dissolved Solids

%RPD **RPDLimit**

Qual

Total Dissolved Solids

SampType: MS

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: Injection Well Prep Date: 8/6/2012

Batch ID: 3211

RunNo: 4720

Result

4770

Analysis Date: 8/8/2012

PQL

SeqNo: 132996

Units: mg/L

Analyte

SPK value SPK Ref Val

%REC LowLimit

HighLimit

Qual

Total Dissolved Solids

4740

40.0

2000 2742

100

80

TestCode: SM2540C MOD: Total Dissolved Solids

%RPD

RPDLimit

Sample ID 1208093-001CMSD

Prep Date:

Client ID: Injection Well

8/6/2012

SampType: MSD

Batch ID: 3211

40.0

RunNo: 4720

Units: mg/L

Qual

Analyte Total Dissolved Solids Analysis Date: 8/8/2012 Result

2000

SPK value SPK Ref Val 2742

%REC LowLimit 101

SeqNo: 132997

HighLimit %RPD 120 0.505 **RPDLimit** 20

Qualifiers:

В Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit Ε

Value above quantitation range

J Analyte detected below quantitation limits R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

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RL Reporting Detection Limit



Hall Environmental Analysis Laboratory 4901 Hanvkins NE Albuquerque, NM 87105

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: Western Refining Southwest, Inc Bloomfield Work Order Number: 1208093 Received by/date: Logged By: 8/1/2012 9:30:00 AM Lindsay Mangin 8/2/2012 12:55:15 PM Completed By: Lindsay Mangin 18/02/12 Reviewed By: Chain of Custody 1. Were seals intact? No Not Present ✔ 2. Is Chain of Custody complete? Yes V. No Not Present 3. How was the sample delivered? **UPS** Log In 4. Coolers are present? (see 19. for cooler specific information) NA · 5. Was an attempt made to cool the samples? Yes No V 6. Were all samples received at a temperature of >0° C to 6.0°C Approved by client. 7. Sample(s) in proper container(s)? Yes W No 8. Sufficient sample volume for indicated test(s)? Yes W No 9. Are samples (except VOA and ONG) properly preserved? Yes V No NA Yes No V 10. Was preservative added to bottles? Yes M No I No VOA Vials 11, VOA vials have zero headspace? Yes No V 12. Were any sample containers received broken? # of preserved 13. Does paperwork match bottle labels? Yes V No bottles checked (Note discrepancies on chain of custody) for pH; Yes W No 14. Are matrices correctly identified on Chain of Custody? (<2 or >12 unless noted) Adjusted? 15. Is it clear what analyses were requested? Yes V No il 16. Were all holding times able to be met? Yes V No i i (If no, notify customer for authorization.) Checked by: Special Handling (if applicable) 17. Was client notified of all discrepancies with this order? Yes No NA 🔽 Person Notified: Date: By Whom: Via: | eMail | Phone X Fax | In Person Regarding: w/ analysis Client Instructions: 18. Additional remarks: 19. Cooler Information

ļ	Cooler No	Temp ºC	Condition	Seal Intact	Seal No	Seal Date	Signed By
	1			Yes			

	HALL ENVIRONMENTAL ANALYSTS I AROBATODY	773	4901 Hawkins NE - Albuqueraue, NM 87109	100	4na		Dies	\286 \ZTT \ZTT	HPH 682 (M)	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	od (A)	BTEX + M BTEX + M TPH Methr ROGA 8 M Anions (F, 8081 Pesti 8081 Pesti 8081 Pesti 8081 Pesti 8081 Pesti 8270 (Sem	×	×	×	X		×		X			emarks:		If necessary, samples submitted to Hall Environmental may be subcombacted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.
	HALL	3 1 OTR www.hallen	1	100	4na	(les	Dies	69) \286	HAT HAT (M	108 + 3 + 3	18T 3 bo	nteM HqT				X	X			X			8/1/12 9:30 Remarks:	Date Time	serves as notice of this possibility. Any sub-contracted data will be
Turn-Around Time:	Standard 🗆 Rush		Injection Well	Project #:		Project Manager:			Sampler: 45.b			Container Preservative Type and # Type	3-VOA HCI	1-liter amber		1-500ml	1-350m H2504	1-500m Na OH	1-500ml Zai Actata	-7		-	400	Received by: Do	ontracted to other accredited laboratories. This
Chain-of-Custody Record	Western Refining		#50 CR 4990	eld NM 87413	505-632-4135			★ Level 4 (Full Validation)				ne Matrix Sample Request ID	Had INJECTION Well										Relinquished by: Robot Krakan	Refinquished by:	ary, samples submitted to Hall Environmental may be subcor
Cha	Client:		Mailing Address:		Phone #:	email or Fax#:	QA/QC Package:	□ Standard	Accreditation	D EDD (Tyme)		Date Time	7-31-12 1:30	_									Pate: Time: 7-3/-/2 3:80	Date: Time:	If necess



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: <u>www.hallenvironmental.com</u>

November 07, 2012

Kelly Robinson

Western Refining Southwest, Inc.

#50 CR 4990

Bloomfield, NM 87413

TEL: (505) 632-4135 FAX (505) 632-3911

RE: Injection Well 10-11-12 OrderNo.: 1210682

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 10/12/2012 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107

Website: www.hallenvironmental.com

Workorder Sample Summary

WO#:

1210682

07-Nov-12

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 10-11-12

			<u>.</u>		
Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1210682-001	Injection Well		10/11/2012 9:00:00 AM	10/12/2012 10:30:00 AM	Aqueous
1210682-001	Injection Well		10/11/2012 9:00:00 AM	10/12/2012 10:30:00 AM	Aqueous
1210682-001	Injection Well		10/11/2012 9:00:00 AM	10/12/2012 10:30:00 AM	Aqueous
1210682-001	Injection Well		10/11/2012 9:00:00 AM	10/12/2012 10:30:00 AM	Aqueous
1210682-001	Injection Well		10/11/2012 9:00:00 AM	10/12/2012 10:30:00 AM	Aqueous

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 11/7/2012

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 10-11-12

Lab ID: 1210682-001

Client Sample ID: Injection Well

Collection Date: 10/11/2012 9:00:00 AM **Received Date:** 10/12/2012 10:30:00 AM

					2012 10:50:00 AW
Analyses	Result	RL Qu	al Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS	··				Analyst: JRR
Chloride	1200	50	mg/L	100	10/13/2012 1:23:58 PM
Sulfate	37	5.0	mg/L	10	10/13/2012 1:11:34 PM
EPA METHOD 7470: MERCURY					Analyst: IDC
Mercury	ND	0.00020	mg/L	1	10/30/2012 6:06:43 PM
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst: JLF
Arsenic	ND	0.020	mg/L	1	10/18/2012 10:44:05 AM
Barium	0.41	0.020	mg/L	1	10/18/2012 10:44:05 AM
Cadmium	ND	0.0020	mg/L	1	10/18/2012 10:44:05 AM
Calcium	150	5.0	mg/L	5	10/18/2012 10:54:52 AM
Chromium	ND	0.0060	mg/L	1	10/18/2012 10:44:05 AN
Lead	ND	0.0050	mg/L	1	10/18/2012 10:44:05 AM
Magnesium	44	1.0	mg/L	1	10/18/2012 10:44:05 AM
Potassium	14	1.0	mg/L	1	10/18/2012 10:44:05 AM
Selenium	ND	0.050	mg/L	1	10/24/2012 2:15:44 PM
Silver	ND	0.0050	mg/L	1	10/18/2012 10:44:05 AM
Sodium	670	10	mg/L	10	10/18/2012 11:19:04 AM
EPA METHOD 8270C: SEMIVOLATILE	ES				Analyst: JDC
Acenaphthene	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Acenaphthylene	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Aniline	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Anthracene	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Azobenzene	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Benz(a)anthracene	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Benzo(a)pyrene	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Benzo(b)fluoranthene	ND	50	μg/L	16	10/20/2012 7:09:26 PM
Benzo(g,h,i)perylene	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Benzo(k)fluoranthene	ND	50	μg/L	1	10/20/2012 7:09;26 PM
Benzoic acid	ND	100	μg/L	1	10/20/2012 7:09:26 PM
Benzyl alcohol	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Bis(2-chloroethoxy)methane	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Bis(2-chloroethyl)ether	ND	50	μg/L	10	10/20/2012 7:09:26 PM
Bis(2-chloroisopropyl)ether	ND	50	μg/L	10	10/20/2012 7:09:26 PM
Bis(2-ethylhexyl)phthalate	ND	50	μ g/ L	1	10/20/2012 7:09:26 PM
4-Bromophenyl phenyl ether	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Butyl benzyl phthalate	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Carbazole	ND	50	μg/L	1	10/20/2012 7:09:26 PM
4-Chloro-3-methylphenol	ND	50	μg/∟	1	10/20/2012 7:09:26 PM
4-Chloroaniline	ND	50	μg/L	1	10/20/2012 7:09:26 PM
2-Chloronaphthalene	ND	50	μg/L	1	10/20/2012 7:09:26 PM
2-Chlorophenol	ND	50	μg/L	1	10/20/2012 7:09:26 PM

Matrix: AQUEOUS

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits 2 of 19

Analytical Report

Lab Order 1210682

Date Reported: 11/7/2012

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 10-11-12

Lab ID: 1210682-001

Client Sample ID: Injection Well

Collection Date: 10/11/2012 9:00:00 AM Received Date: 10/12/2012 10:30:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLA	TILES			· · · · ·	Analyst: JD(
4-Chlorophenyl phenyl ether	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Chrysene	ND	50	μg/L	1	10/20/2012 7:09:26 Pt
Di-n-butyl phthalate	ND	50	µg/L	9	10/20/2012 7:09:26 PI
Di-n-octyl phthalate	ND	100	μg/L	1	10/20/2012 7:09:26 PI
Dibenz(a,h)anthracene	ND	50	μg/L	1	10/20/2012 7:09:26 Pf
Dibenzofuran	ND	50	μg/L	1	10/20/2012 7:09:26 PI
1,2-Dichlorobenzene	ND	50	μg/L	1	10/20/2012 7:09:26 PI
1,3-Dichlorobenzene	ND	50	μg/L	1	10/20/2012 7:09:26 PI
1,4-Dichlorobenzene	ND	50	μg/L	1	10/20/2012 7:09:26 PI
3,3'-Dichlorobenzidine	ND	50	μg/L	1	10/20/2012 7:09:26 Pi
Diethyl phthalate	ND	50	μg/L	1	10/20/2012 7:09:26 PI
Dimethyl phthalate	ND	50	μg/L	1	10/20/2012 7:09:26 PI
2,4-Dichlorophenol	ND	100	μg/L	1	10/20/2012 7:09:26 PI
2,4-Dimethylphenol	ND	50	μg/L	1	10/20/2012 7:09:26 P
4,6-Dinitro-2-methylphenol	ND	100	μg/L	1	10/20/2012 7:09:26 P
2,4-Dinitrophenol	ND	100	μg/L	1	10/20/2012 7:09:26 P
2,4-Dinitrotoluene	ND	50	μg/L	1	10/20/2012 7:09:26 P
2,6-Dinitrotoluene	ND	50	μg/L	1	10/20/2012 7:09:26 P
Fluoranthene	ND	50	μg/L	1	10/20/2012 7:09:26 P
Fluorene	ND	50	μg/L	1	10/20/2012 7:09:26 P
Hexachiorobenzene	ND	50	μg/L	1	10/20/2012 7:09:26 P
Hexachlorobutadiene	ND	50	μg/L	1	10/20/2012 7:09:26 P
Hexachlorocyclopentadiene	ND	50	μg/L	35	10/20/2012 7:09:26 P
Hexachloroethane	ND	50	μg/L	1	10/20/2012 7:09:26 PI
Indeno(1,2,3-cd)pyrene	ND	50	μg/L	1	10/20/2012 7:09:26 P
Isophorone	ND	50	μg/L	1	10/20/2012 7:09:26 PI
1-Methylnaphthalene	ND	50	μg/L	1	10/20/2012 7:09:26 PI
2-Methylnaphthalene	ND	50	µg/∟	1	10/20/2012 7:09:26 PI
2-Methylphenol	ND	50	μg/L	1	10/20/2012 7:09:26 PI
3+4-Methylphenol	ND	50	μg/L	1	10/20/2012 7:09:26 PI
N-Nitrosodi-n-propylamine	ND	50	μg/L	1	10/20/2012 7:09:26 PI
N-Nitrosodimethylamine	ND	50	μg/L	1	10/20/2012 7:09:26 Pt
N-Nitrosodiphenylamine	ND	50	μg/L	3	10/20/2012 7:09:26 PM
Naphthalene	ND	50	μg/L	1	10/20/2012 7:09:26 Pt
2-Nitroaniline	ND	50	μg/L	1	10/20/2012 7:09:26 Pt
3-Nitroaniline	ND	50	μg/L	1	10/20/2012 7:09:26 Pi
4-Nitroaniline	ND	50	μg/L	1	10/20/2012 7:09:26 Pt
Nitrobenzene	ND	50	μg/L	1	10/20/2012 7:09:26 PM
2-Nitrophenol	ND	50	μg/L	1	10/20/2012 7:09:26 PM
4-Nitrophenol	ND	50	µg/L	1	10/20/2012 7:09:26 PM
Pentachlorophenol	ND	100	μg/L	1	10/20/2012 7:09:26 PM
Phenanthrene	ND	50	μg/L	1	10/20/2012 7:09:26 PM

Matrix: AQUEOUS

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery finits 2 of 19

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 10-11-12

Lab ID: 1210682-001

Client Sample ID: Injection Well

Collection Date: 10/11/2012 9:00:00 AM Received Date: 10/12/2012 10:30:00 AM

Analyses	Result				
	Kesuit	RL Qu	al Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES					Analyst: JDC
Phenol	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Pyrene	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Pyridine	ND	50	μg/L	1	10/20/2012 7:09:26 PM
1,2,4-Trichlorobenzene	ND	50	μg/L	1	10/20/2012 7:09:26 PM
2,4,5-Trichlorophenol	ND	50	μg/L	1	10/20/2012 7:09:26 PM
2,4,6-Trichlorophenol	ND	50	μg/L	1	10/20/2012 7:09:26 PM
Surr: 2,4,6-Tribromophenol	98.5	42.9-124	%REC	1	10/20/2012 7:09:26 PM
Surr: 2-Fluorobiphenyl	84.5	40-108	%REC	1	10/20/2012 7:09:26 PM
Surr: 2-Fluorophenol	72.0	23.6-94.8	%REC	1	10/20/2012 7:09:26 PM
Surr: 4-Terphenyl-d14	85.9	41.9-103	%REC	1	10/20/2012 7:09:26 PM
Surr: Nitrobenzene-d5	100	42.6-114	%REC	- 3	10/20/2012 7:09:26 PM
Surr: Phenol-d5	57.0	20.3-74.7	%REC	1	10/20/2012 7:09:26 PM
EPA METHOD 8260B: VOLATILES					Analyst: MMS
Benzene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
Toluene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
Ethylbenzene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
Methyl tert-butyl ether (MTBE)	ND	10	μg/L	10	10/19/2012 1:17:34 PM
1,2,4-Trimethylbenzene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
1,3,5-Trimethylbenzene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
1,2-Dichloroethane (EDC)	ND	10	μg/L	10	10/19/2012 1:17:34 PM
1,2-Dibromoethane (EDB)	ND	10	μg/L	10	10/19/2012 1:17:34 PM
Naphthalene	ND	20	μg/L	10	10/19/2012 1:17:34 PM
1-Methylnaphthalene	ND	40	μg/L	10	10/19/2012 1:17:34 PM
2-Methylnaphthalene	ND	40	μg/L	10	10/19/2012 1:17:34 PM
Acetone	130	100	μg/L	10	10/19/2012 1:17:34 PM
Bromobenzene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
Bromodichloromethane	ND	10	μg/L	10	10/19/2012 1:17:34 PM
Bromoform	ND	10	µg/L	10	10/19/2012 1:17:34 PM
Bromomethane	ND	30	μg/L	10	10/19/2012 1:17:34 PM
2-Butanone	ND	100	μg/L	10	10/19/2012 1:17:34 PM
Carbon disulfide	ND	100	μg/L	10	10/19/2012 1:17:34 PM
Carbon Tetrachloride	ND	10	μg/L	10	10/19/2012 1:17:34 PM
Chlorobenzene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
Chloroethane	ND	20	μg/L	10	10/19/2012 1:17:34 PM
Chloroform	ND	10	μg/L	10	10/19/2012 1:17:34 PM
Chloromethane	ND	30	μg/L	10	10/19/2012 1:17:34 PM
2-Chlorotoluene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
4-Chlorotoluene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
cis-1,2-DCE	ND	10	μg/L	10	10/19/2012 1:17:34 PM
cis-1,3-Dichloropropene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
1,2-Dibromo-3-chloropropane	ND	20	μg/L	10	10/19/2012 1:17:34 PM

Matrix: AQUEOUS

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits 4 of 19

Analytical Report

Lab Order 1210682

Date Reported: 11/7/2012

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 10-11-12

Lab ID: 1210682-001

Client Sample ID: Injection Well

Collection Date: 10/11/2012 9:00:00 AM Received Date: 10/12/2012 10:30:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Analyst: MMS
Dibromochloromethane	ND	10	µg/L	10	10/19/2012 1:17:34 PM
Dibromomethane	ND	10	μg/L	10	10/19/2012 1:17:34 PM
1,2-Dichlorobenzene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
1,3-Dichlorobenzene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
1,4-Dichlorobenzene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
Dichlorodifluoromethane	ND	10	μg/L	10	10/19/2012 1:17:34 PN
1,1-Dichloroethane	ND	10	μg/L	10	10/19/2012 1:17:34 PN
1,1-Dichloroethene	ND	10	μg/L	10	10/19/2012 1:17:34 PN
1,2-Dichloropropane	ND	10	μg/L	10	10/19/2012 1:17:34 PN
1,3-Dichloropropane	ND	10	μg/L	10	10/19/2012 1:17:34 PN
2,2-Dichloropropane	ND	20	μg/L	10	10/19/2012 1:17:34 PN
1,1-Dichloropropene	ND	10	μg/L	10	10/19/2012 1:17:34 PN
Hexachlorobutadiene	ND	10	μg/L	10	10/19/2012 1:17:34 PN
2-Hexanone	ND	100	μg/L	10	10/19/2012 1:17:34 PN
Isopropylbenzene	ND	10	μg/L	10	10/19/2012 1:17:34 PN
4-Isopropyltoluene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
4-Methyl-2-pentanone	ND	100	μg/L	10	10/19/2012 1:17:34 PM
Methylene Chloride	ND	30	μg/L	10	10/19/2012 1:17:34 PM
n-Butylbenzene	ND	30	μg/L	10	10/19/2012 1:17:34 PM
n-Propylbenzene	ND	10	µg/∟	10	10/19/2012 1:17:34 PM
sec-Butylbenzene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
Styrene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
tert-Butylbenzene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
1,1,1,2-Tetrachioroethane	ND	10	μg/L	10	10/19/2012 1:17:34 PM
1,1,2,2-Tetrachloroethane	ND	20	μg/L	10	10/19/2012 1:17:34 PM
Tetrachloroethene (PCE)	ND	10	μg/L	10	10/19/2012 1:17:34 PM
trans-1,2-DCE	ND	10	μg/L	10	10/19/2012 1:17:34 PM
trans-1,3-Dichloropropene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
1,2,3-Trichlorobenzene	ND	10	μg/L	10	10/19/2012 1:17:34 PN
1,2,4-Trichlorobenzene	ND	10	μg/L	10	10/19/2012 1:17:34 PM
1,1,1-Trichloroethane	ND	10	μg/L	10	10/19/2012 1:17:34 PM
1,1,2-Trichloroethane	ND	10	μg/L	10	10/19/2012 1:17:34 PN
Trichloroethene (TCE)	ND	10	μg/L	10	10/19/2012 1:17:34 PM
Trichlorofluoromethane	ND	10	µg/L	10	10/19/2012 1:17:34 PM
1,2,3-Trichloropropane	ND	20	μg/L	10	10/19/2012 1:17:34 PN
Vinyl chloride	ND	10	μg/L	10	10/19/2012 1:17:34 PN
Xylenes, Total	ND	15	μg/L	10	10/19/2012 1:17:34 PN
Surr: 1,2-Dichloroethane-d4	95.9	70-130	%REC	10	10/19/2012 1:17:34 PM
Surr: 4-Bromofluorobenzene	102	70-130	%REC	10	10/19/2012 1:17:34 PN
Surr: Dibromofluoromethane	102	70-130	%REC	10	10/19/2012 1:17:34 PN
Surr: Toluene-d8	96.0	70-130	%REC	10	10/19/2012 1:17:34 PN

Matrix: AQUEOUS

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits 5 of 19

Analytical Report

Lab Order 1210682

Date Reported: 11/7/2012

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 10-11-12

Lab ID: 1210682-001

Client Sample ID: Injection Well

Collection Date: 10/11/2012 9:00:00 AM Received Date: 10/12/2012 10:30:00 AM

Analyses	Result	RL Qua	al Units	DF	Date Analyzed
EPA 120.1: SPECIFIC CONDUCTA	ANCE				Analyst: JML
Conductivity	4600	0.010	µmhos/cm	1	10/15/2012 12:32:45 PM
SM4500-H+B: PH					Analyst: JML
рН	7.35	1.68 H	l pH units	1	10/15/2012 12:32:45 PM
SM2320B: ALKALINITY					Analyst: JML
Bicarbonate (As CaCO3)	510	20	mg/L CaCO3	1	10/15/2012 12:32:45 PM
Carbonate (As CaCO3)	ND	2.0	mg/L CaCO3	1	10/15/2012 12:32:45 PM
Total Alkalinity (as CaCO3)	510	20	mg/L CaCO3	1	10/15/2012 12:32:45 PM
SM2540C MOD: TOTAL DISSOLV	ED SOLIDS				Analyst: KS
Total Dissolved Solids	2910	100	mg/L	1	10/16/2012 7:08:00 PM

Matrix: AQUEOUS

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
 - Spike Recovery outside accepted recovery himses 6 of 19

CASE NARRATIVE

November 2, 2012

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM

Project Tracking No.: 1210682 Anatek Batch: 121017011

Project Summary: One (1) water sample was received on 10/11/2012 for reactive cyanide, reactive sulfide, pH, and flashpoint analysis. The sample was received with appropriate chain of custody at 4.5C.

Client Sample ID 1210682-001E / Injection Well Anatek Sample ID Method/Prep Method 121017011-001

EPA 1010/150.1/SW 846 CH7

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Υ	NA
Surrogate Recoveries Valid?	Υ	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Y	NA
Tune(s) Valid?	NA	NA
Internal Standard Responses Valid?	NA	NA
Initial Calibration Curve(s) Valid?	Υ	NA
Continuing Calibration(s) Valid?	Υ	NA
Comments:	Υ	NA

1. Holding Time Requirements

No problems encountered.

2. GC/MS Tune Requirements

N/A

3. Calibration Requirements

No problems encountered.

4. Surrogate Recovery Requirements

N/A.

5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

6. Method Blank Requirements

No problems encountered.

7.	Internal	Standard	8	Response	Rec	uirements

N/A.

8. Comments

No problems encountered.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by:

Page 2 of 16

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste, D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

121017011

Address:

4901 HAWKINS NE SUITE D **ALBUQUERQUE, NM 87109**

Project Name:

1210682

Attn:

ANDY FREEMAN

Analytical Results Report

10/11/2012

Sample Number

121017011-001

Sampling Date

Date/Time Received 10/16/2012 1:05 PM

Client Sample ID

1210682-001E / INJECTION WELL

Sampling Time

9:00 AM

Sample Location

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	0.1	10/22/2012	CRW	SW846 CH7	
Flashpoint	>200	٩F		10/25/2012	KFG	EPA 1010	
pH [©]	7.37	ph Units	507	10/18/2012	ETL	EPA 150.1	
Reactive sulfide	6.43	mg/L	1	10/24/2012	ЛТ	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL

EPA's Maximum Contaminant Level

ND

Not Detected

PQL

Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.

The results reported relate only to the samples indicated.

Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

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Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Address:

4901 HAWKINS NE SUITE D

ALBUQUERQUE, NM 87109

Attn:

ANDY FREEMAN

Batch #:

121017011

Project Name:

1210682

Analytical Results Report
Quality Control Data

Lab Control Sam	ple		•	•			-			1,1
Parameter		LCS Result	Unit	s LCS	Spike	%Rec	AR %Re	c Pro	p Date	Analysis Date
Reactive sulfide		0.180	mg/l	L.	0.2	90.0	70-130	10/	24/2012	10/24/2012
Cyanide (reactive)		0.487	mg/l	L	0.5	97.4	80-120	10/	22/2012	10/22/2012
Lab Control Sam	pie Duplicate	_ ·				·				<u>.</u>
Parameter		LCSD	D-4-	LCSD			AR			
Reactive sulfide		Result 0.180	Units	Spike	%Rec	%RPD	701/U E			Anaiysis Date
Meacave suince		0.180	mg/L	0.2	90.0	0.0	0-25	10/2	1/2012	10/24/2012
Matrix Spike		· · · · · · · · · · · · · · · · · · ·					<u> </u>			
Sample Number Pa	ırameter		Sample	MS	1114-		IS	AR		
•	eactive sulfide		Result 6.43	Result 12.9	Unite	. vp	ike %Re			-
	yanide (reactive)		ND	0.453	mg/L mg/L		03 80.6 .5 90.6			
	,,	<u></u>		0.400	ng/L		,08 c.	80-12	0 10/22/201	2 10/22/2012
Matrix Spike Dupi	licate	···	<u></u>	· //						<u> </u>
Parameter		MSD	1 t ta-	MSD	44 m		A			
Cyanide (reactive)		Result 0.468	Units	Spike	%Re		Jun 1	_	rep Date	Analysis Date
- Change (Legerise)	<u> </u>	0.408	mg/L	0.5	93.0	5 3	.3 0-:	25 10	/22/2012	10/22/2012
Method Blank		<u></u>	_							
Parameter			Re	sult	Uni	lts	PQL		Prep Date	Analysis Date
Cyanide (reactive)			N	ID	mg	/L	0.1		1/22/2012	10/22/2012
Reactive sulfide				ID .	mg/		1		/24/2012	10/24/2012

AR

Acceptable Range

ND Not Detected

PQL

Practical Quantitation Limit

RPD

Relative Percentage Difference

Comments;

Certifications held by Anstek Lebs ID: EPA:ID00013; A2:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0026; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anstek Lebs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0085

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Login Report

NM

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB

Order ID:

121017011

4901 HAWKINS NE SUITE D

Order Date:

10/17/2012

ALBUQUERQUE

87109

Contact Name: ANDY FREEMAN

Project Name: 1210682

Comment:

Sample #;

121017011-001

Customer Sample #:

Water

1210682-001E / INJECTION WELL

Recv'd:

V

Collector:

Date Collected:

10/11/201

Quantity:

Matrix:

Date Received:

10/16/2012 1:05:00 P

Comment:

Test	Lab	Method	Due Date	Priority
CYANIDE REACTIVE	М	SW846 CH7	10/26/2012	Normal (6-10 Days)
FLASHPOINT	М	EPA 1010	10/26/2012	Normai (6-10 Days)
pH	М	EPA 150.1	10/26/2012	Normai (6-10 Days)
SULFIDE REACTIVE	M	SW846 CH7	10/26/2012	Normai (6-10 Days)
SA	MPLE CON	DITION RECORD		
Samples received in a cooler?			Yes	
Samples received intact?			Yes	

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	4.5
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

1
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200
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CINE
Г

1st SAMP

10/16/2012

1210682

121017 011 HALL Last 10/26/2012

10/11/201 1st RCVD

Fr. t. A. B. W. W. W. W.

(208) 882-9246

MHII

SAMPLE

1210682-001E Injection Well

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10 9

ÇÜ

CITY, STATE, ZIP. MOSCOW, ID 83843

1282 Alturas Dr

SUB CONTRAITOR: Anatek Labs

COMPANY:

Anatek Labs, Inc.

PHONE: ACCOUNT #:

(208) 883-2839

EMAIL: ĪĄ.

CLIENT SAMPLE ID 50(IHDPE HOTTLE Aqueous 10/11/2012 9:00:00 AM | 3 RCI LEVEL 4 MATRIX COLLECTION DATE 0 # CONTAINERS 0 0 ō MWBS ANALYTICAL COMMENTS Page 6 of 16

Page	#

Flashpoint Analysis

Sample Matrix - Soil (1), Sludge (2), Oil (3), Water (4), Other (5)

Sample ID	Analyses	Sample	Analyst	Temp - °C	Temp - °F	ī
<u>L.</u>	Date	Matrix	Initials		1	
120727018-01	7/30/2012	4/ 420	12		7200° F	1
12.0727025-001		5/ Ganid	124		1450A	1
-002	1	1	9-		1410F]
	5/9/13/2	-/ 720	11/2-		7 130 7	
125257579-ST					1.63 5	
-007	<u>.</u>		اسسانت		1 65° m	
		5/ Linuid	nu		>200°F	
123810097-01		47 H36	"WM		12200	
44444	8 29/2012	5/ Liquid	me		720007	
[2083000]-08	8/31/2012	4/420	144		>2000F	1
	9/04/2012	5/Liquid	Ma		>200°=	
12033104370)					<50°F	•
-007					7200°F	
~053					×200°F	6.5-4
-004					-1250f 115%	4/4/12
121002054-00	10/04/2012	5/Liquid	m		850=	7/4/12
12/004/001-001	4-	<u> </u>			<640 F	
	10/08/2012	5/Ligned	m		135°⊨	
-002	· +-	14	J.,		1500P	
121717011-00	10/25/2012	4 Water	non		>200°F	
ļ						
						
		<u> </u>				
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
						26
					,	
	· · · · · · · · · · · · · · · · · · ·					

^{*} SAFETY GLASSES REQUIRED.

pH - SM4500H+B / Alkalinity SM2320B

_
2
147
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7
150
90
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Z
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_	1		_				
Method QC Requirements:	its LFB/Blank every 10		% Recovery 85-115%		Amount Spiked (mg/L)	100	n 007858
Method	pH 7 within 0.1 pH units	Slope 95-102%			Expires	11/18/2012	urefte: CAT 10uL, sn 600055 - pH Meter: Orion Model 620A, sn 007858
Expires	Sep-13	Dec-13	Sep-12	Apr 2013	Conc.	1N	600055 - pH Mete
Solution #	M854-01	M854-02	M854-03	A046-07	Solution #	M637-04	ırette: CAT 10uL, sn
Reagent	pH Buffer 4 (Red)	pH Buffer 7 (Yellow)	pH Buffer 10 (Blue)	0.02N H2SO4 Titrant	Standard	Matrix Spike Solution	Contribu

					,	_										
	*	L													Í	
_	Bit. Carbonate												0	0	0	0
Alkalinity (mg/L)	Bit- carbonate	٥		٥	0	0			0	0	0			0	0	0
Alkalini	Cerbonate		0				0	0				0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1 (mL)	C 4.2															
Titrant vol to pH (mL)	B 4.5									1						
Titran	A 8.3															
	Sample Vol. (mL)			-												
	pH 7 Buffer	7.iO								₹						
	Slope	101.5														
	pH 10 Cai											7				
	라 4 오래	3,95 10.00														
	뜐	7.53	7,51	2.08	7.37	10.39										
	Temp (°C)	34.8	19.9	19,0	19.8	Do.01 0.05										
	Sample	100-81010161	(20)- Pa	500-	12011-001	100-450016										

Analysis Date: 10-18-13

Analyst: EAC

ıg/L.	ر	;	lfide			Initials	MAC	_												1
1. 1 blank per batch, must be < 20 ug/L. 2. 1 LFB per batch must be +/- 30%. 3. 1ml iodine reacts with 0.4 mg Sulfide 21024H25R_		Date	21-22-07	_												1				
1. 1 blank per ba	2. 1 LFB ner bate		3. 1ml iodine rea		121024H25R	Concentration (mg/L)	120.0	0.0383	0.345	0.1.0	0.130	0.020	0.0795	18500	0.0381	8350.0	0.0379	0.0378	6.43	12.86
201			<u> </u>		T- 1	Concentration (mg/sample)	0.020	0.020	051.0	0.120	091.0	0.050	00.0	0.00.0	0,020	0.020	0.020	0.020	0.160	0.350
Date Made/Exnires			12/31/2009			lodine amount (50 uL increments)	25	50	450	254	452	50	(0.0	29	50	22	50	50	400	202
Concentration	Z		% by weight		9	Sample Volume	525	522	4	0001		4	503	524	525	519	528	625	24.9	1
	Iodine 0.025 N	HCI 6N		Indicator	Zinc Acetate 99.9%	Sample	(2001,062-81	ec ,	SM 2 -		16	19.	18045-7	19049.5	23016.5	0)-	-(5	.8	1-1106)	2M) -

Comments

or to the mean to a manage of

otal Cyanide by Semi-Automated Colorimetry lethod: EPA 335.4\SM-4500-CN-E istillation Bench Sheet

Weak Acid Dissociable Cyanide by SM 4500-CN-I (check WAD column)

otal Cyanide MS/MSD/LCS Soln: ree Cyanide MS/MSD/LCS Soln: M884-06 Exp:10/15/13

M879-06 Exp:9/10/13

Method requirements: All QC +/- 10%

Equipment: Midi-vap

Instrument: ALPCHEM FIA 3000

Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
14	121011-049-4	50, pm	Numl	50ml	28-8	28.8		
4	yms	-4	· · ·	1	BA 199		Int	
r‡	- Yensp				NAME OF	1		
14	-W5				LX	l y		
1	-180				4	{		
	-5				29.9	79.9		
	-6				30.4	30,4		
ī 🗜	-4				78.9	28.9		
1	21010018-1	1						
	121011064-2	WWPEN	+		(X	_X		
1/	21018021-1	reactivessi	Maple	50mc	27-7	27.9		
2	luns						Inl	
3	- lmsn				4	4		
1	-W5				>	1×	_	
5	-M				4	₹		
3	25-1				28.7	28.7		
7	26-1	+			17.1	17.9		
3/	2017011-1	un redive			X	lx		
3	lins						Ind	
2	myn	1	4	4	- ₹	4	4	

If soils this calculation is taken from cyanide extraction bench sheet.

^{**} If soils, mLs of extract used for distillation.

Extraction Reagents:	Reagent #:
methyl red indicator	A051-01
18 N H₂SO₄	A053-08
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% MgCl ₂	A053-07

Analytical Reagents: Reagent #:
Barbituric Acid R038-13
Sodium Phosphate R026-23
Chloramine-t R048-09
Pyridine R043-03

stillation Initials/Date Distilled: MW W/W/

Analyst Initials/Date Analyzed MW 10/22/12

I'e name: T:\DATA1\FLOW4\2012\EPA335.4\102212C2.RST

ate: October 22, 2012

perator: CRW

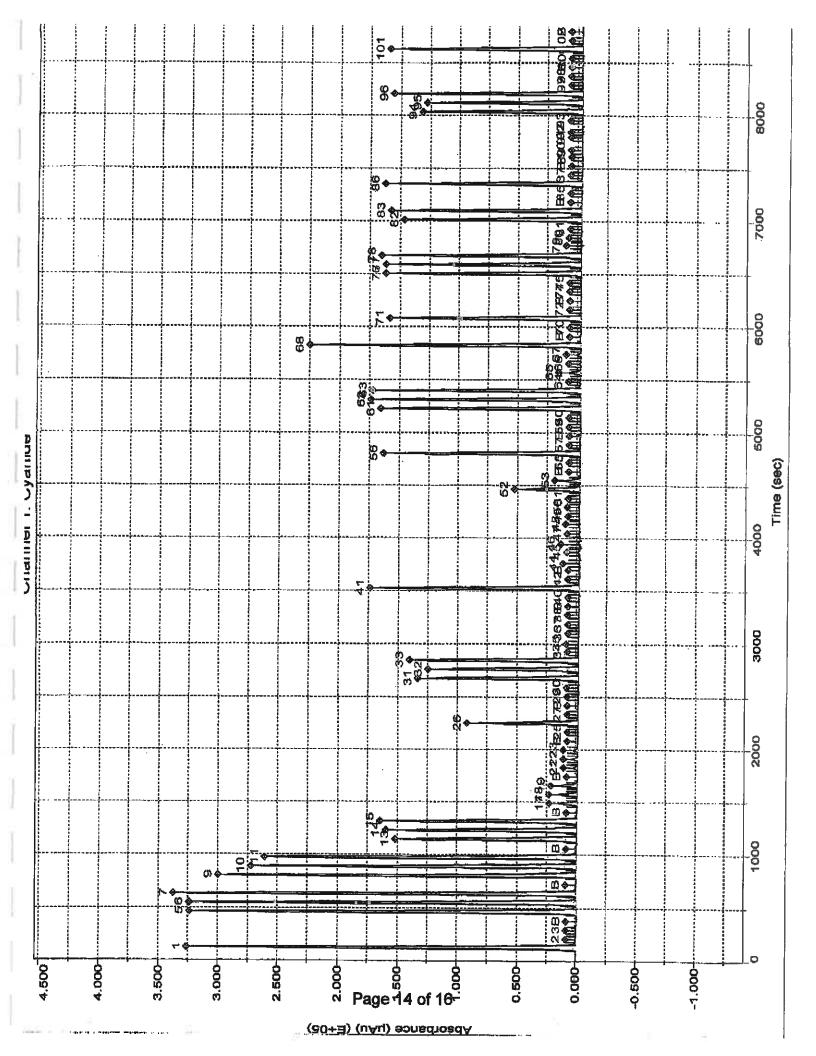
121022FIACNRW

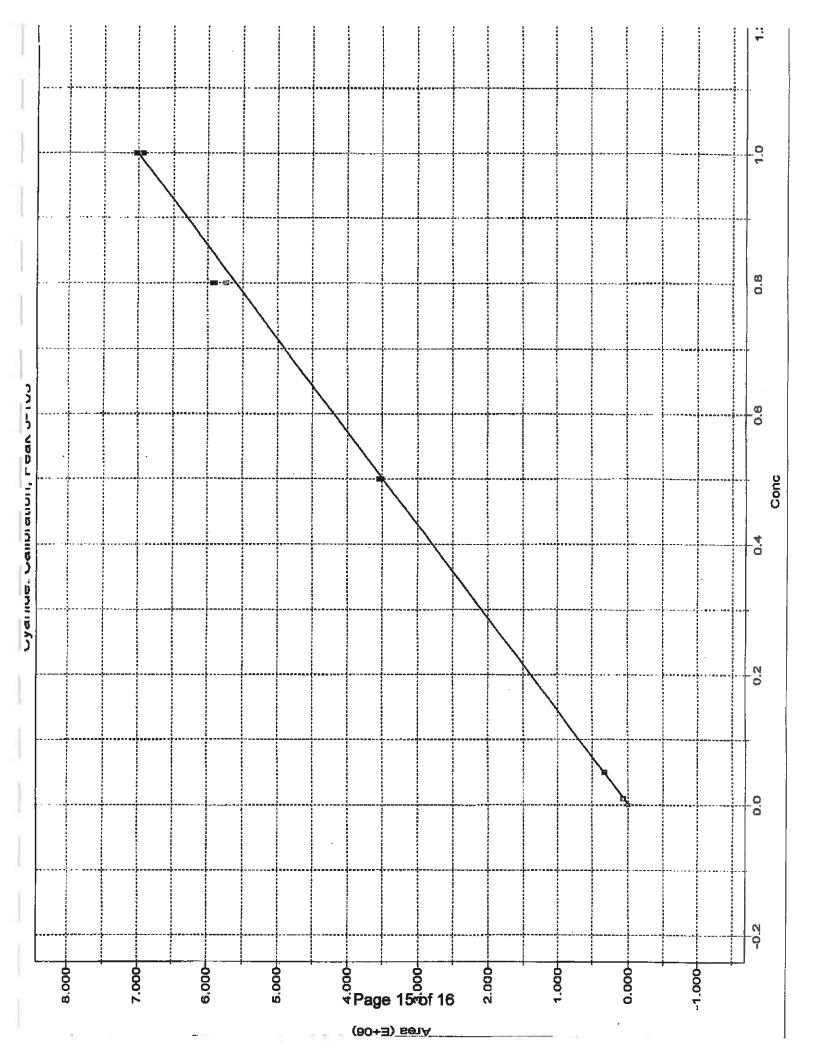
	eak	Cup	Name	Туре	Dil	W.t.	2	Area	Calc.	(ppm)
										
		2	Sync	SYNC		1	1	6896128		0.985156
		0	Carryover	CO		1	1	16248		0.004798
		0	Carryover	CO		1	1	-1347		0.002291
		0	Baseline	RB		1	1	-5625		0.001681
		2	Cal 1.00 ppm	C		1	1	7026224		1.003694
		2	Cal 1.00 ppm	C		1	1	6923783		0.989097
		2	Cal 1.00 ppm	C		1	1	7012644		1.001759
1		0	Baseline	RB		1	1	~4419		0.001853
	_	3	Cal 0.80 ppm	C		1	1	5734824		0.B19675
1	ລ	3	Cal 0.80 ppm	C		1	1	5895692		0.842598
	1	3	Cal 0.80 ppm	C		1	1	5926719		0.847019
	_	0	Baseline	RB		1	1	6658		0.003431
	3	4	Cal 0.50 ppm	Ċ		1	1	3525813		0.504898
- 1	4	4	Cal 0.50 ppm	C		1	1	3503091		0.501661
	5	4	Cal 0.50 ppm	C		1	#1 <u>1</u>	3544872		0.507614
	-,	0	Baseline	RB		1	1	7206		0.003509
	7	5	Cal 0.05 ppm	C		1	1	330488		0.049576
-1	3	5	Cal 0.05 ppm	C		1	1	328535		0.049298
- (9	5	Cal 0.05 ppm	C		1	1	326599		0.049022
	-	0	Baseline	RB		1 7	1	3289		0.002951
	1	6	Cal 0.01 ppm	C		1	1	67522		0.012104
-1	2	6	Cal 0.01 ppm	C		1	1	64335		0.011650
- [3	6	Cal 0.01 ppm	C		1	1	71374		0.012653
,	_	٥	Baseline	RB		1.	1	2328		0.002814
	5	1	Blank	BLNK		1	1	-3589		0.001971
- [6	7	ICV 0.25 ppm	CCV		1	1	1812828		0.260804
- 1	7	1	Blank	BLNK		1	1	3475		0.002978
- 1	_	0	Baseline	RB		1	1	3745		0.003016
	9	8	121017039-BL	U		1	1	21154		0.005497
П	2	9	121017039-001	U		1	1	5777		0.003306
-	1	10	121017039-001MS	U		1	1	2830796		0.405861
	3	11	121017039-001MSI			1	1	2704044	}	0.387799
	3	12	121017039-LCS	σ		1	1	3068466		0.439728
- 1	4	13	121017039-002	Ü		1	1	701		0.002582
1	5	1.4	121017039-003	Ü		1	1	10956		0.004044
	5	15	121017039~004	υ		1	1	180		0.002508
	7	16	121011045-001	U		1	1	4229		0.003085
1	3	17	121011047-001	U		1	1	-5655		0.001677
_			Baseline	RB		1	1	-2539		0.002121
	þ	1	Blank	BLNK		1	1	-6362		0.001576
	1	4	CCV 0.5 ppm	CCV		1	1	3683226		0.527329
-1	2	1	Blank	BLNK		1	1	-4448		0.001849
1			Read Baseline	RB		1	1	-2614		0.002110
	4	18	121011044-001	U		1	1	8811		0.003738
	5 6	19	121011046-001	Ü		1	1	17784		0.005017
-1	5	20	121012023-001	U		1	1	19745		0.005296
	7	21	121012023-002	ט		1	1	3578		0.002992
	3	22	121016064-001	U		1	1	16321		0.004808
1	9	23	121016064-002	U		1	1	12962		0.004330
-1	2	24	121016064-003	U		1	1.	24899		0.006031
	1	25	121016064-004	U		1	1	7742		0.003586
	2	26	121017039-005	ט		1	1	1065183		0.154267
×	3	27	121017039-006	Ū		1	1	259646		0.039481
			Baseline	RB		1	1	-4918		0.001782
1	5		Blank	BLNK		1	1	-3462		0.001989
	5		CCV 0.5 ppm	CCV		1	1	3553014		0.508774
į,	7		Blank	BLNK		1	1	-1855		0.002218
			Read Baseline	RB		ī	1	8664		0.003717
	9	28	121011049-BL	U		1	1	-2062		0.002189
	2	29	121011049-004	ט	28.		1	4978		0.091925
	1	30		Ü	28.		1	3504808		4.454871
	2		121011049-004MSD		28	8.8	1	3560151		14.681992
1	3		121011049-LCS	U		1	1	3570142		0.511215
	4	33		U	29.		1	14327		0.135268
	5		121011049-006	Ū	₽â€	ight 11 of 16	1	192177		0.907959
	6	35	121011049-007	U	28.	9	1	14137		0.129963

36	121010018-001	U	221	1	57327	2.353950
37	121011064-002	U	8 1	1	4561180	0.652435
0	Baseline	RB	1	1.	4290	0.003094
1	Blank	BLNK	1	1	-4766	0.001803
4	CCV 0.5 ppm	CCV	1	1	3565866	0.510606
1	Blank	BLNK	1	1	-2990	0.002057
0	Baseline	RB	1	1	-673	0.002387
38	121018024-BL	U	1	1	-2068	0.002188
39	121018024-001	U	27.9	1	3977	0.085072
40	121018024-001MS	ט	27.9	1	3329258	13.305229
41	121018024-001MS	ט ס	27.9	A 1	L 3400022	
42	121018024-LCS	U	1	1	3401070	0.487123
43	121018025-001	Ū	28.7	1	4755	0.090695
44	121018026-001	Ų	27.9	1.	25061	0.168897
45	.121017011-001	U	.1.	1	-6380	0.001573
46	·121017011-001MS	ט	1	1	3158807	0.452601
47	121017011-001MS	ט ס	1	1	3270089	0.468459
0	Baseline	RB	1	1	2133	0.002786
1	Blank	BLNK	1	1	-5834	0.001651
4	CCV 0.5 ppm	ÇCV	1	1	3558024	0.509488
1	Blank	BLNK	1	1	9428	0.003826
0	Baseline	RB	1	1	1524	0.002700
48	R	ប	1	1	-137	0.002463
49	R	ט	1	1	9061	0.003774
50	R	U	1	1	9574	0.003847
51	121017039-BL	U	1	1	-167	0.002459
52	121017039-001	ט	1	1	10798	0.004021
53	121017039-001MS	_	1	1	2855315	0.409355
54	121017039-001MS	ט כ	1	1	. 2727674	0.391166
55	121017039~LCS	Ü	1	1	3254267	0.466204
56	R	Ü	1	1	3157	0.002932
57	Ř	Ü	1	1	6806	0.003452
0	Baseline	RB	1	1	376	0.002536
1	Blank	BLNK	1	1	-7122	0.001468
4	CCV 0.5 ppm	CCV	1	1	3616182	0.517776
1	Blank	BLNK	1	1	-5670	0.001675
0	Baseline	RB	1	1	-6489	0.001558

ak	Cup	Flags
	2 0 0	
	0 2 2	BL
	ō	BL
	3 3 3	OL
	0 4 4	BL
	200022203330444055506660	BL
	0 6 6	BL
	6	OL
	0 1 7 1	BL
	8 0	BL

1			
0	9		
1	10		
2 3 4 5 6 7	11 12		
4	13		
ີ 6	14 15		
7	16		
B	17 0	13.7	
э	1	BL	
1	4		
2	1 0	BL	
4	18		
5 6	19		
7	20 21		
3	22		
3 9 0 1 2	23 24		
1	25		
2	26		
3	27 0	BL	
5	1.		
5 6 7	4 1		
	0	BL	
9 1 2 3	28 29		
1	30		
2	31		
3	32 33		
5	34		
5 7	35		
3	36 37		
	0	BL	
ວ 1	1 4		
2	1		
	0 38	BL	
5	39		
6	40		
3	41 42		
9	43		
4 5 6 7 8 9 7 1 2 3	44 45		
Ş	46		
	47		
5 6 7	0 1	BL	
6	4		
7	1 0	BL	
Э	48	ريد ميد	
2	49		
₁. 2	50 51		
3	52		
4	53 54		
901234567B	55		
7	56		
3	57 0	BL	
00	1		





TIE Hame: I: /DATAI/EHOW4/&UL&/EPA555.4/IUZXIXCX.KST

ale: October 22, 2012

perator: CRW

Name	€		Conc	Area
Cal	1.00	ppm	1.000000	7026223.500000
Cal	1.00	ppm	1.000000	6923783.000000
Cal	1.00	ppm	1.000000	7012644.000000
Cal	0.80	ppm	0.800000	5734824.000000
Cal	0.80	ppm	0.800000	5895692.500000
Cal	0.80	ppm	0.800000	5926719.000000
Çal	0.50	ppm	0.500000	3525813.250000
Cal	0.50	ppm	0.500000	3503091.000000
Cal	0.50	ppm	0.500000	3544872.500000
Cal	0.05	ppm	0.050000	330488.250000
Cal	0.05	ppm	0.050000	328535.125000
Cal	0.05	ppm	0.050000	326599.437500
Cal	0.01	ppm	0.010000	67521.554688
Cal	0.01	ppm	0.010000	64335.367188
Cal	0.01	ppm	0.010000	71374.187500

Calib Coef:

y∞bx+a

a: (intercept) -1.7422e+04 b: 7.0177e+06

Corr Coef: 0.999327

Carryover:

0.236%

No Drift Peaks

Hall Environmental Analysis Laboratory, Inc.

WO#:

RPDLimit

1210682

07-Nov-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 10-11-12

Sample ID MB

SampType: MBLK

TestCode: EPA Method 300.0: Anions

Client ID: **PBW** Batch ID: R6225

RunNo: 6225

Analysis Date: 10/13/2012

Units: mg/L

Prep Date: Analyte

PQL SPK value SPK Ref Val

SeqNo: 179335

%REC LowLimit

HighLimit

%RPD

Qual

Chloride Sulfate

ND ND 0.50

0.50

Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

Analyte detected below quantitation limits

Sample pH greater than 2

В Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

Not Detected at the Reporting Limit

RPD outside accepted recovery limits

Page 7 of 19

Hall Environmental Analysis Laboratory, Inc.

WO#:

1210682

07-Nov-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 10-11-12

١											
į,	Sample ID 5ml rb	Samp⊤yr	e: ME	BLK	Tes	tCode: EF	PA Method	8260B: VOL	ATILES		
	Client ID: PBW	Batch I	D: R6	432	F	RunNo: 64	432				
i.	Prep Date:	Analysis Dat	e: 10	0/19/2012	S	eqNo: 1	84843	Units: µg/L			
	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
	Benzene	ND	1.0							<u> </u>	
	Toluene	ND	1.0								
	Ethylbenzene	ND	1.0								
	Methyl tert-butyl ether (MTBE)	ND	1.0								
	1,2,4-Trimethylbenzene	ND	1.0								
	1,3,5-Trimethylbenzene	ND	1.0								
	1,2-Dichloroethane (EDC)	ND	1.0								
	1,2-Dibromoethane (EDB)	ND	1.0								
	Naphthalene	ND	2.0								
	1-Methylnaphthalene	ND	4.0								
	2-Methylnaphthalene	ND	4.0								
Π,	Acetone	ND	10								
	Bromobenzene	ND	1.0								
	Bromodichloromethane	ND	1.0								
	Bromoform	ND	1.0								
	Bromomethane	ND	3.0								
	2-Butanone	ND	10								
	Carbon disulfide	ND	10								
	Carbon Tetrachloride	ND	1.0								
	Chlorobenzene	ND	1.0								
1	Chloroethane	ND	2.0								
1	Chloroform	ND	1.0								
ı	Chloromethane	ND	3.0								
;	2-Chlorotoluene	ND	1.0								
,	1-Chlorotoluene	ND	1.0								
(cis-1,2-DCE	ND	1.0								
(cis-1,3-Dichloropropene	ND	1.0								
	1,2-Dibromo-3-chloropropane	ND	2.0								
ı	Dibromochloromethane	ND	1.0								
ı	Dibromomethane	ND	1.0								
	1,2-Dichlorobenzene	ND	1.0								
	1,3-Dichlorobenzene	ND	1.0								
	1,4-Dichlorobenzene	ND	1.0								
	Dichlorodifluoromethane	ND	1.0								
	I,1-Dichloroethane	ND	1.0								
	i,1-Dichloroethene	ND	1.0								
	,2-Dichloropropane	ND	1.0								
	,3-Dichloropropane	ND	1.0								
	-Dichloropropane ND 2.0										
	1,1-Dichloropropene	• •									
	-lexachlorobutadiene	ND	1.0								
,	- कर कर के विकास के का का बार का का के से कि										

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- Sample pH greater than 2

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

Page 8 of 19

Hall Environmental Analysis Laboratory, Inc.

WO#:

1210682

07-Nov-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 10-11-12

Sample ID 5ml rb	SampTy	pe: MI	BLK	TestCode: EPA Method 8260B: VOLATILES										
Client ID: PBW	Batch	ID: Re	432	F	RunNo: 6	432								
Prep Date:	Analysis Da	ate: 10	0/19/2012	\$	SeqNo: 1	84843	Units: µg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual				
2-Hexanone	ND	10												
Isopropylbenzene	ND	1.0												
4-isopropyltoluene	ND	1.0												
4-Methyl-2-pentanone	ND	10												
Methylene Chloride	ND	3.0												
n-Butylbenzene	ND	3.0												
n-Propylbenzene	ND	1.0												
sec-Butylbenzene	ND	1.0												
Styrene	ND	1.0												
tert-Butylbenzene	ND	1.0												
1,1,1,2-Tetrachloroethane	ND	1.0												
1,1,2,2-Tetrachloroethane	ND	2.0												
Tetrachloroethene (PCE)	ND	1.0												
trans-1,2-DCE	ND	1.0												
trans-1,3-Dichloropropene	ND	1.0												
1,2,3-Trichlorobenzene	ND	1.0												
1,2,4-Trichlorobenzene	ND	1.0												
1,1,1-Trichloroethane	ND	1.0												
1,1,2-Trichloroethane	ND	1.0												
Trichloroethene (TCE)	ND	1.0												
Trichlorofluoromethane	ND	1.0												
1,2,3-Trichloropropane	ND	2.0												
Vinyl chloride	ND	1.0												
Xylenes, Total	ND	1.5												
Surr: 1,2-Dichloroethane-d4	11		10.00		105	70	130							
Surr: 4-Bromofluorobenzene	9.5		10.00		95.3	70	130							
Surr: Dibromofluoromethane	10		10.00		103	70	130							
Surr: Toluene-d8	10		10.00		102	70	130							
Sample ID b6	SampTy	pe: ME	BLK	Tes	Code: El	PA Method	8260B: VOLA	ATILES	<u> </u>					
Client ID: PBW	Batch	ID: R6	432	R	unNo: 64	432								
Prep Date:	Analysis Da	te: 10	/19/2012	S	eqNo: 1	84881	Units: µg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual				
Benzene	ND	1.0												
Toluene	ND	1.0												

Qualifiers:

Ethylbenzene

Methyl tert-butyl ether (MTBE)

1,2,4-Trimethylbenzene

1,3,5-Trimethylbenzene

1,2-Dichloroethane (EDC)

Value exceeds Maximum Contaminant Level.

ND

ND

ND

ND

ND

1.0

1.0

1.0

1.0

1.0

- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1210682

07-Nov-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 10-11-12

Sample ID b6	SampTy	/ne· Mi	RI K	TestCode: EPA Method 8260B: VOLATILES										
Client ID: PBW		ID: Re			RunNo: 6		UZUUD. YUL	TILES						
Prep Date:	Analysis Da				SeqNo: 1		Unites south	na/l						
							Units: µg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual				
1,2-Dibromoethane (EDB)	ND	1.0												
Naphthalene	ND	2.0												
1-Methylnaphthalene	ND	4.0												
2-Methylnaphthalene	ND	4.0												
Acetone	ND	10												
Bromobenzene	ND	1.0												
Bromodichloromethane	ND	1.0												
Bromoform	ND	1.0												
Bromomethane	ND	3.0												
2-Butanone	ND	10												
Carbon disulfide	ND	10												
Carbon Tetrachloride	ND	1.0												
Chlorobenzene	ND	1.0												
Chloroethane	ND	2.0												
Chloroform	ND	1.0												
Chloromethane	ND	3.0												
2-Chlorotoluene	ND	1.0												
4-Chlorotoluene	ND	1.0												
cis-1,2-DCE	ND	1.0												
cis-1,3-Dichloropropene	ND	1.0												
1,2-Dibromo-3-chloropropane	ND	2.0												
Dibromochloromethane	ND	1.0												
Dibromomethane	ND	1.0												
1,2-Dichlorobenzene	ND	1.0												
1,3-Dichlorobenzene	ND	1.0												
1,4-Dichlorobenzene	ND	1.0												
Dichlorodifluoromethane	ND	1.0												
1,1-Dichloroethane	ND	1.0												
1,1-Dichloroethene	ND	1.0												
1,2-Dichloropropane	ND	1.0												
1,3-Dichloropropane	ND	1.0												
2,2-Dichloropropane	ND	2.0												
1,1-Dichloropropene	ND	1.0												
Hexachlorobutadiene	ND	1.0												
2-Hexanone	ND	10												
Isopropylbenzene	ND	1.0												
4-isopropyltoluene	ND	1.0												
4-Methyl-2-pentanone	ND	10												
Methylene Chloride	ND	3.0												
n-Butylbenzene	ND	3.0												
n-Propylbenzene	ND	1.0												
11-3 Topytoenzene	ND	1.0												

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- Sample pH greater than 2

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

Page 10 of 19

Hall Environmental Analysis Laboratory, Inc.

WO#:

1210682

07-Nov-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 10-11-12

				TestCode: EPA Method 8260B: VOLATILES								
Sample ID b6	Samp⊺	ype: ME	BLK	Tes	tCode: E	PA Method	8260B: VOL	ATILES				
Client ID: PBW	Batch	1D: R6	432	F	RunNo: 6	432						
Prep Date:	Analysis D	ate: 10)/19/2012	5	SeqNo: 1	84881	Units: µg/L					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual		
sec-Butylbenzene	ND	1.0										
Styrene	ND	1.0										
tert-Butylbenzene	ND	1.0										
1,1,1,2-Tetrachloroethane	ND	1.0										
1,1,2,2-Tetrachloroethane	ND	2.0										
Tetrachloroethene (PCE)	ND	1.0										
trans-1,2-DCE	ND	1.0										
trans-1,3-Dichloropropene	ND	1.0										
1,2,3-Trichlorobenzene	ND	1.0										
1,2,4-Trichlorobenzene	ND	1.0										
1,1,1-Trichloroethane	ND	1.0										
1,1,2-Trichloroethane	ND	1.0										
Trichloroethene (TCE)	ND	1.0										
Trichlorofluoromethane	ND	1.0										
1,2,3-Trichloropropane	ND	2.0										
Vinyl chloride	ND	1.0										
Xylenes, Total	ND	1.5										
Surr: 1,2-Dichloroethane-d4	9.9		10.00		98.6	70	130					
Surr: 4-Bromofluorobenzene	9.9		10.00		98.6	70	130					
Surr: Dibromofluoromethane	10		10.00		105	70	130					
Surr: Toluene-d8	10		10.00		101	70	130					

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

WO#:

1210682

07-Nov-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 10-11-12

4							<u>-</u>								
į	Sample ID mb-4322	SampTy	-					8270C: Semi	volatiles						
I	Client ID: PBW	Batch	ID: 43	22	F	RunNo: 62	287								
,	Prep Date: 10/16/2012	Analysis Da	ate: 10)/16/2012	8	SeqNo: 18	B1174	Units: µg/L	j/L						
i	Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual				
l	Acenaphthene	ND	10		-	-									
	Acenaphthylene	ND	10												
ř	Aniline	ND	10												
1	Anthracene	ND	10												
١	Azobenzene	ND	10												
	Benz(a)anthracene	ND	10												
1	Benzo(a)pyrene	ND	10												
ļ	Benzo(b)fluoranthene	ND	10												
	Benzo(g,h,i)perylene	ND	10												
ĺ	Benzo(k)fluoranthene	ND	10												
l	Benzoic acid	ND	20												
7	Benzyl alcohol	ND	10												
ì	Bis(2-chloroethoxy)methane	ND	10												
l	Bis(2-chloroethyl)ether	ND	10												
ł,	Bis(2-chloroisopropyl)ether	ND	10												
	Bis(2-ethylhexyl)phthalate	ND	10												
Ϊ	4-Bromophenyl phenyl ether	ND	10												
ŀ	Butyl benzyl phthalate	ND	10												
	Carbazole	ND	10												
i	4-Chloro-3-methylphenol	ND	10												
l	4-Chloroaniline	ND	10												
	2-Chloronaphthalene	ND	10												
	2-Chlorophenol	ND	10												
l	4-Chlorophenyl phenyl ether	ND	10												
ŀ	Chrysene	ND	10												
	Di-n-butyl phthalate	ND	10												
l	Di-n-octyl phthalate	ND	10												
	Dibenz(a,h)anthracene	ND	10												
	Dibenzofuran	ND	10												
í	1,2-Dichlorobenzene	ND	10												
	1,3-Dichlorobenzene	ND	10												
	1,4-Dichlorobenzene	ND	10												
	3,3'-Dichlorobenzidine	ND	10												
	Diethyl phthalate	ND	10												
	Dimethyl phthalate	ND	10												
	2,4-Dichlorophenol	ND	20												
	2,4-Dimethylphenol	ND	10												
	4,6-Dinitro-2-methylphenol	ND	20												
	2,4-Dinitrophenol	ND	20												
	2,4-Dinitrotoluene	ND	10												
	2,6-Dinitrotoluene	ND	10												

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#: 1210682

07-Nov-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 10-11-12

Client ID: PBW Batch ID: 4322 Prep Date: 10/16/2012 Analysis Date: 10/16/201 Analyte Result PQL SPK v Fluoranthene ND 10	RunNo: 2 SeqNo: alue SPK Ref Val %RE	181174	Units: µg/L HighLimit							
Analyte Result PQL SPK v	·									
	alue SPK Ref Val %RE	C LowLimit			Units: µg/L					
	<u> </u>	O LOWEIIIII		%RPD	RPDLimit	Qual				
			I IIgii Liiiit	70131 15	N DEIIII	Quai				
Fluorene ND 10										
Hexachlorobenzene ND 10										
Hexachlorobutadiene ND 10										
Hexachlorocyclopentadiene ND 10										
Hexachloroethane ND 10										
Indeno(1,2,3-cd)pyrene ND 10										
Isophorone ND 10										
1-Methylnaphthalene ND 10										
2-Methylnaphthalene ND 10										
2-Methylphenol ND 10										
3+4-Methylphenol ND 10										
N-Nitrosodi-n-propylamine ND 10										
N-Nitrosodimethylamine ND 10										
N-Nitrosodiphenylamine ND 10										
Naphthalene ND 10										
2-Nitroaniline ND 10										
3-Nitroaniline ND 10										
4-Nitroaniline ND 10										
Nitrobenzene ND 10										
2-Nitrophenol ND 10										
4-Nitrophenol ND 10										
Pentachlorophenol ND 20										
Phenanthrene ND 10										
Phenoi ND 10										
Pyrene ND 10										
Pyridine ND 10										
1,2,4-Trichlorobenzene ND 10										
2,4,5-Trichlorophenol ND 10										
2,4,6-Trichlorophenol ND 10										
Surr: 2,4,6-Tribromophenol 140 20	00.0 71.		126							
Surr: 2-Fluorobiphenyl 86 10	0.00	.2 37	114							
Surr: 2-Fluorophenol 110 20	00.0 56	.3 23.4	98							
	00.0 75.	-	116							
	00.0 97.		118							
Surr: Phenol-d5 100 20	00.0 52	.2 20.9	95.9							

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1210682

07-Nov-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 10-11-12

Sample ID 1210682-001c dup

SampType: dup

TestCode: EPA 120.1: Specific Conductance

Client ID: Injection Well Batch ID: R6237

PQL

RunNo: 6237

Prep Date:

Analysis Date: 10/15/2012

SeqNo: 179731

Units: µmhos/cm

Analyte

Result

SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD **RPDLimit** Qual

Conductivity

4600

0.010

0.651 20

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range Е
- Analyte detected below quantitation limits
- Sample pH greater than 2

- В Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
 - RPD outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

RPDLimit

1210682

07-Nov-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 10-11-12

Sample ID MB-4546

SampType: mblk

TestCode: EPA Method 7470: Mercury

Client ID: PBW

Batch ID: 4546

10/30/2012

RunNo: 6596

Units: mg/L

Prep Date: Analyte

Analysis Date: 10/30/2012 **PQL**

SeqNo: 190478 SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD

Qual

Mercury

ND 0.00020

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range Е
- Analyte detected below quantitation limits
- Sample pH greater than 2

- Analyte detected in the associated Method Blank В
- Н Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit
 - RPD outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1210682

07-Nov-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 10-11-12

Sample ID MB-43	29 Samp	Туре: МВ	LK	TestCode: EPA 6010B: Total Recoverable Metals										
Client ID: PBW	Bate	ch ID: 432	29	R	lunNo: 6	333								
Prep Date: 10/16	i/2012 Analysis	Date: 10	/18/2012	S	eqNo: 1	82303	Units: mg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual				
Arsenic	ND	0.020												
Barium	ND	0.020												
Cadmium	ND	0.0020												
Calcium	ND	1.0												
Chromium	ND	0.0060												
Lead	ND	0.0050												
Magnesium	ND	1.0												
Potassium	ND	1.0												
Silver	ND	0.0050												
Sodium	ND	1.0												
Camala ID 14D 40		T M.D.			<u> </u>			_						

Sam	ple ID	MB-4329	SampT	уре: МЕ	BLK	Tes	als	<u></u>				
Clien	t ID:	PBW	Batch	ID: 43	29	F	RunNo: 6	462				
Prep	Date:	10/16/2012	Analysis D	ate: 10)/24/2012	S	SeqNo: 1	85746	ı			
Analy	/te		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Onland.			MPS	0.050					-			

Selenium ND 0.050

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1210682

07-Nov-12

Client:

Western Refining Southwest, Inc.

Project:

Prep Date:

Injection Well 10-11-12

Sample ID 1210682-001c dup

SampType: dup

TestCode: SM4500-H+B: pH

Client ID: Injection Well

Batch ID: R6237

PQL

RunNo: 6237

HighLimit

Analysis Date: 10/15/2012

SPK value SPK Ref Val

SeqNo: 179738

%REC LowLimit

Units: pH units

%RPD

RPDLimit

Qual

Analyte pΗ

7.36 1.68

Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

Analyte detected below quantitation limits

Sample pH greater than 2

Analyte detected in the associated Method Blank В

Н Holding times for preparation or analysis exceeded

Not Detected at the Reporting Limit

RPD outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

RPDLimit

1210682

07-Nov-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 10-11-12

Sample ID mb-1

SampType: mblk

TestCode: SM2320B: Alkalinity

Client ID: PBW

Batch ID: R6237 Analysis Date: 10/15/2012 RunNo: 6237

Prep Date: Analyte

PQL

SeqNo: 179709 SPK value SPK Ref Val %REC LowLimit Units: mg/L CaCO3

%RPD

HighLimit

Qual

Total Alkalinity (as CaCO3)

ND 20

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- Analyte detected below quantitation limits
- Sample pH greater than 2

- Analyte detected in the associated Method Blank В
- Н Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit
- RPD outside accepted recovery limits

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Hall Environmental Analysis Laboratory, Inc.

WO#:

1210682

07-Nov-12

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 10-11-12

Sample ID MB-4296

SampType: MBLK

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: **PBW** Batch ID: 4296

RunNo: 6273

Prep Date: 10/15/2012

Analysis Date: 10/16/2012

SeqNo: 180753

%REC LowLimit

Units: mg/L

HighLimit

Qual

Analyte **Total Dissolved Solids** Result **PQL** ND 20.0

Sample ID 1210682-001CMS

SampType: MS

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: Injection Well

Prep Date: 10/15/2012

Batch ID: 4296 Analysis Date: 10/16/2012

PQL

RunNo: 6273 SeqNo: 180774

Units: mg/L

RPDLimit

Analyte

Result 8040

8000

SPK value SPK Ref Val

SPK value SPK Ref Val

%REC LowLimit 103

HighLimit

%RPD **RPDLimit**

%RPD

Qual

Total Dissolved Solids

100 5000

2910

TestCode: SM2540C MOD: Total Dissolved Solids

Sample ID 1210682-001CMSD Client ID: Injection Well

SampType: MSD Batch ID: 4296

RunNo: 6273

Prep Date: 10/15/2012

Analysis Date: 10/16/2012

SeqNo: 180775

Units: mg/L

RPDLimit

Qual

Analyte

Result PQL

SPK value SPK Ref Val

%REC LowLimit

HighLimit

%RPD 0.498

Total Dissolved Solids

100

5000

2910

102

120

20

Qualifiers:

Value exceeds Maximum Contaminant Level.

Value above quantitation range

Analyte detected below quantitation limits

Sample pH greater than 2

B Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

RPD outside accepted recovery limits

Not Detected at the Reporting Limit

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Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87105 TEL: 505-345-3975 FAX: 505-345-410; Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: Western Refining Southwest, Inc.Bloomfield	Work Order Number: 1210682
Received by/date: /b/12/12	
Logged By: Lindeay Mangin 10/12/2012 10:30:0	7 PM
Completed By: Lindsey Mangin 10/12/2012 2:40:37	7 PM
Reviewed By: 0121	12
Chain of Custody	
1. Were seals intact?	Yes ☐ No ☐ Not Present ☑
2. Is Chain of Custody complete?	Yes 🗹 No 🗌 Not Present 🗌
3. How was the sample delivered?	<u>FedEx</u>
<u>Log In</u>	
4. Coolers are present? (see 19. for cooler specific information)	Yes ☑ No ☐ NA ☐
5. Was an attempt made to cool the samples?	Yes 🗹 No 🗆 NA 🗆
6. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑ No ☐ NA ☐
7. Sample(s) in proper container(s)?	Yes 🗹 No 🗌
8. Sufficient sample volume for indicated test(s)?	Yes 🗹 No 🗆
g, Are samples (except VOA and ONG) properly preserved?	Yes 🗹 No 🗌
10. Was preservative added to bottles?	Yes □ No 🗹 NA □
11. VOA vials have zero headspace?	Yes ☑ No ☐ No VOA Vials ☐
12. Were any sample containers received broken?	Yes No 🗹
13. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ✓ No ☐ # of preserved bottles checked for pH:
14. Are matrices correctly identified on Chain of Custody?	Yes No (<2 or 12)unless noted)
15. Is it clear what analyses were requested?	Yes V No Adjusted?
16. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑ No ☐ Checked by:
Special Handling (If applicable)	
17. Was client notified of all discrepancies with this order?	Yes 🗆 No 🗆 NA 🗹
Person Notified: Date	
By Whom: Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:	
Client Instructions:	
18. Additional remarks:	
19. Cooler Information	
Cooler No Temp C Condition Seal Intact Seal No 1 1.3 Good Yes	Seal Date Signed By

	HALL ENVIRONMENTAL	www hallanvironmental com	4901 Hawkins NE - Albuqueraue, NM 87109	Tel. 505-345-3975 Fax 505-345-4107	Ana	(%) (%) () () () ()	77.77.77.77.77.77.77.77.77.77.77.77.77.) d (3:5)	TPH (2008)	08 40V () () () () () () () () () () () () ()	BTEX + MTE BTEX + MTE BTEX + MTE TPH Method 8310 (PNA 6 8260B (VOA 8 8260B (VOA 8 8270 (Semi-	.*	*	*		×	X	,×	X			Remarks:	
Turn-Around Time:	Standard 🗆 Rush	Project Name:	INJECTION Well 10-11-12			Project Manager:			Sampler: MATT A BOD	A The same and the same of the	Container Preservative HEALING Type and # Type	3-10A HC1 -001	1-liter Amber	1-500ml	1-50ml	1-350ml H2504	1-50ml HNO3	1-500ml NaOH	1-50m Triketal			Received by Time 10/12/12 1930	Recalived by: Date Time
Chain-of-Custody Record	Client: Westrn Refining		Mailing Address: #50 CR 4990	Bloomfield, nM 87413	Phone #: 505-632-4135	email or Fax#:	QA/QC Package:	☐ Standard ★ (Full Validation)	Accreditation	□ EDD (Type)	Matrix Sample Request ID	10-12- 9:00 Has Injection well										Rollmywished by: Kalbar	Time: Relinquished бу:

if necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

APPENDIX C



Hall Environmental Analysis Laboratory

QUALITY ASSURANCE PLAN

Effective Date: July 2nd, 2012

Revision 9.5

www.hallenvironmental.com

Control Number: 00000120

Approved By:

Andy Freeman

Laboratory Manager

Approved By:

Carolyn Swanson

Date

Quality Assurance/Quality Control Officer

Approved By:

Andy Freeman

Date

Organics Technical Director

Approved By:

Ian Cameron

Date

Inorganics Technical Director

Approved By:

eva Jensen Da

Microbiology Technical Director

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3.0 Introduction

Purpose of Document

The purpose of this Quality Assurance Plan is to formally document the quality assurance policies and procedures of Hall Environmental Analysis Laboratory, Inc. (HEAL), for the benefit of its employees, clients, and accrediting organizations. HEAL continually implements all aspects of this plan as an essential and integral part of laboratory operations in order to ensure that high quality data is produced in an efficient and effective manner.

Objectives

The objective of HEAL is to achieve and maintain excellence in environmental testing. This is accomplished by developing, incorporating and documenting the procedures and policies specified by each of our accrediting authorities and outlined in this plan. These activities are carried out by a laboratory staff that is analytically competent, well-qualified, and highly trained. An experienced management team, knowledgeable in their area of expertise, monitors them. Finally, a comprehensive quality assurance program governs laboratory practices and ensures that the analytical results are valid, defensible, reproducible, reconstructable and of the highest quality.

HEAL establishes and thoroughly documents its activities to ensure that all data generated and processed will be scientifically valid and of known and documented quality. Routine laboratory activities are detailed in method specific standard operating procedures (SOP). All data reported meets the applicable requirements for the specific method that is referenced, ORELAP, TCEQ, EPA, client specific requirements and/or State Bureaus. In the event that these requirements are ever in contention with each other, it is HEAL's policy to always follow the most prudent requirement available. For specific method requirements refer to HEAL's Standard Operating Procedures (SOP's), EPA methods, Standard Methods 20th edition, ASTM methods or state specific methods.

HEAL management ensures that this document is correct in terms of required accuracy and data reproducibility, and that the procedures contain proper quality control measures. HEAL management additionally ensures that all equipment is reliable, well-maintained and appropriately calibrated. The procedures and practices of the laboratory are geared towards not only strictly following our regulatory requirements but also allowing the flexibility to conform to client specific specifications. Meticulous records are maintained for all samples and their respective analyses so that results are well-documented and defensible in a court of law.

The HEAL Quality Assurance/Quality Control Officer (QA/QCO) and upper management are responsible for supervising and administering this quality assurance program, and ensuring each individual is responsible for its proper implementation. All HEAL

management remains committed to the encouragement of excellence in analytical testing and will continue to provide the necessary resources and environment conducive to its achievement.

Policies

Understanding that quality cannot be mandated, it is the policy of this laboratory to provide an environment that encourages all staff members to take pride in the quality of their work. In addition to furnishing proper equipment and supplies, HEAL stresses the importance of continued training and professional development. Further, HEAL recognizes the time required for data interpretation. Therefore, no analyst should feel pressure to sacrifice data quality for data quantity. Each staff member must perform with the highest level of integrity and professional competence, always being alert to problems that could compromise the quality of their technical work.

Management and senior personnel supervise analysts closely in all operations. Under no circumstance is the willful act or fraudulent manipulation of analytical data condoned. Such acts must be reported immediately to HEAL management. Reported acts will be assessed on an individual basis and resulting actions could result in dismissal. The laboratory staff is encouraged to speak with lab managers or senior management if they feel that there are any undo commercial, financial, or other pressures, which might adversely affect the quality of their work; or in the event that they suspect that data quality has been compromised in any way. HEAL's Quality Assurance/Quality Control Officer is available if any analyst and/or manager wishes to anonymously report any suspected or known breaches in data integrity.

Understanding the importance of meeting customer requirements in addition to the requirements set forth in statutory and regulatory requirements, HEAL shall periodically seek feedback from customers and evaluate the feedback in order to initiate improvements.

All proprietary rights and client information at HEAL (including national security concerns) are considered confidential. No information will be given out without the express verbal or written permission of the client. All reports generated will be held in the strictest of confidence.

HEAL shall continually improve the effectiveness of its management system through the use of the policies and procedures outlined in this Quality Assurance Plan. Quality control results, internal and external audit findings, management reviews, new and continual training and corrective and preventive actions are continually evaluated to identify possible improvements and to ensure that appropriate communication processes are taking place regarding the effectiveness of the management system. HEAL shall ensure that the integrity of the quality system is maintained when changes to the system are planned and implemented.

This is a controlled document. Each copy is assigned a unique tracking number and when released to a client or accrediting agency the QA/QCO keeps the tracking number on file. This document is reviewed on an annual basis to ensure that it is valid and representative of current practices at HEAL.

4.0 Organization and Responsibility

Company

HEAL is accredited in accordance with the 2009 TNI standard (see NELAC accredited analysis list in the Document Control Logbook), through ORELAP and TCEQ and by the Arizona Department of Health Services. Additionally, HEAL is qualified as defined under the State of New Mexico Water Quality Control Commission regulations and the New Mexico State Drinking Water Bureau. HEAL is a locally owned small business that was established in 1991. HEAL is a full service environmental analysis laboratory with analytical capabilities that include both organic and inorganic methodologies and has performed analyses of soil, water, and air as well as various other matrices for many sites in the region. HEAL's client base includes local, state and federal agencies, private consultants, commercial industries as well as individual homeowners. HEAL has performed as a subcontractor to the state of New Mexico and to the New Mexico Department of Transportation. HEAL has been acclaimed by its customers as producing quality results and as being adaptive to client-specific needs.

The laboratory is divided into an organic section and an inorganic section. Each section has a designated manager/technical director. The technical directors report directly to the laboratory manager, who oversees all operations.

Certifications

ORELAP - NELAC Oregon Primary accrediting authority.

TCEQ - NELAC Texas Secondary accrediting authority.

The Arizona Department of Health Services

The New Mexico Drinking Water Bureau

The New Mexico Department of Health

See the current Document Control Logbook for copies of current licenses and licensed parameters, or refer to our current list of certifications online at www.hallenvironmental.com.

In the event of a certification being revoked or suspended, HEAL will notify, in writing, those clients that require the affected certification.

Personnel

HEAL management ensures the competence of all who operate equipment, perform environmental tests, evaluate results, and sign test reports. Personnel performing specific tasks shall be qualified on the basis of appropriate education, training, experience and /or demonstrated skills.

HEAL ensures that all personnel are aware of the relevance and importance of their activities and how each employee contributes to the achievement of the objectives defined throughout this document.

All personnel shall be responsible for complying with HEAL's quality assurance/quality control requirements that pertain to their technical function. Each technical staff member must have a combination of experience and education to adequately demonstrate specific knowledge of their particular function and a general knowledge of laboratory operations, test methods, quality assurance/quality control procedures, and records management.

All employees' training certificates and diplomas are kept on file with demonstrations of capability for each method they perform. An Organizational Chart can be found at the end of this section and a personnel list is available in the current Document Control Logbook.

Laboratory Director

The Laboratory Director is responsible for overall technical direction and business leadership of HEAL. The Laboratory Manager, the Project Manager and Quality Assurance/Quality Control Officer report directly to the Laboratory Director. Someone with a minimum of 7 years of directly related experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

Laboratory Manager/Lead Technical Director

The Laboratory Manager shall exercise day—to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results. The Laboratory Manager shall be experienced in the fields of accreditation for which the laboratory is approved or seeking accreditation. The Laboratory Manager shall certify that personnel with appropriate educational and/or technical background perform all tests for which HEAL is accredited. Such certification shall be documented.

The Laboratory Manager shall monitor standards of performance in quality control and quality assurance and monitor the validity of the analyses performed and data generated at HEAL to assure reliable data.

The Laboratory Manager is responsible for the daily operations of the laboratory. The Laboratory Manager is the lead technical director of the laboratory and, in conjunction

with the section technical directors, is responsible for coordinating activities within the laboratory with the overall goal of efficiently producing high quality data within a reasonable time frame.

In events where employee scheduling or current workload is such that new work cannot be incorporated, without missing hold times, the Laboratory Manager has authority to modify employee scheduling, re-schedule projects or, when appropriate, allocate the work to approved subcontracting laboratories.

Additionally, the laboratory manager reviews and approves new analytical procedures and methods, and performs a final review of most analytical results. The Laboratory Manager provides technical support to both customers and HEAL staff.

The Laboratory Manager also observes the performance of supervisors to ensure that good laboratory practices and proper techniques are being taught and utilized, and to assist in overall quality control implementation and strategic planning for the future of the company. Other duties include assisting in establishing laboratory policies that lead to the fulfillment of requirements for various certification programs, assuring that all Quality Assurance and Quality Control documents are reviewed and approved, and assisting in conducting Quality Assurance Audits.

The laboratory manager addresses questions or complaints that cannot be answered by the section managers.

The Laboratory Manager shall have a bachelor's degree in a chemical, environmental, biological sciences, physical sciences or engineering field, and at least five years of experience in the environmental analysis of representative inorganic and organic analytes for which the laboratory seeks or maintains accreditation.

Quality Assurance Quality Control Officer

The Quality Assurance/Quality Control Officer (QA/QCO) serves as the focal point for QA/QC and shall be responsible for the oversight and/or review of quality control data. The QA/QCO functions independently from laboratory operations and shall be empowered to halt unsatisfactory work and/or prevent the reporting of results generated from an out-of-control measurement system. The QA/QCO shall objectively evaluate data and perform assessments without any outside/managerial influence. The QA/QCO shall have direct access to the highest level of management at which decisions are made on laboratory policy and/or resources. The QA/QCO shall notify laboratory management of deficiencies in the quality system in periodic, independent reports.

The QA/QCO shall have general knowledge of the analytical test methods for which data review is performed and have documented training and/or experience in QA/QC procedures and in the laboratory's quality system. The QA/QCO will have a

minimum of a BS in a scientific or related field and a minimum of three years of related experience.

The QA/QCO shall schedule and conduct internal audits as per the Internal Audit SOP at least annually, monitor and trend Corrective Action Reports as per the Data Validation SOP, periodically review control charts for out of control conditions, and initiate any appropriate corrective actions.

The QA/QCO shall oversee the analysis of proficiency testing in accordance with our standards and monitor any corrective actions issued as a result of this testing.

The QA/QCO reviews all standard operating procedures and statements of work in order to assure their accuracy and compliance to method and regulatory requirements.

The QA/QCO shall be responsible for maintaining and updating this quality manual.

Project Manager

The role of the project manager is to act as a liaison between HEAL and our clients. The Project Manager updates clients on the status of projects in-house, prepares quotations for new work, and is responsible for HEAL's marketing effort.

All new work is assessed by the Project Manager and reviewed with the other managers so as to not exceed the laboratory's capacity. In events where employee scheduling or current workload is such that new work cannot be incorporated without missing hold times, the Project Manager has authority to re-schedule projects.

It is also the duty of the project manager to work with the Laboratory Manager and QA/QCO to insure that before new work is undertaken, the resources required and accreditations requested are available to meet the client's specific needs.

Additionally, the Project Manager can initiate the review of the need for new analytical procedures and methods, and perform a final review of some analytical results. The Project Manager provides technical support to customers. Someone with a minimum of 2 years of directly related experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

Technical Directors

Technical Directors are full-time members of the staff at HEAL who exercise day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results for their department within HEAL. A Technical Director's duties shall include, but not be limited to, monitoring standards of performance in quality

control and quality assurance, monitoring the validity of the analyses performed and the data generated in their sections to ensure reliable data, overseeing training and supervising departmental staff, scheduling incoming work for their sections, and monitoring laboratory personnel to ensure that proper procedures and techniques are being utilized. They supervise and implement new Quality Control procedures as directed by the QA/QCO, update and maintain quality control records including, but not limited to, training forms, IDOCs, ADOCPs, and MDLs, and evaluate laboratory personnel in their Quality Control activities. In addition, technical directors are responsible for upholding the spirit and intent of HEAL's data integrity procedures.

As Technical Directors of their associated section, they review analytical data to acknowledge that data meets all criteria set forth for good Quality Assurance practices. Someone with a minimum of 2 years of experience in the environmental analysis of representative analytes for which HEAL seeks or maintains accreditation and a bachelor's degree in a scientific or related discipline should fill this position.

Section Supervisors

Section Supervisors are full time members of staff at HEAL who exercise day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results for their department within HEAL. Section Supervisors report directly to their technical director. A Section Supervisor's duties shall include, but not be limited to, monitoring standards of performance in quality control and quality assurance, monitoring the validity of the analyses performed and the data generated in their sections to ensure reliable data, overseeing training and supervising departmental staff, scheduling incoming work for their sections, and monitoring laboratory personnel to ensure that proper procedures and techniques are being utilized. They supervise and implement new Quality Control procedures as directed by the QA/QCO, update and maintain quality control records including, but not limited to, training forms, IDOCs. ADOCPs, and MDLs, and evaluate laboratory personnel in their Quality Control activities. In addition, Section Supervisors are responsible for upholding the spirit and intent of HEAL's data integrity procedures. Section Supervisors update their Technical Director on the status and needs of their departments and submit all Quality Control documents to their technical director for their review, approval and signature.

As section supervisors, they review analytical data to acknowledge that data meets all criteria set forth for good Quality Assurance practices. Someone with a minimum of 2 years of experience in the environmental analysis of representative analytes for which HEAL seeks or maintains accreditation and a bachelor's degree, or equivalent experience in a scientific or related discipline should fill this position.

Health and Safety / Chemical Hygiene Officer

Page 13 of 56 Quality Assurance Plan 9.5 Effective July 2nd, 2012 Refer to the most recent version of the Health and Safety and Chemical Hygiene Plans for the roles, responsibilities, and basic requirements of the Health and Safety Officer (H&SO) and the Chemical Hygiene Officer (CHO). These jobs can be executed by the same employee.

Analyst I, II and III

Analysts are responsible for the analysis of various sample matrices including, but not limited to, solid, aqueous, and air, as well as the generation of high quality data in accordance with the HEAL SOPs and QA/QC guidelines in a reasonable time as prescribed by standard turnaround schedules or as directed by the Section Manager or Laboratory Manager.

Analysts are responsible for making sure all data generated is entered in the database in the correct manner and the raw data is reviewed, signed and delivered to the appropriate peer for review. An analyst reports daily to the section manager and will inform them as to material needs of the section specifically pertaining to the analyses performed by the analyst. Additional duties may include preparation of samples for analysis, maintenance of lab instruments or equipment, and cleaning and providing technical assistance to lower level laboratory staff.

The senior analyst in the section may be asked to perform supervisory duties as related to operational aspects of the section. The analyst may perform all duties of a lab technician.

The position of Analyst is a full or part time hourly position and is divided into three levels, Analyst I, II, and III. All employees hired into an Analyst position at HEAL must begin as an Analyst I and remain there at a minimum of three months regardless of their education and experience. Analyst I must have a minimum of an AA in a related field or equivalent experience (equivalent experience means years of related experience can be substituted for the education requirement). An Analyst I is responsible for analysis, instrument operation, including calibration and data reduction. Analyst II must have a minimum of an AA in a related field or equivalent experience and must have documented and demonstrated aptitude to perform all functions of an Analyst II. An Analyst II is responsible for the full analysis of their test methods, routine instrument maintenance, purchase of consumables as dictated by their Technical Director, advanced data reduction, and basic data review. Analyst II may also assist Analyst III in method development and, as dictated by their Technical Director, may be responsible for the review and/or revision of their method specific SOPs. Analyst III must have Bachelors degree or equivalent experience and must have documented and demonstrated aptitude to perform all functions of an Analyst III. An Analyst III is responsible for all tasks completed by an Analyst I and II as well as advanced data review, non-routine instrument maintenance, assisting their technical director in basic supervisory duties and method development.

Laboratory Technician

A laboratory technician is responsible for providing support to analysts in the organics, inorganics and disposal departments. Laboratory Technicians can assist analysts in basic sample preparation, general laboratory maintenance, glassware washing, chemical inventories, sample disposal and sample kit preparation. This position can be filled by someone without the education and experience necessary to obtain a position as an analyst.

Sample Control Manager

The sample control manager is responsible for receiving samples and reviewing the sample login information after it has been entered into the computer. The sample control manager also checks the samples against the chain-of-custody for any sample and/or labeling discrepancies prior to distribution.

The sample control manager is responsible for sending out samples to the sub-contractors along with the review and shipping of field sampling bottle kits. The sample control manager acts as a liaison between the laboratory and field sampling crew to ensure that the appropriate analytical test is assigned. If a discrepancy is noted, the sample control manager or sample custodian will contact the customer to resolve any questions or problems. The sample control manager is an integral part of the customer service team.

This position should be filled by someone with a high school diploma and a minimum of 2 years of related experience and can also be filled by a senior manager.

Sample Custodians

Sample Custodians work directly under the Sample Control Manager. They are responsible for sample intake into the laboratory and into the LIMS. Sample Custodians take orders from our clients and prepare appropriate bottle kits to meet the clients' needs. Sample Custodians work directly with the clients in properly labeling and identifying samples as well as properly filling out legal COCs. When necessary, Sample Custodians contact clients to resolve any questions or problems associated with their samples. Sample Custodians are responsible for distributing samples throughout the laboratory and are responsible for notifying analysts of special circumstances such as short holding times or improper sample preservation upon receipt.

Sample Disposal Custodian

The sample disposal custodian is responsible for characterizing and disposing of samples in accordance to the most recent version of the sample disposal SOP. The sample disposal custodian collects waste from the laboratory and transports it to the disposal warehouse for storage and eventual disposal. The sample disposal custodian is responsible for maintaining the disposal warehouse and following the requirements for documentation, integrity, chemical hygiene and health and safety as set forth in the various HEAL administrative SOPs. The sample disposal custodian is responsible for overseeing any laboratory technicians employed at the disposal warehouse.

This position should be filled by someone with a high school diploma and a minimum of 1 year of related experience.

Bookkeeper

The Bookkeeper is responsible for the preparation of quarterly financials and quarterly payroll reports. The bookkeeper monitors payables, receivables, deposits, pays all bills and maintains an inventory of administrative supplies. The Bookkeeper completes final data package assembly and oversees the consignment of final reports. The Bookkeeper assists in the project management of drinking water compliance samples for NMED and NMEFC and any other tasks as assigned by the Laboratory Manager. This position should be filled by someone with a degree in accounting or a minimum of a high school diploma and at least 4 years of directly related experience.

Administrative Assistant

The Administrative Assistant is responsible for aiding administrative staff in tasks that include but are not limited to: the processing and consignment of final reports, and the generation of client specific spreadsheets. This position should be filled by someone with a minimum of a high school diploma.

IT Specialist

The IT Specialist is responsible for the induction and maintenance of all hard and software technology not maintained through a service agreement. The IT Specialist follows the requirements of this document, all regulatory documents and the EPAs Good Automated Laboratory Practices. This position should be filled by someone with a degree in a computer related field, or at least two years of directly related experience.

Delegations in the Absence of Key Personnel

Planned absences shall be preceded by notification to the Laboratory Manager. The appropriate staff members shall be informed of the absence. In the case of unplanned absences, the superior shall either assume the responsibilities and duties or delegate the responsibilities and duties to another appropriately qualified employee.

In the event that the Laboratory Manager is absent for a period of time exceeding fifteen consecutive calendar days, another full-time staff member meeting the basic qualifications and competent to temporarily perform this function will be designated. If this absence exceeds thirty-five consecutive calendar days, HEAL will notify ORELAP in writing of the absence and the pertinent qualifications of the temporary laboratory manager.

Laboratory Personnel Qualification and Training

All personnel joining HEAL shall undergo orientation and training. During this period the new personnel shall be introduced to the organization and their responsibilities, as well as the policies and procedures of the company. They shall also undergo on-the-job training and shall work with trained staff. They will be shown required tasks and be observed while performing them.

When utilizing staff undergoing training, appropriate supervision shall be dictated and overseen by the appropriate section technical director. Prior to analyzing client samples, a new employee, or an employee new to a procedure, must meet the following basic requirements. The SOP and Method for the analysis must be read and signed by the employee indicating that they read, understand, and intend to comply with the requirements of the documents. The employee must undergo documented training. Training is conducted by a senior analyst familiar with the procedure and overseen by the section Technical Director. This training is documented by any means deemed appropriate by the trainer and section Technical Director, and kept on file in the employees file located in the QA/QCO's office. The employee must perform a successful Initial Demonstration of Proficiency (IDOC). See the current Document Control Logbook for the training documents and checklists utilized at HEAL to ensure that all of these requirements are met. Once all of the above requirements are met it is incumbent upon the section Technical Director to determine at which point the employee can begin to perform the test unsupervised. A Certification to Complete Work Unsupervised (see the current Document Control Logbook) is then filled out by the employee and technical director.

IDOCs are required for all new analysts and methods prior to sample analysis. IDOCs are also required any time there is a change in the instrument, analyte list or method. If more than twelve months have passed since an analyst performed an IDOC and they have not performed the method and/or have not met the continuing DOC requirements, the analyst must perform an IDOC prior to resuming the test.

All IDOCs shall be documented through the use of the certification form which can be found in the current Document Control Logbook. IDOCs are performed by analyzing four Laboratory Control Spikes (LCSs). Using the results of the LCSs the mean recovery is calculated in the appropriate reporting units and the standard deviations of the population sample (n-1) (in the same units) as well as the relative percent difference for each parameter of interest. When it is not possible or pertinent to determine mean and standard deviations HEAL assesses performance against establish and documented criteria dictated in the method SOP. The mean and standard deviation are compared to the corresponding acceptance criteria for precision and accuracy in the test method (if applicable) or in laboratory-generated acceptance criteria. In the event that the HEAL SOP or test method fail to establish the pass/fail criteria the default limits of +/- 20% for calculated recovery and <20% relative percent difference based on the standard deviation will be utilized. If all parameters meet the acceptance criteria, the IDOC is successfully completed. If any one of the parameters do not meet the acceptance criteria, the performance is unacceptable for that parameter and the analyst must either locate and correct the source of the problem and repeat the test for all parameters of interest or repeat the test for all parameters that failed to meet criteria. Repeat failure, however, confirms a general problem with the measurement system. If this occurs the source of the problem must be identified and the test repeated for all parameters of interest.

New employees that do not have prior analysis experience will not be allowed to perform analysis until they have demonstrated attention to detail with minimal errors in the assigned tasks. To ensure a sustained level of quality performance among staff members, continuing demonstration of capability shall be performed at least once a year. These are as an Annual Documentation of Continued Proficiency (ADOCP).

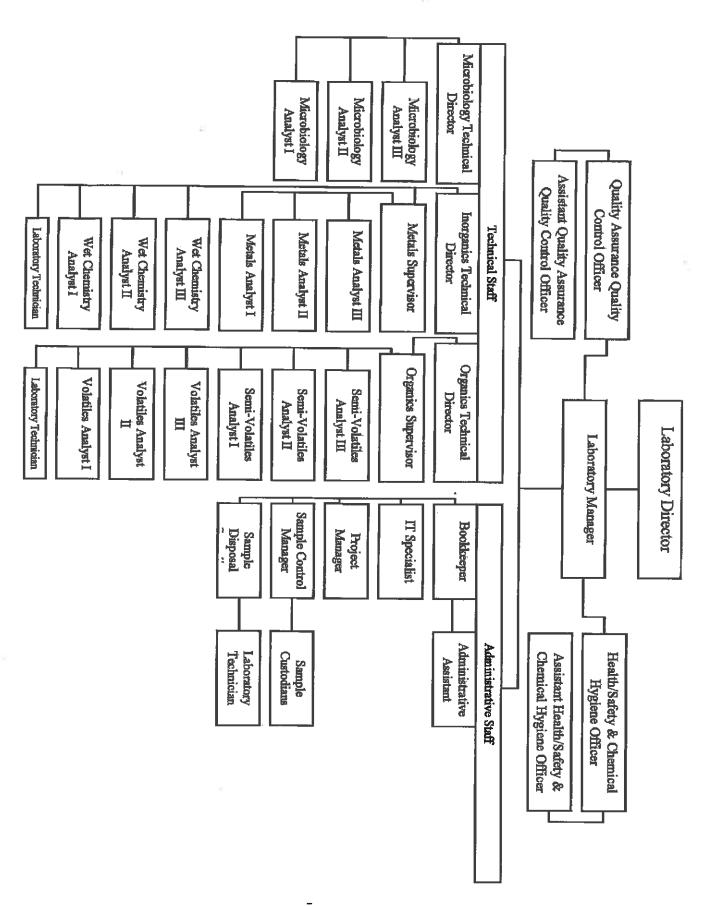
At least once per year an ADOCP must be completed. This is achieved by the acceptable performance of a blind sample (typically by using a PT sample, but can be a single blind (to the analyst) sample), by performing another IDOC, or by summarizing the data of four consecutive laboratory control samples with acceptable levels of precision and accuracy (these limits are those currently listed in the LIMS for an LCS using the indicated test method.) ADOCPs are documented using a standard form and are kept on file in each analyst's employee folder.

Each new employee shall be provided with data integrity training as a formal part of their new employee orientation. Each new employee will sign an ethics and data integrity agreement to ensure that they understand that data quality is our main objective. Every HEAL employee recognizes that although turn around time is important, quality is put above any pressure to complete the task expediently. Analysts are not compensated for passing QC parameters nor are incentives given for the quantity of work produced. Data Integrity and Ethics training are performed on an annual basis in order to remind all employees of HEAL's policy on data quality. Employees are required to understand that any infractions of the laboratory data integrity procedures will result in a detailed investigation that could lead to very serious

consequences including immediate termination, debarment, or civil/criminal prosecution.

Training for each member of HEAL's technical staff is further established and maintained through documentation that each employee has read, understood, and is using the latest version of this Quality Assurance Manual. Training courses or workshops on specific equipment, analytical techniques, or laboratory procedures are documented through attendance sheets, certificates of attendance, training forms, or quizzes. This training documentation is located in analyst specific employee folders in the QA/QCO Office. On the front of all methods, SOPs, and procedures for HEAL, there is a signoff sheet that is signed by all pertinent employees, indicating that they have read, understand, and agree to perform the most recent version of the document.

The effectiveness of training will be evaluated during routine data review, annual employee reviews, and internal and external audits. Repetitive errors, complaints and audit findings serve as indicators that training has been ineffective. When training is deemed to have been ineffective a brief review of the training process will be completed and a re-training conducted as soon as possible.



Quality Assurance Plan 9.5 Effective July 2nd, 2012

5.0 Receipt and Handling of Samples

Sampling

Procedures

HEAL does not provide field sampling for any projects. Sample kits are prepared and provided for clients upon request. The sample kits contain the appropriate sampling containers (with a preservative when necessary), labels, blue ice (The use of 'blue ice' by anyone except HEAL personnel is discouraged because it generally does not maintain the appropriate temperature of the sample. If blue ice is used, it should be completely frozen at the time of use, the sample should be chilled before packing, and special notice taken at sample receipt to be certain the required temperature has been maintained.), a cooler, chain-of-custody forms, plastic bags, bubble wrap, and any special sampling instructions. Sample kits are reviewed prior to shipment for accuracy and completeness.

Containers

Containers which are sent out for sampling are purchased by HEAL from a commercial source. Glass containers are certified "EPA Cleaned" QA level 1. Plastic containers are certified clean when required. These containers are received with a Certificate of Analysis verifying that the containers have been cleaned according to the EPA wash procedure. Containers are used once and discarded. If the samples are collected and stored in inappropriate containers the laboratory may not be able to accurately quantify the amount of the desired components. In this case, re-sampling may be required.

Preservation

If sampling for analyte(s) requires preservation, the sample custodians fortify the containers prior to shipment to the field, or provide the preservative for the sampler to add in the field. The required preservative is introduced into the vials in uniform amounts and done so rapidly to minimize the risk of contamination. Vials that contain a preservative are labeled appropriately. If the samples are stored with inappropriate preservatives, the laboratory may not be able to accurately quantify the amount of the desired components. In this case re-sampling may be required.

Refer to the current Login SOP and/or the current price book for detailed sample receipt and handling procedures, appropriate preservation and holding time requirements.

Sample Custody

Chain-of-Custody Form

A Chain-of-Custody (COC) form is used to provide a record of sample chronology from the field to receipt at the laboratory. HEAL's COC contains the client's name, address, phone and fax numbers, the project name and number, the project manager's name, and the field sampler's name. It also identifies the date and time of sample collection, sample matrix, field sample ID number, number/volume of sample containers, sample temperature upon receipt, and any sample preservative information.

There is also a space to record the HEAL ID number assigned to samples after they are received. Next to the sample information is a space for the client to indicate the desired analyses to be performed. There is a section for the client to indicate the data package level as well as any accreditation requirements. Finally, there is a section to track the actual custody of the samples. The custody section contains lines for signatures, dates and times when samples are relinquished and received. The COC form also includes a space to record special sample related instructions, sampling anomalies, time constraints, and any sample disposal considerations.

It is paramount that all COCs arrive at HEAL complete and accurate so that the samples can be processed and allocated for testing in a timely and efficient manner. A sample chain-of-custody form can be found in the current Document Control Logbook or on line at www.hallenvironmental.com.

Receiving Samples

Samples are received by authorized HEAL personnel. Upon arrival, the COC is compared to the respective samples. After the samples and COC have been determined to be complete and accurate, the sampler signs over the COC. The HEAL staff member in turn signs the chain-of-custody, also noting the current date, time, and sample temperature. This relinquishes custody of the samples from the sampler and delegates sample custody to HEAL. The first (white) copy of the COC form is filed in the appropriate sample folder. The second (yellow) copy of the COC form is filed in the COC file in the sample control manger's office. The third (pink) copy of the COC form is given to the person who has relinquished custody of the samples.

Logging in Samples and Storage

Standard Operating Procedures have been established for the receiving and tracking of all samples (refer to the current HEAL Login SOP). These procedures ensure that samples are received and properly logged into the laboratory and that all associated documentation, including chain of custody forms, is complete and consistent with the samples received. Each sample set is given a unique HEAL tracking ID number.

Individual sample locations within a defined sample set are given a unique sample ID suffix-number. Labels with the HEAL numbers, and tests requested, are generated and placed on their respective containers. The pH of preserved, non-volatile samples is checked and noted if out of compliance. Due to the nature of the samples, the pHs of volatiles samples are checked after analysis. Samples are reviewed prior to being distributed for analysis.

Samples are distributed for analysis based upon the requested tests. In the event that sample volume is limited and different departments at HEAL are required to share the sample, volatile work takes precedence and will always be analyzed first before the sample is sent to any other department for analysis.

All samples that require thermal preservation shall be acceptably stored at a temperature range just above freezing to 6 °C.

Each project (sample set) is entered into the Laboratory Information Management System (LIMS) with a unique ID that will be identified on every container. The ID tag includes the Lab ID, Client ID, date and time of collection, and the analysis/analyses to be performed. The LIMS continually updates throughout the lab. Therefore, at any time, an analyst or manager may inquire about a project and/or samples status. For more information about the login procedures, refer to the Sample Login SOP.

Disposal of Samples

Samples are held at HEAL for a minimum of thirty days and then transferred to the HEAL warehouse for disposal. Analytical results are used to characterize their respective sample contamination level(s) so that the proper disposal can be performed. These wastes will be disposed of according to their hazard as well as their type and level of contamination. Refer to the Hall Environmental Analysis Laboratory Chemical Hygiene Plan and current Sample Disposal SOP for details regarding waste disposal.

Waste drums are provided by an outside agency. These drums are removed by the outside agency and disposed of in a proper manner.

The wastes that are determined to be non-hazardous are disposed of as non-hazardous waste in accordance with the Chemical Hygiene Plan and Sample Disposal SOP.

6.0 Analytical Procedures

All analytical methods used at HEAL incorporate necessary and sufficient Quality Assurance and Quality Control practices. A Standard Operating Procedure (SOP) is used for each method to provide the necessary criteria to yield acceptable results. These procedures are reviewed at least annually and revised as necessary and are attached as a pdf file in the Laboratory Information Management System (LIMS) for easy access by each analyst. The sample is often consumed or altered during the analytical process. Therefore, it is important that each step in the analytical process be correctly followed in order to yield valid data.

When unforeseen problems arise, the analyst, technical director, and, when necessary, laboratory manager meet to discuss the factors involved. The analytical requirements are evaluated and a suitable corrective action or resolution is established. The client is notified in the case narrative with the final report or before, if the validity of their result is in question.

List of Procedures Used

Typically, the procedures used by HEAL are EPA approved methodologies or 20th edition Standard Methods. However, proprietary methods for client specific samples are sometimes used. The following tables list EPA and Standard Methods Method numbers with their corresponding analytes and/or instrument classification.

Methods Utilized at HEAL

Drinking Water(DW) Non-Potable Water (NPW) Solids (S)

Methodology	Matrix	Title of Method	
120.1	DW	"Conductonos/Consilio Conductonos Lunbras et 85.9 ON	
	NPW	"Conductance(Specific Conductance, uohms at 25 ° C)"	
180.1	DW	(Tradition / Normal and a second a 20	
	NPW	"Turbidity (Nephelometric)"	
200.2	DW	"Sample Preparation Procedure For Spectrochemical	
	NPW	Determination of Total Recoverable Elements"	
200.7	DW	"Determination of Metals and Trace Elements in Water and	
	NPW	Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry"	
200.8	. DW	*Determination of Trace Elements in Waters and Wastes by	
	NPW	Inductively Coupled Plasma-Mass Spectrometry."	
245.1	DW	"Mercury (Manual Cold Vapor Technique)"	
	NPW		
300	DW		
	NPW	"Determination of Inorganic Anions by Ion Chromatography"	
	s		

T		
	- "Oil and Grease"	
S	"Petroleum Hydrocarbons (Spectrophotometric, Infrared)"	
DW	"EDB, DBCP and 123TCP in Water by Microextraction and Gas Chromatography"	
DW	"Analysis of Organohalide Pesticides and Commercial Polychlorinated Biphenyl (PCB) Products in Water by Microextraction and Gas Chromatography"	
DW	"Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron Capture Detector"	
DW	"Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry"	
DW	"Measurement of N-Methylcarbomoyloximes and N-Methylcarbamates in Water by Direct Aqueous Injection HPLC with Post Column Derivatization"	
DW	"Determination of Glyphosate in Drinking Water by Direct- Aqueous Injection HPLC, Post-Column Derivatization, and Fluorescence Detection"	
DW	"Determination of Haloacetic Acids and Dalapon in Drinking Water by Ion-Exchange Liquid-Solid Extraction and Gas Chromatography with an Electron Capture Detector"	
DW	Appendix A to Part 136 Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater Method 624- Purgeables"	
DW	Appendix A to Part 136 Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater Method 625- Base/Neutrals and Acids"	
S	"Toxicity Characteristic Leaching Procedure"	
S	"Toxicity Characteristic Leaching Procedure"	
NPW	"N-Hexane Extractable Material (HEM; Oil and Grease) and Silica Gel Treated N-Hexane Extractable Material) by Extraction and Gravimetry"	
NPW	"Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by FLAA or ICP Spectroscopy"	
s	"Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by FLAA or ICP Spectroscopy"	
S	"Acid Digestion of Sediment, Sludge, and Soils"	
DW NPW	"Separatory Funnel Liquid-Liquid Extraction"	
	DW DW DW DW DW NPW S S DW	

3540	s	"Soxhlet Extraction"	
3545	s	"Pressurized Fluid Extraction(PFE)"	
3665	NPW S	"Sulfuric Acid/Permanganate Cleanup"	
5030B	NPW	"Purge-and-Trap for Aqueous Samples"	
5035	s	"Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples"	
6010B	NPW S	"Inductively Coupled Plasma-Atomic Emission Spectrometry"	
6020	NPW S	"Inductively Coupled Plasma-Mass Spectrometry"	
7470A	NPW	"Mercury in Liquid Waste (Manual Cold-Vapor Technique)"	
7471A	s	"Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)"	
8021B	NPW	"Aromatic and Halogenated Volatiles By Gas Chromatography Using Photoionization and/or Electrolytic	
	3	Conductivity Detectors"	
8015B	NPW	"Nonhalogenated Volatile Organics by Gas Chromatography"	
	s	(Gasoline Range and Diesel Range Organics)	
8015AZ	s	"C10-C32 Hydrocarbons in Soil-8015AZ"	
8081A	NPW S	"Organochlorine Pesticides by Gas Chromatography"	
8082	NPW S	"Polychlorinated Biphenyls (PCBs) by Gas Chromatography"	
8260B	NPW S	"Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)"	
8270C	NPW S	"Semivolatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)"	
8310	NPW S	"Polynuclear Aromatic Hydrocarbons"	
9045C	S	"Soil and Waste pH"	
9060	NPW	"Total Organic Carbon"	
9067	NPW S	"Phenolics (Spectrophotometric, MBTH With Distillation)"	
9095	s	Paint Filter	
Walkley/Black	S	FOC/TOC WB	
SM2320 B	DW NPW	"Alkalinity"	

SM2540 C	DW	"Total Dissolved Solids Dried at 180° C"	
	NPW	Total Biosolved Colles Blied at 100 C	
SM2540 D	NPW	"Total Suspended Solids Dried at 103-105° C"	
SM4500-CL G	DW	"Chlorine (Residual) 4500-CL G. DPD Colorimetric Method"	
SM4500-H+B	DW NPW	"pH Value"	
SM4500-NH3 C	NPW S	"4500-NH3" Ammonia	
SM4500-Norg C	NPW S	"4500-Norg" Total Kjeldahl Nitrogen (TKN)	
SM5210 B	NPW	"5210 B. 5-day BOD Test"	
SM5310 B	DW	"5310" Total Organic Carbon (TOC)	
8000B	NPW	"Determinative Chromate graphic Consulting"	
	S	"Determinative Chromatographic Separations"	
8000C	NPW	"Determinative Chromategraphic Conservices"	
	S	"Determinative Chromatographic Separations"	

Criteria for Standard Operating Procedures

HEAL has Standard Operating Procedures (SOPs) for each of the test methods listed above. These SOPs are based upon the listed methods and detail the specific procedure and equipment utilized as well as the quality requirements necessary to prove the integrity of the data. SOPs are reviewed or revised every twelve months or sooner if necessary. The review/revision is documented in the Master SOP Logbook filed in the QA/QC Office. All SOPs are available in the LIMS linked under the specific test method. Administrative SOPs, which are not linked in the LIMS, are available on desktops throughout the laboratory in the link to administrative SOPs folder.

Hand written corrections or alterations to SOPs are not permitted. In the event that a correction is needed and a revision is not immediately possible, a corrective action report will be generated documenting the correction or alteration, signed by the section Technical Director and the QA/QC Officer and will be scanned into the current SOP and will document the change until a new revision is possible.

Each HEAL test method SOP shall include or reference the following topics where applicable:

Identification of the test method;

Applicable matrix or matrices;

Limits of detection and quantitation;

Scope and application, including parameters to be analyzed;

Summary of the test method;

Definitions;

Interferences;

Safety;

Equipment and supplies;

Reagents and standards;

Sample collection, preservation, shipment and storage;

Quality control parameters;

Calibration and standardization;

Procedure;

Data analysis and calculations;

Method performance;

Pollution prevention:

Data assessment and acceptance criteria for quality control measures;

Corrective actions for out-of-control data:

Contingencies for handling out-of-control or unacceptable data;

Waste management;

References; and

Any tables, diagrams, flowcharts and validation data.

7.0 Calibration

All equipment and instrumentation used at HEAL are operated, maintained and calibrated according to manufacturers' guidelines, as well as criteria set forth in applicable analytical methodology. Personnel who have been properly trained in their procedures perform the operation and calibration. Brief descriptions of the calibration processes for our major laboratory equipment and instruments are found below.

Thermometers

The thermometers in the laboratory are used to measure the temperatures of the refrigerators, freezers, ovens, water baths, incubators, hot blocks, ambient laboratory conditions, TCLP Extractions, digestion blocks, and samples at the time of log-in. All NIST traceable thermometers are either removed from use upon their documented expiration date or they are checked annually with a NIST-certified thermometer and a correction factor is noted on each thermometer log. See the most current Login SOP for detailed procedures on this calibration procedure.

Data Loggers are used to record refrigerator temperatures. These data loggers are calibrated quarterly with NIST-certified thermometers.

Refrigerators/Freezers

Each laboratory refrigerator or freezer contains a thermometer capable of measuring to a minimum precision of 0.1°C. The thermometers are kept with the bulb immersed in liquid. Each day of use, the temperatures of the refrigerators are recorded to insure that the refrigerators are within the required designated range. Samples are stored separately from the standards to reduce the risk of contamination.

See the current Catastrophic Failure SOP for the procedure regarding how to handle failed refrigerators or freezers.

Ovens

The ovens contain thermometers graduated by 1° C. The ovens are calibrated quarterly against NIST thermometers and checked each day of use as required and in whatever way is dictated by or appropriate for the method in use.

Analytical and Table Top Balances

The table top balances are capable of weighing to a minimum precision of 0.01 grams. The analytical balances are capable of weighing to a minimum precision of 0.0001 grams. Records are kept of daily calibration checks for the balances in use. Working weights are used in these checks. The balances are annually certified by an outside source and the certifications are on file with the QA/QCO.

Balances, unless otherwise indicated by method specific SOPs, will be checked each day of use with at least two weights that will bracket the working range of the balance for the day. Daily balance checks will be done using working weights that are calibrated annually against Class S weights. Class S weights are calibrated by an external provider as required. The Class S weights are used once a year, or more frequently if required, to assign values to the Working Weights. During the daily balance checks, the working weights are compared to their assigned values and must pass in order to validate the calibration of the balance. The assigned values, as well as the daily checks, for the working weights are recorded in the balance logbook for each balance.

Instrument Calibration

An instrument calibration is the relationship between the known concentrations of a set of calibration standards introduced into an analytical instrument and the measured response they produce. Calibration curve standards are a prepared series of aliquots at various known concentration levels from a primary source reference standard. Specific mathematical types of calibration techniques are outlined in SW-846 8000B and/or 8000C. The entire initial calibration must be performed prior to sample analyses.

The lowest standard in the calibration curve must be at or below the required reporting limit.

Refer to the current SOP to determine the minimum requirement for calibration points.

Most compounds tend to be linear and a linear approach should be favored when linearity is suggested by the calibration data. Non-linear calibration should be considered only when a linear approach cannot be applied. It is not acceptable to use an alternate calibration procedure when a compound fails to perform in the usual manner. When this occurs, it is indicative of instrument issues or operator error.

If a non-linear calibration curve fit is employed, a minimum of six calibration levels must be used for second-order (quadratic) curves.

When more than 5 levels of standards are analyzed in anticipation of using second-order calibration curves, all calibration points MUST be used regardless of the calibration option employed. The highest or lowest calibration point may be excluded for the purpose of narrowing the calibration range and meeting the requirements for a specific calibration option. Otherwise, unjustified exclusion of calibration data is expressly forbidden.

Analytical methods vary in QC acceptance criteria. HEAL follows the method specific guidelines for QC acceptance. The specific acceptance criteria are outlined in the analytical methods and their corresponding SOPs.

pH Meter

The pH meter measures to a precision of 0.01 pH units. The pH calibration logbook contains the calibration before each use, or each day of use, if used more than once per day. It is calibrated using a minimum of 3 certified buffers. Also available with the pH meter is a magnetic stirrer with a temperature sensor. See the current pH SOP (SM4500 H+ B) for specific details regarding calibration of the pH probe.

Other Analytical Instrumentation and Equipment

The conductivity probe is calibrated as needed and checked daily when in use.

Eppendorf (or equivalent brands) pipettes are checked gravimetrically prior to use.

Standards

All of the source reference standards used are ordered from a reliable commercial vendor. A Certificate of Analysis (CoA), which verifies the quality of the standard, accompanies the standards from the vendor. The Certificates of Analysis are dated and stored on file by the Technical Directors or their designee. These standards are traceable to the National Institute of Standards (NIST). When salts are purchased and used as standards the certificate of purity must be obtained from the vendor and filed with the CoAs.

All standard solutions, calibration curve preparations, and all other quality control solutions are labeled in a manner that can be traced back to the original source reference standard. All source reference standards are entered into the LIMS with an appropriate description of the standard. Dilutions of the source reference standard (or any mixes of the source standards) are fully tracked in the LIMS. Standards are labeled with the date opened for use and with an expiration date.

As part of the quality assurance procedures at HEAL, analysts strictly adhere to manufacturer recommendations for storage times/expiration dates and policies of analytical standards and quality control solutions.

Reagents

HEAL ensures that the reagents used are of acceptable quality for their intended purpose. This is accomplished by ordering high quality reagents and adhering to good laboratory practices so as to minimize contamination or chemical degradation. All reagents must meet any specifications noted in the analytical method. Refer to the current Purchase of Consumables SOP for details on how this is accomplished and documented.

Upon receipt, all reagents are assigned a separate ID number, and logged into the LIMS. All reagents shall be labeled with the date received into the laboratory and again with the date opened for use. Recommended shelf life, as defined by the manufacturer, shall be documented and controlled. Dilutions or solutions prepared shall be clearly labeled, dated, and initialed. These solutions are traceable back to their primary reagents and do not extend beyond the expiration date listed for the primary reagent.

All gases used with an instrument shall meet specifications of the manufacturer. All safety requirements that relate to maximum and/or minimum allowed pressure, fitting types, and leak test frequency, shall be followed. When a new tank of gas is placed in use, it shall be checked for leaks and the date put in use will be written in the instrument maintenance logbook.

HEAL continuously monitors the quality of the reagent water and provides the necessary indicators for maintenance of the purification systems in order to assure that the quality of laboratory reagent water meets established criteria for all analytical methods.

Reagent blank samples are also analyzed to ensure that no contamination is present at detectable levels. The frequency of reagent blank analysis is typically the same as calibration verification samples. Refrigerator storage blanks are stored in the volatiles refrigerator for a period of one week and analyzed and replaced once a week.

8.0 Maintenance

Maintenance logbooks are kept for each major instrument and all support equipment in order to document all repair and maintenance. In the front of the logbook, the following information is included:

Unique Name of the Item or Equipment
Manufacturer
Type of Instrument
Model Number
Serial Number
Date Received and Date Placed into Service
Location of Instrument
Condition of Instrument Upon Receipt

For routine maintenance, the following information shall be included in the log:

Maintenance Date
Maintenance Description
Maintenance Performed by Initials

A manufacturer service agreement (or equivalent) covers most major instrumentation to assure prompt and reliable response to maintenance needs beyond HEAL instrument operator capabilities.

Refer to the current Maintenance and Troubleshooting SOP for each section in the laboratory for further information.

9.0 Data Integrity

For HEAL's policy on ethics and data integrity, see section 3.0 of this document. Upon being hired, and annually there after, all employees at HEAL undergo documented data integrity training. All new employees sign an Ethics and Data Integrity Agreement, documenting their understanding of the high standards of integrity required at HEAL and outlining their responsibilities in regards to ethics and data integrity. See the current Document Control Logbook for a copy of this agreement.

In instances of ethical concern, analysts are required to report the known or suspected concern to their Technical Director, the Laboratory Manager, or the QA/QCO. This will be done in a confidential and receptive environment, allowing all employees to privately discuss ethical issues or report items of ethical concern.

Once reported and documented, the ethical concern will be immediately elevated to the Laboratory Manager and the need for an investigation, analyst remediation, or termination will be determined on a case-by-case basis.

All reported instances of ethical concern will be thoroughly documented and handled in a manner sufficient to rectify any breaches in data integrity with an emphasis on preventing similar incidences from happening in the future.

10.0 Quality Control

Internal Quality Control Checks

HEAL utilizes various internal quality control checks, including duplicates, matrix spikes, matrix spike duplicates, method blanks, laboratory control spikes, laboratory control spike duplicates, surrogates, internal standards, calibration standards, quality control charts, proficiency tests and calculated measurement uncertainty.

Refer to the current method SOP to determine the frequency and requirements of all quality controls. In the event that the frequency of analysis is not indicated in the method specific SOP, duplicate samples, laboratory control spikes (LCS), Method Blanks (MB), and matrix spikes and matrix spike duplicates (MS/MSD) are analyzed for every batch of twenty samples.

When sample volume is limited on a test that requires an MS/MSD an LCSD shall be analyzed to demonstrate precision and accuracy and when possible a sample duplicate will be analyzed.

Duplicates are identical tests repeated for the same sample or matrix spike in order to determine the precision of the test method. A Relative Percent Difference (RPD) is calculated as a measure of this precision. Unless indicated in the SOP, the default acceptance limit is </= 20%.

Matrix Spikes and Matrix Spike Duplicates are spiked samples (MS/MSD) that are evaluated with a known added quantity of a target compound. This is to help determine the accuracy of the analyses and to determine the matrix affects on analyte recovery. A percent recovery is calculated to assess the quality of the accuracy. In the event that the acceptance criteria is not outlined in the SOP, a default limits of 70-130% will be utilized. When an MSD is employed an RPD is calculated and when not indicated in the SOP shall be acceptable at

When appropriate for the method, a Method Blank should be analyzed with each batch of samples processed to assess contamination levels in the laboratory. MBs consist of all the reagents measured and treated as they are with samples, except without the samples. This enables the laboratory to ensure clean reagents and procedures. Guidelines should be in place for accepting or rejecting data based on the level of contamination in the blank. In the event that these guidelines are not dictated by the SOP or in client specific work plans, the MB should be less than the MDL reported for the analyte being reported.

A Laboratory Control Spike and Laboratory Control Spike Duplicate (LCS/LCSD) are reagent blanks, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. It is generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system. Guidelines are outlined in each

SOP for the frequency and pass fail requirements for LCS and LCSDs. These limits can be set utilizing control charts as discussed below.

Surrogates are utilized when dictated by method and are substances with properties that mimic the analytes of interest. The surrogate is an analyte that is unlikely to be found in environmental samples. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for surrogates.

Internal Standards are utilized when dictated by the method and are known amounts of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for Internal Standards.

Proficiency Test (PT) Samples are samples provided by an unbiased third party. They are typically analyzed twice a year, between five and seven months apart, or at any other interval as defined in the method SOP. They contain a pre-determined concentration of the target compound, which is unknown to HEAL. HEAL's management and all analysts shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates and other procedures as used when analyzing routine samples. PT results are reported as normal samples, within the working range of the associated calibration curve. In the event an analyte concentration is less than the PQL, the result shall be reported as less than the PQL.

With regards to analyzing PT Samples HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seek accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall not attempt to obtain the assigned value of any PT sample from the PT Provider.

Upon receiving a Not Acceptable PT result for any analyte, a root cause analysis is conducted and the cause of the failure determined and corrected. As defined by TNI, two out of the past three PTs must be acceptable to maintain accreditation for any given analyte. If this requirement is not met a successful history will be reestablished by the analysis of an additional PT sample. For accredited tests, the PT provider will be notified, when the PT is for corrective action purposes. The analysis dates of successive PT samples for the same accredited analyte shall be at least fifteen days apart.

Calibration standards are standards run to calibrate. Once the calibration is established the same standards can be analyzed as Continuing Calibration Verifications (CCV), used to confirm the consistency of the instrumentation. Calibration standards can be utilized at the beginning and end of each batch, or more frequently as required. Typically Continuing

Calibration Blanks (CCB) are run in conjunction with CCVs. Refer to the current method SOP for frequency and pass/fail requirements of CCVs and CCBs.

Control Limits are limits of acceptable ranges of the values of quality control checks. The control limits approximate a 99% confidence interval around the mean recovery. Any matrix spike, surrogate, or LCS results outside of the control limits require further evaluation and assessment. This should begin with the comparison of the results from the samples or matrix spike with the LCS results. If the recoveries of the analytes in the LCS are outside of the control limits, then the problem may lie with the application of the extraction, with cleanup procedures, or with the chromatographic procedure. Once the problem has been identified and addressed, corrective action may include reanalysis of samples or reextraction followed by reanalysis. When the LCS results are within the control limits, the issue may be related to the sample matrix or to the use of an inappropriate extraction, cleanup, and/or determinative method for the matrix. If the results are to be used for regulatory compliance monitoring, then steps must be taken to demonstrate that the analytes of concern can be determined in the sample matrix at the levels of interest. Data generated with laboratory control samples that fall outside of the established control limits are judged to be generated during an "out-of-control" situation. These data are considered suspect and shall be repeated or reported with qualifiers.

Control limits are to be updated only by Technical Directors, Section Supervisors or the Quality Assurance Officer. Control limits should be established and updated according to the requirements of the method being utilized. When the method does not specify, and control limits are to be generated or updated for a test, the following guidelines shall be utilized.

Limits should typically be generated utilizing the most recent 20-40 data values. In order to obtain an even distribution across multiple instruments and to include more than a single day's worth of data, surrogate limits should be generated using around 100 data values. The data values used shall not reuse values that were included in the previous Control Limit update. The data values shall also be reviewed by the LIMS for any Grubbs Outliers, and if identified, the outliers must be removed prior to generating new limits. The results used to update control limits should meet all other QC criteria associated with the determinative method. For example, MS/MSD recoveries from a GC/MS procedure should be generated from samples analyzed after a valid tune and a valid initial calibration that includes all analytes of interest. Additionally, no analyte should be reported when it is beyond the working range of the calibration currently in use. MS/MSD and surrogate limits should be generated using the same set of extraction, cleanup, and analysis procedures.

All generated limits should be evaluated for appropriateness. Where limits have been established for MS/MSD samples, the LCS/LCSD limits should fall within those limits, as the LCS/LCSD are prepared in a clean matrix. Surrogate limits should be updated using all sample types and should be evaluated to ensure that all instruments as well as a reasonable dispersion across days are represented by the data. LCS/LCSD recovery limits should be evaluated to verify that they are neither inappropriately wide nor unreasonably tight. The default LCS/LCSD acceptance limits of 70-130% and RPD of 20% (or those limits

specified by the method for LCS/LCSD and/or CCV acceptability), should be used to help make this evaluation. Technical directors may choose to use warning limits when they feel their generated limits are too wide, or default LCS limits when they feel their limits have become arbitrarily tight.

Once new Control Limits have been established and updated in the LIMS, the Control Charts shall be printed and reviewed by the appropriate section supervisor and primary analyst performing the analysis for possible trends and compared to the previous Control Charts. The technical director initials the control charts, indicating that they have been reviewed and that the updated Limits have been determined to be accurate and appropriate. Any manual alterations to the limits will be documented and justified on the printed control chart. These initialed charts are then filed in the QA/QCO office.

Once established, control limits should be reviewed after every 20-30 data values and updated at least every six months, provided that there are sufficient points to do so. The limits used to evaluate results shall be those in place at the time that the sample was analyzed. Once limits are updated, those limits apply to all subsequent analyses.

When updating surrogate control limits, all data, regardless of sample/QC type, shall be updated together and assigned one set of limits for the same method/matrix.

In the event that there are insufficient data points to update limits that are over a year old, the default limits, as established in the method or SOP, shall be re-instated. Refer to the requirements in SW-846 method 8000B and 8000C for further guidance on generating control limits.

Calculated Measurement Uncertainty is calculated annually using LCSs in order to determine the laboratory specific uncertainty associated with each test method. These uncertainty values are available to our clients upon request and are utilized as a trending tool internally to determine the effectiveness of new variables introduced into the procedure over time.

Precision, Accuracy, Detection Levels

Precision

The laboratory uses sample duplicates, laboratory control spike duplicates, and matrix spike duplicates to assess precision in terms of relative percent difference (RPD). HEAL requires the RPD to fall within the 99% confidence interval of established control charts or an RPD of less than 20% if control charts are not available. RPD's greater than these limits are considered out-of-control and require an appropriate response.

RPD = 2 x (Sample Result – Duplicate Result) X 100 (Sample Result + Duplicate Result)

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Accuracy

The accuracy of an analysis refers to the difference between the calculated value and the actual value of a measurement. The accuracy of a laboratory result is evaluated by comparing the measured amount of QC reference material recovered from a sample and the known amount added. Control limits can be established for each analytical method and sample matrix. Recoveries are assessed to determine the method efficiency and/or the matrix effect.

Analytical accuracy is expressed as the Percent Recovery (%R) of an analyte or parameter. A known amount of analyte is added to an environmental sample before the sample is prepared and subsequently analyzed. The equation used to calculate percent recovery is:

%Recovery = {(concentration* recovered)/(concentration* added)} X 100

HEAL requires that the Percent Recovery to fall within the 99 % confidence interval of established control limits. A value that falls outside of the confidence interval requires a warning and process evaluation. The confidence intervals are calculated by determining the mean and sample standard deviation. If control limits are not available, the range of 80 to 120% is used unless the specific method dictates otherwise. Percent Recoveries outside of this range mandate additional action such as analyses by Method of Standard Additions, additional sample preparation(s) where applicable, method changes, and out-of-control action or data qualification.

Detection Limit

Current practices at HEAL define the Detection Limit (DL) as the smallest amount that can be detected above the baseline noise in a procedure within a stated confidence level.

HEAL presently utilizes an Instrument Detection Limit (IDL), a Method Detection Limit (MDL), and a Practical Quantitation Limit (PQL). The relationship between these levels is approximately

IDL: MDL: PQL = 1:5:5.

The IDL is a measure of the sensitivity of an analytical instrument. The IDL is the amount which, when injected, produces a detectable signal in 99% of the analyses at that concentration. An IDL can be considered the minimum level of analyte concentration that is detectable above random baseline noise.

^{*}or amount

The MDL is a measure of the sensitivity of an analytical method. MDL studies are required annually for each quality system matrix, technology and analyte, unless indicated otherwise in the referenced method. An MDL determination (as required in 40CFR part 136 Appendix B) consists of replicate spiked samples carried through all necessary preparation steps. The spike concentration is three times the standard deviation of three replicates of spikes. At least seven replicates are spiked and analyzed and their standard deviation(s) calculated. Routine variability is critical in passing the 10 times rule and is best achieved by running the MDLs over different days and when possible over several calibration events. Standard Methods and those methods used for drinking water analysis must have MDL studies that are performed over a period of at least three days in order to include day to day variations. The method detection limit (MDL) can be calculated using the standard deviation according to the formula:

$$MDL = s * t (99\%),$$

where t (99%) is the Student's t-value for the 99% confidence interval. The t-value depends on the number of trials used in calculating the sample standard deviation, so choose the appropriate value according to the number of trials.

Number of Trials	t(99%)
6	3.36
7	3.14
8	3.00
9	2.90

The calculated MDL must not be less than 10 times the spiked amount or the study must be performed again with a lower concentration.

Where there are multiple MDL values for the same test method in the LIMS the highest MDL value is utilized.

The PQL is significant because different laboratories can produce different MDLs although they may employ the same analytical procedures, instruments and sample matrices. The PQL is about two to five times the MDL and represents a practical, and routinely achievable, reporting level with a good certainty that the reported value is reliable. It is often determined by regulatory limits. The reported PQL for a sample is dependent on the dilution factor utilized during sample analysis.

In the event that an analyte will not be reported less than the PQL, an MDL study is not required and a PQL check shall be done, at least annually, in place of the MDL study. The PQL check shall consist of a QC sample spiked at or below the PQL. All sample-processing and analysis steps of the analytical method shall be included in the PQL check and shall be done for each quality system matrix, technology, and analyte. A successful check is one where the recovery of each analyte is within the

established method acceptance criteria. When this criterion is not defined by the method or SOP, a default limit of +/-50% shall be utilized.

Quality Control Parameter Calculations

Mean

The sample mean is also known as the arithmetic average. It can be calculated by adding all of the appropriate values together, and dividing this sum by the number of values.

Average =
$$(\Sigma x_i)/n$$

 x_i = the value x in the ith trial n = the number of trials

Standard Deviation

The sample standard deviation, represented by s, is a measure of dispersion. The dispersion is considered to be the difference between the average and each of the values x_i . The variance, s^2 , can be calculated by summing the squares of the differences and dividing by the number of differences. The sample standard deviation, s, can be found by taking the square root of the variance.

Standard deviation =
$$s = [\sum (x_i - average)^2 / (n-1)]^{1/2}$$

Percent Recovery (LCS and LCSD)

Percent Recovery (MS, MSD)

Control Limits

Page 41 of 56 Quality Assurance Plan 9.5 Effective July 2nd, 2012 Control Limits are calculated by the LIMS using the average percent recovery (x), and the standard deviation (s).

Upper Control Limit = x + 3sLower Control Limit = x - 3s

These control limits approximate a 99% confidence interval around the mean recovery.

RPD (Relative Percent Difference)

Analytical precision is expressed as a percentage of the difference between the results of duplicate samples for a given analyst. Relative percent difference (RPD) is calculated as follows:

RPD = 2 x (Sample Result – Duplicate Result) X 100 (Sample Result + Duplicate Result)

Uncertainty Measurements

Uncertainty, as defined by ISO, is the parameter associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurement. Ultimately, uncertainty measurements are used to state how good a test result is and to allow the end user of the data to properly interpret their reported data. All procedures allow for some uncertainty. For most analyses, the components and estimates of uncertainty are reduced by following well-established test methods. To further reduce uncertainty, results generally are not reported below the lowest calibration point (PQL) or above the highest calibration point (UQL). Understanding that there are many influential quantities affecting a measurement result, so many in fact that it is impossible to identify all of them, HEAL calculates measurement uncertainty at least annually using LCSs. These estimations of measurement uncertainty are kept on file in the method folders in the QA/QC office.

Measurement Uncertainty contributors are those that may be determined statistically. These shall be generated by estimating the overall uncertainty in the entire analytical process by measuring the dispersion of values obtained from laboratory control samples over time. At least 20 of the most recent LCS data points are gathered. The standard deviation(s) is calculated using these LCS data points. Since it can be assumed that the possible estimated values of the spikes are approximately normally distributed with approximate standard deviation(s), the unknown value of the spike is

believed to lie in 95% confidence interval, corresponding to an uncertainty range of +/- 2(s).

Calculate standard deviation (s) and 95% confidence interval according to the following formulae:

$$s = \sqrt{\frac{\sum (x - \overline{x})^2}{(n-1)}}$$

Where: s = standard deviation

x = number in series

 \bar{x} = calculated mean of series n = number of samples taken

95% confidence = $2 \times s$

Example: Assuming that after gathering 20 of the most recent LCS results for Bromide, we have calculated the standard deviations of the values and achieved a result of 0.0326, our measurement of uncertainty for Bromide (at 95% confidence = $2 \times s$) is 0.0652.

Total Nitrogen

Total nitrogen is calculated as follows:

Total Nitrogen = TKN + NO₂ + NO₃

Calibration Calculations

1. Response Factor or Calibration Factor:

$$RF = ((A_x)(C_{is}))/((A_{is})(C_x))$$

 $CF=(A_x)/(C_x)$

a. Average RF or CF

$$RF_{AVE} = \Sigma RF_i / n$$

b. Standard Deviation

$$s = SQRT \{ [\Sigma (RF_I - RF_{AVE})^2] / (n-1) \}$$

c. Relative Standard Deviation

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Where:

 A_x = Area of the compound

 C_x = Concentration of the compound

Ais = Area of the internal standard

Cis = Concentration of the internal standard

n = number of pairs of data

RF_i = Response Factor (or other determined value)

RF_{AVE} = Average of all the response factors

 Σ = the sum of all the individual values

2. Linear Regression

y=mx+b

a. Siope (m)

$$\mathbf{m} = (\mathbf{n} \Sigma \mathbf{x}_i \mathbf{y}_i - (\mathbf{n} \Sigma \mathbf{x}_i)^* (\mathbf{n} \Sigma \mathbf{y}_i)) / (\mathbf{n} \Sigma \mathbf{x}_i^2 - (\Sigma \mathbf{x}_i)^2)$$

b. intercept (b)

$$b = y_{AVE} - m^*(x_{AVE})$$

c. Correlation Coefficient (cc)

CC (r) ={
$$\Sigma((x_i-x_{ave})^*(y_i-y_{ave}))$$
 } / { $SQRT((\Sigma(x_i-x_{ave})^2)^*(\Sigma(y_i-y_{ave})^2))$ } Or CC (r) =[($\Sigma w * \Sigma wxy$) - ($\Sigma wx * \Sigma wy$)] / ($sqrt(([($\Sigma w * \Sigma wx^2) - (\Sigma wx * \Sigma wx)])^*[($\Sigma w * \Sigma wy^2$) - ($\Sigma wy * \Sigma wy$)])))]$$

d. Coefficient of Determination

$$COD(r^2) = CC*CC$$

Where:

y = Response (Area) Ratio A_x/A_{is}

 $x = Concentration Ratio C_x/C_{is}$

m = slope

b = intercept

n = number of replicate x,y pairs

 x_i = individual values for independent variable

yı = individuai values for dependent variable

Page 44 of 56 Quality Assurance Plan 9.5 Effective July 2nd, 2012 Σ = the sum of all the individual values

 x_{ave} = average of the x values

 $y_{ave} = average of the y values$

w = weighting factor, for equal weighting w=1

3. Quadratic Regression

$$y = ax^2 + bx + c$$

a. Coefficient of Determination

COD (r²) =(
$$\Sigma(y_i-y_{ave})^2 - \{[(n-1)/(n-p)] * [\Sigma(y_i-Y_i)^2]\}$$
) / $\Sigma(y_i-y_{ave})^2$

Where:

 $y = Response (Area) Ratio A_x/A_{is}$

x = Concentration Ratio C_x/C_{is}

 $a = x^2$ coefficient

b = x coefficient

c = intercept

 y_i = individual values for each dependent variable

x_i = individual values for each independent variable

yave = average of the y values

n = number of pairs of data

p = number of parameters in the polynomial equation (i.e., 3 for third order, 2 for second order)

 $Yi = ((2*a*(C_x/C_{is})^2)-b^2+b+(4*a*c))/(4a)$

b. Coefficients (a,b,c) of a Quadratic Regression

$$a = S_{(x2y)}S_{(xx)}-S_{(xy)}S_{(xx2)} / S_{(xx2)}S_{(xx2)}-[S_{(xx2)}]^{2}$$

$$b = S_{(xy)}S_{(x2x2)} - S_{(x2y)}S_{(xx2)} / S_{(xx3)}S_{(x2x2)} - [S_{(xx2)}]^2$$

$$c = [(\Sigma yw)/n] - b^*[(\Sigma xw)/n] - a^*[\Sigma(x^2w)/n]$$

Where:

n = number of replicate x,y pairs

x = x values

y = y values

 $w = S^{-2} / (\Sigma S^{-2}/n)$

 $S_{(xx)} = (\Sigma x^2 w) - [(\Sigma x w)^2 / n]$

 $S_{(xy)} = (\Sigma xyw) - [(\Sigma xw)^*(\Sigma yw) / n]$

 $S_{(xx2)} = (\Sigma x^3 w) - [(\Sigma xw)^*(\Sigma x^2 w) / n]$

 $S_{(x2y)} = (\Sigma x^2 yw) - [(\Sigma x^2 w)^* (\Sigma yw) / n]$

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 $S_{(x2x2)} = (\Sigma x^4 w) - [(\Sigma x^2 w)^2 / n]$ Or If unweighted calibration, w=1 S(xx) = (Sx2) - [(Sx)2 / n]S(xy) = (Sxy) - [(Sx)*(Sy) / n]S(xx2) = (Sx3) - [(Sx)*(Sx2) / n]S(x2y) = (Sx2y) - [(Sx2)*(Sy) / n]S(x2x2) = (Sx4) - [(Sx2)2 / n]

Concentration Calculations

On-Column Concentration for Average RRF Calibration using Internal Standard

On-Column Concentration $C_x = ((A_x)(C_{is}))/((A_{is})(RF_{AVE}))$

On-Column Concentration for Average CF Calibration using External Standard

On-Column Concentration $C_x = (A_x)/(CF_{AVE})$

On-Column Concentration for Linear Calibration

If determining an external standard, then exclude the Ais and Cis for internal standards On-Column Concentration $C_x = ((Absolute\{[(A_x)/(A_{ia})] - b\})/m) * C_{ia}$

Where: m = slope

b = intercept

 $A_x = Area of the Sample$

C_{is} = Concentration of the Internal Standard

A_{is} = Area of the Internal Standard

On-Column Concentration for Quadratic Calibration

If determining an external standard, then exclude the A_{le} and C_{le} for internal standards On-Column Concentration =[(+SQRT(b2-(4*a*(c-y)))-b)/(2*a)] * C_{is}

Where: $a = x^2$ coefficient

b = x coefficient

c = intercept

y = Area Ratio = A_x/A_{ix}

Cis = Concentration of the Internal Standard

Final Concentration (Wet Weight)

Concentration for Extracted Samples = (On-Column Conc)(Dilution)(Final Volume) (Initial Amount)(Injection Volume) Concentration for Purged Samples = (On-Column Conc)(Purged Amount)(Dilution) (Purged Amount)

Dry Weight Concentration

Dry Weight Concentration = Final Concentration Wet Weight **Total Solids**

Percent Difference

% Difference= Absolute(Continuing Calibration RRF - Average RRF) * 100

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Average RRF

Percent Drift

% Drift= Absolute(Calculated Concentration - Theoretical Concentration) * 100
Theoretical Concentration

Dilution Factor

Dilution Factor =(Volume of Solvent + Solute) / Volume of Solute

Relative Retention Time

RRT =RT of Compound / RT of ISTD

Breakdown Percent

Breakdown = <u>Area of DDD + Area of DDE</u> Average (DDT, DDE and DDD)

-or-

<u>Area of Endrin Ketone + Area of Endrin Aldehyde</u> Average (Endrin, Endrin Ketone, Endrin Aldehyde)

11.0 Data Reduction, Validation, Reporting, and Record Keeping

All data reported must be of the highest possible accuracy and quality. During the processes of data reduction, validation, and report generation, all work is thoroughly checked to insure that error is minimized.

Data Reduction

The analyst who generated the data usually performs the data reduction. The calculations include evaluation of surrogate recoveries (where applicable), and other miscellaneous calculations related to the sample quantitation.

If the results are computer generated, then the formulas must be confirmed by hand calculations, at minimum, one per batch.

See the current Data Validation SOP for details regarding data reduction.

Validation

A senior analyst, most often the section supervisor, validates the data. All data undergoes peer review. If an error is detected, it is brought to the analyst's attention so that he or she can rectify the error, and perform further checks to ensure that all data for that batch is sound. Previous and/or common mistakes are stringently monitored throughout the validation process. Data is reported using appropriate significant figure criteria. In most cases, two significant digits are utilized, but three significant digits can be used in QC calculations. Significant digits are not rounded until after the last step of a sample calculation. All final reports undergo a review by the laboratory manager, the project manager, or their designee, to provide a logical review of all results before they are released to the client.

If data is to be manually transferred between media, the transcribed data is checked by a peer. This includes data typing, computer data entry, chromatographic data transfer, data table inclusion to a cover letter, or when data results are combined with other data fields.

All hand-written data from run logs, analytical standard logbooks, hand-entered data logbooks, or on instrument-generated chromatograms, are systematically archived should the need for future retrieval arise.

See the current Data Validation SOP for details regarding data validation.

Reports and Records

All records at HEAL are retained and maintained through the procedures outlined in the most recent version of the Records Control SOP.

Sample reports are compiled by the Laboratory Information Management System (LIMS). Most data is transferred directly from the instruments to the LIMS. After being processed by the analyst and reviewed by a data reviewer, final reports are approved and signed by the senior laboratory management. A comparative analysis of the data is performed at this point. For example, if TKN and NH3 are analyzed on the same sample, the NH3 result should never be greater than the TKN result. Lab results and reports are released only to appropriately designated individuals. Release of the data can be by fax, email, electronic deliverables, or mailed hard copy.

When a project is completed, the final report, chain of custody, any relevant supporting data, and the quality assurance/control worksheets are scanned as a .pdf file onto the main server. Original client folders are kept on file and are arranged by project number. Additionally, all electronic data is backed up routinely on the HEAL main server. The backup includes raw data, chromatograms, and report documents. Hard copies of chromatograms are stored separately according to the instrument and the analysis date. All records and analytical data reports are retained in a secure location as permanent records for a minimum period of five years (unless specified otherwise in a client contract). Access to archived information shall be documented with an access log. Access to archived electronic reports and data will be password protected. In the event that HEAL transfers ownership or terminates business practices, complete records will be maintained or transferred according to the client's instructions.

After issuance, the original report shall remain unchanged. If a correction to the report is necessary, then an additional document shall be issued. This document shall have a title of "Addendum to Test Report or Correction to Original Report", or equivalent. Demonstration of original report integrity comes in two forms. First, the report date is included on each page of the final report. Second, each page is numbered in sequential order, making the addition or omission of any data page(s) readily detectable.

12.0 Corrective Action

Refer to the most recent version of the Data Validation SOP for the procedure utilized in filling out a Corrective Action Report. A blank copy of the corrective action report is available in the current Document Control Logbook.

The limits that have been defined for data acceptability also form the basis for corrective action initiation. Initiation of corrective action occurs when the data generated from continuing calibration standard, sample surrogate recovery, laboratory control spike, matrix spike, or sample duplicates exceed acceptance criteria. If corrective action is necessary, the analyst or the section supervisor will coordinate to take the following guidelines into consideration in order to determine and correct the measurement system deficiency:

Check all calculations and data measurements systems (Calibrations, reagents, instrument performance checks, etc.).

Assure that proper procedures were followed.

Unforeseen problems that arise during sample preparation and/or sample analysis that lead to treating a sample differently from documented procedures shall be documented with a corrective action report. The section supervisor and laboratory manager shall be made aware of the problem at the time of the occurrence. See the appropriate SOP regarding departures from documented procedures.

Continuing calibration standards below acceptance criteria can not be used for reporting analytical data unless method specific criteria states otherwise.

Continuing calibration standards above acceptance criteria can be used to report data as long as the failure is isolated to a single standard and the corresponding samples are non-detect for the failing analyte.

Samples with non-compliant surrogate recoveries should be reanalyzed, unless deemed unnecessary by the supervisor for matrix, historical data, or other analysis-related anomalies.

Laboratory and Matrix Spike acceptance criteria vary significantly depending on method and matrix. Analysts and supervisors meet and discuss appropriate corrective action measures as spike failures occur.

Sample duplicates with RPD values outside control limits require supervisor evaluation and possible reanalysis.

A second mechanism for initiation of corrective action is that resulting from Quality Assurance performance audits, system audits, inter- and intra-laboratory comparison studies. Corrective Actions initiated through this mechanism will be monitored and coordinated by the laboratory QA/QCO.

All corrective action forms are entered in the LIMS and included with the raw data for peer review, signed by the technical director of the section and included in the case narrative to the client whose samples were affected. All Corrective action forms in the LIMS are reviewed by the QA/QCO.

13.0 Quality Assurance Audits, Reports and Complaints

Internal/External Systems' Audits, Performance Evaluations, and Complaints

Several procedures are used to assess the effectiveness of the quality control system. One of these methods includes internal performance evaluations, which are conducted by the use of control samples, replicate measurements, and control charts. External performance audits, which are conducted by the use of inter-laboratory checks, such as participation in laboratory evaluation programs and performance evaluation samples available from a NELAC-accredited Proficiency Standard Vendor, are another method.

Proficiency samples will be obtained twice per year from an appropriate vendor for all tests and matrices for which we are accredited and for which PTs are available. HEAL participates in soil, waste water, drinking water, and underground storage tank PT studies. Copies of results are available upon request. HEAL's management and all analysts shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities, and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates, and other procedures as used when analyzing routine samples.

With regards to analyzing PT Samples, HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seek accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall not attempt to obtain the assigned value of any PT sample from the PT Provider.

Internal Audits are performed annually by the QA/QCO in accordance with the current Internal Audit SOP. The system audit consists of a qualitative inspection of the QA system in the laboratory and an assessment of the adequacy of the physical facilities for sampling, calibration, and measurement. This audit includes a careful evaluation and review of laboratory quality control procedures. Internal audits are performed using the guidelines outlined below, which include, but are not limited to:

- 1. Review of staff qualifications, demonstration of capability, and personnel training programs
- 2. Storage and handling of reagents, standards, and samples
- 3. Standard preparation logbook and LIMS procedures
- 4. Extraction logbooks
- 5. Raw data logbooks
- 6. Analytical logbooks or batch printouts and instrument maintenance logbooks
- 7. Data review procedures

- 8. Corrective action procedures
- 9. Review of data packages, which is performed regularly by the lab manager/QA Officer.

The QA/QCO will conduct these audits on an annual basis.

Management Reviews

HEAL management shall periodically, and at least annually, conduct a review of the laboratory's quality system and environmental testing activities to ensure their continuing suitability and effectiveness, and to introduce necessary changes or improvements. The review shall take account of:

- 1. the suitability and implementation of policies and procedures
- 2. reports from managerial and supervisory personnel
- 3. the outcome of recent internal audits
- 4. corrective and preventive actions
- 5. assessments by external bodies
- 6. the results of inter-laboratory comparisons or proficiency tests
- 7. changes in volume and type of work
- 8. client feed back
- 9. complaints
- 10. other relevant factors, such as laboratory health and safety, QC activities, resources, and staff training.

Findings from management reviews and the actions that arise from them shall be recorded and any corrective actions that arise shall be completed in an appropriate and agreed upon timescale.

Complaints

Complaints from clients are documented and given to the laboratory manager. The lab manager shall review the information and contact the client. If doubt is raised concerning the laboratory's policies or procedures, then an audit of the section or sections may be performed. All records of complaints and subsequent actions shall be maintained in the client compliant logbook for five years unless otherwise stated.

Internal and External Reports

The QA/QCO is responsible for preparation and submission of quality assurance reports to the appropriate management personnel as problems and issues arise. These reports include the assessment of measurement systems, data precision and accuracy, and the results of performance and system audits. Additionally, they include significant QA problems, corrective actions, and recommended resolution measures. Reports of these Quality Assurance Audits describe the particular activities audited, procedures utilized in the examination and evaluation of laboratory records, and data validation procedures. Finally, there are procedures for evaluating the performance of Quality Control and Quality Assurance activities, and laboratory deficiencies and the implementation of corrective actions with the review requirements.





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2014 JAH 31 P 12: 112

January 30, 2014

Carl Chavez New Mexico Oil Conservation Division Environmental Bureau 1220 South St. Francis Dr Santa Fe, NM 87505

FedEx Tracking #:

RE:

Western Refining Southwest, Inc. - Bloomfield Refinery 2013 Annual Class I Well Report Non-Hazardous Injection Well Permit # - UIC-CL-009 API # - 30- 45-29002

Mr. Chavez,

Bloomfield Refinery is submitting the 2013 Annual Class I Well Report. The well is located in the NE/4, SE/4 of Section 27, Township 29 North, Range 11 West, NMPM, San Juan County, New Mexico and is operated by Western Refining Southwest, Inc.

If you need more information, please contact me at (505) 632-8013.

Sincerely,

Ron Weaver

Regional Terminals Manager Western Refining Southwest, Inc.

Cc: Brandon Powell (NMOCD Aztec District Office)
Randy Schmaltz (WNR – Bloomfield)

Allen Hains – Western Refining (WNR - El Paso)

ANNUAL CLASS I WELL REPORT

Waste Disposal Well #1 January – December 2013

是是自己的人的,但是是一种的人的,我们就是这个的人,我们就是这个人的人,我们就是这个人的人,也不是一个人的人,也是这个人的人的,我们就是这个人的人,我们就是一个



Western Refining Southwest, Inc.
Bloomfield Refinery
Bloomfield, New Mexico
Permit # - UIC-CL1-009
API # - 30-45-29002

Submitted January 30, 2014

Prepared by:

Kelly Robinson

Environmental Supervisor

Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Ron Weaver

Regional Terminals Manager

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EXECUTIVE SUMMARY

This report provides a summary of activities conducted in 2013 on Waste Disposal Well #1 (WDW-#1) at the Bloomfield Refinery. The following is a summary of well operations and well testing activities performed in 2012.

Operational Summary

Injection Volume - The volume injected into the disposal well during 2013 was 12,110,780 gallons. Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation.

Sampling and Chemical Analyses - Injection fluids samples were collected on a quarterly basis for chemical analysis, with the following exception. A quarterly sample was not collected during the first quarter of 2013 due to the fact that that injection well was not in operation from mid-January through March 2013. Quarterly samples were collected during the 2nd, 3rd, and 4th quarters of 2013. Analytical results did not exhibit characteristics of hazardous waste.

Maintenance Operations - No down-hole maintenance activities were conducted in 2013.

Mechanical Integrity Tests - The 2013 well testing program witnessed by a representative of the New Mexico Oil Conservation Division (NMOCD) included a High-Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test. Results of these tests prove that the operational integrity of the well is sound.

Area of Review (AOR) - No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

Recommendations

Western will continue the routine monitoring, maintenance, and testing programs which

include quarterly chemical analysis of injection fluids, mechanical integrity testing, and Bradenhead testing. Western will continue to utilize the maximum operating injection pressure at the wellhead as permitted by Discharge Permit GW-130.

1.0 INTRODUCTION

This report provides a summary of activities conducted during 2013 on Waste Disposal Well #1 (WDW #1). The disposal well is part of the Bloomfield Refinery operations. The refinery is located immediately south of Bloomfield, New Mexico in San Juan County. The well location is depicted in Figure 1. The physical address of the facility is as follows:

Bloomfield Refinery

#50 County Road 4990 Bloomfield, NM 87413

The Bloomfield Refinery is located on approximately 263 acres. Bordering the facility is a combination of federal and private properties. Public property managed by the Bureau of Land Management lies to the south. The majority of undeveloped land in the vicinity of the facility is used extensively for oil and gas production and, in some instances, grazing. U.S. Highway 550 is located approximately one-half mile west of the facility. The topography of the main portion of the site is generally flat with steep bluffs to the north.

WDW #1 is owned by San Juan Refining Company, a New Mexico corporation. It is operated by Western Refining Southwest, Inc. formerly known as Giant Industries Arizona, Inc. an Arizona corporation.

1.1 Well Information

Well Name & Number: Waste Disposal Well #1

OCD UIC: UIC-CL1-009
OCD Discharge Plan Permit Number: GW-130

Well Classification: Class I Non-hazardous

API Number: 30-045-29002

Legal Location: 1250 FEL, 2442FSL, I Sec 27 T29S R11E Physical Address: #50 Road 4990, Bloomfield, NM 87413

2.0 SUMMARY OF ACTIVITIES

The following list of activities was conducted in 2012 on WDW #1 located at the Bloomfield Refinery:

	04/04/12	2 1 0 4 2012 C 1' E
•	04/24/13	2nd Quarter 2013 Sampling Event
•	07/22/13	3rd Quarter 2013 Sampling Event
•	09/19/13	Bradenhead Test
•	09/19/13	High-Pressure Shut-Down Test
•	09/19/13	Mechanical Integrity Test
•	11/07/13	4th Quarter 2013 Sampling Event

An analytical sample was not collected during the first quarter of 2013 due to the fact that the injection well was not operational for most of the quarterly. Quarterly samples collected for laboratory analysis were submitted to Hall Environmental Laboratories located in Albuquerque, New Mexico. Copies of the analytical reports are provided in Appendix B. A summary of the analytical results is provided in Table 3.

A representative of New Mexico Oil Conservation Division (NMOCD) was on-site to witness the Bradenhead Test, High-Pressure Shut-Down Test, and Mechanical Integrity Test on September 19, 2013. A copy of the test reports is provided in Appendix A.

The Annual Pressure Fall-Off Test was not conducted in 2013. In an e-mail to Western from NMOCD dated August 2, 2012, it states that Fall-Off Test frequency requirements are being evaluated by NMOCD and operators will be notified by NMOCD when a Fall Off Test is required. Western did not receive notification from NMOCD that a Fall-Off Test was required for 2013.

3.0 INJECTION VOLUME

The Monthly Injection Well Report summarizing injection volumes and well performance parameters is presented as Table 1.

3.1 Injection Volume

The volume injected into the disposal well during 2013 was 12,110,780 gallons. Throughout 2013 the Bloomfield Refinery injection well operated within the operational limits of less than 1,150 psi.

3.2 Injection Well Down-Time

The injection well was down approximately 5,130 hours in 2013. Decreased volume of plant produced water during 2013 resulted in extended periods in which the injection well was not operational. General maintenance activities on the injection well equipment upstream of the injection well also contributed to the injection well down-time during 2013.

4.0 SAMPLING AND CHEMICAL ANALYSIS

Samples were collected of the injection water on a quarterly basis and analyzed for the following per Item #9 of the Bloomfield Refinery Class I (Non-Hazardous) Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal dated March 23, 2004:

- Volatile Organic Compounds (VOCs);
- Semi-Volatile Organic Compounds (SVOCs);
- General Chemistry Parameters (included calcium, potassium, magnesium, sodium, bicarbonate, carbonate, chloride, sulfate, total dissolved solids, pH, and conductivity);
- RCRA 8 Metals; and
- RCRA Characteristics for Ignitability, Corrosivity, and Reactivity.

First quarter samples were not collected due to the well not being operational during that time. Second quarter samples were collected April 24, 2013. Third quarter samples were collected July 22, 2013. Fourth quarter samples were collected November 7, 2013. A summary of the analytical results is provided in Table 3.

All quarterly samples collected for laboratory analysis were submitted to Hall Environmental Analysis Laboratory located in Albuquerque, NM. The analytical results conclude that the injected water did not exhibit characteristics of hazardous waste. The respective quarterly analytical reports and Laboratory Quality Assurance Plan are provided in Appendices B and C, respectively.

5.0 TESTING AND MAINTENANCE ACTIVITIES

In addition to the conducting general preventative maintenance activities on the injection well equipment, the following testing and well maintenance activities were conducted during 2012:

 Mechanical Integrity Testing (including high-pressure shutdown and Bradenhead Testing)

All activities were conducted following NMOCD approval, and such documentation is provided in Appendix A. The following is a brief summary of the testing and well maintenance activities conducted in 2012.

5.1 Mechanical Integrity Testing

A representative of New Mexico Oil Conservation Division (NMOCD) was on-site to witness a High Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test (MIT) on September 19, 2013. All tests were witnessed by Monica Kuehling of NMOCD-Aztec. The MIT held at 520 psi for 30 minutes, therefore confirming the integrity of the well. A copy of the Test Reports is provided in Appendix A.

6.0 WELL EVALUATION

6.1 Well Evaluation

In 2013, the injection well operated normally and within the operation limit of 1,150 psi. The increased down-time of well operations when compared to 2012 operational hours is mostly contributed to the decrease in produced water at the Bloomfield facility.

6.2 Area of Review (AOR)

The Area of Review data was updated in the 2011 Annual Bottomhole Pressure Surveys and Pressure Fall-Off Tests for Waste Disposal Well #1Report (Cobb & Associates, 2011). At that time, no new wells were found in the one-mile radius.

Fifty-eight wells were found within a one-mile radius of WDW #1, which injects water into the Mesaverde formation. The wells and status are spotted on an area map, Figure 3, with a well number listed with the well data in Table 2. Of these wells, 15 have been plugged and abandoned. Four wells are classified as dry holes and are believed to be plugged and abandoned. Twenty-four wells produce petroleum from shallow zones. One well is an Entrada injection well. Fourteen wells produce petroleum from the Dakota and Gallup zones, which are deeper than the Mesaverde interval used for injection purposes. No wells are producing from the injection interval within a one-mile radius of WDW #1.

Twenty-four of the 59 wells have penetrated the injection zone. Of these, three have been plugged. Five wells are currently producing from shallow zones and 14 wells produce from deep zones. There are two injection wells including WDW #1 and Ashcroft SWD #1 well.

No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The following is a summary of well operations and well testing activities performed in 2013.

7.1 Conclusions

Injection Volume - The volume injected into the disposal well during 2013 was 12,110,780 gallons. Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation.

Sampling and Chemical Analyses - Injection fluids samples were collected for chemical analysis on a quarterly basis when the well was operational. Analytical results did not exhibit characteristics of hazardous waste.

Maintenance Operations - No down-hole maintenance activities were conducted in 2013.

Mechanical Integrity Tests - The 2013 well testing program witnessed by a representative of OCD included a High-Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test. Results of these tests prove that the operational integrity of the well is sound.

Well Evaluation – The injection well operated normally within the operational limit of 1,150 psi throughout 2013.

Area of Review (AOR) - No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

7.2 Recommendations

Western will continue the routine monitoring, maintenance, and testing programs which include quarterly chemical analysis of injection fluids, high-pressure shut-down testing,

mechanical integrity testing, and Bradenhead testing in 2014. Western will continue to utilize the maximum operating injection pressure at the wellhead as permitted by Discharge Permit GW-130.

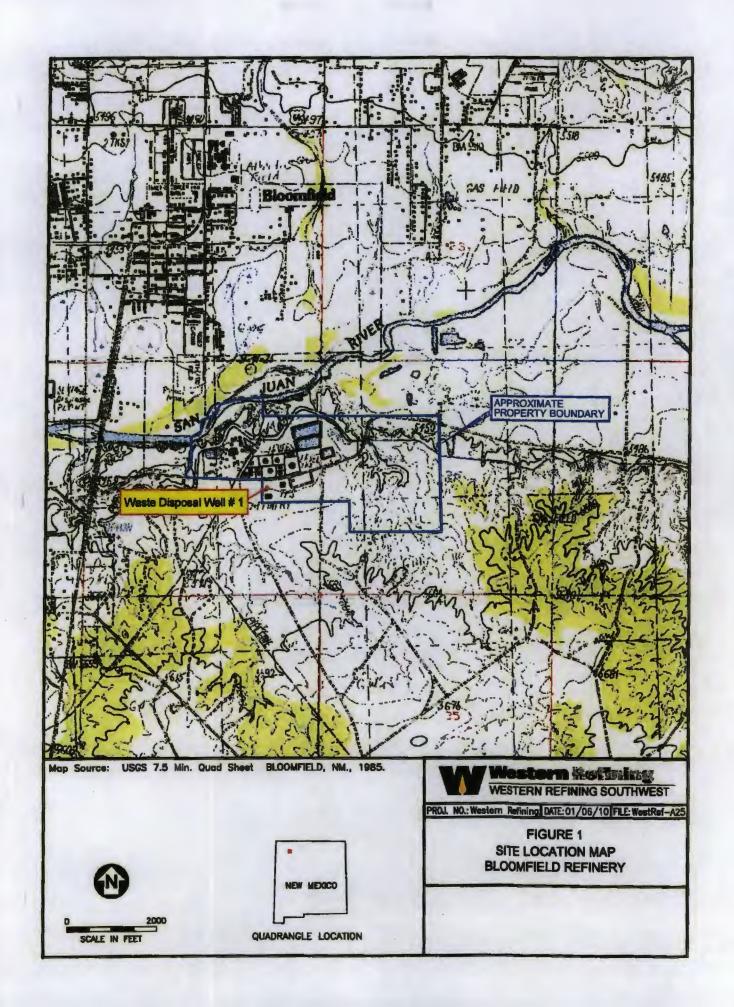
8.0 REFERENCES

Cobb & Associates, 2009a, Evaluation of Disposal Well #1 Bloomfield Refinery, August 26, 2009.

Cobb & Associates, 2011, 2011 Annual Bottomhole Pressure Surveys and Pressure Fall-Off Tests for Waste Disposal Well #1Report December 21, 2011.

Bloomfield Refinery Class I (Non-Hazardous) Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal dated March 23, 2004.

FIGURES



WESTERN REFINING DISPOSAL WELL #1 NW, SW SECTION 26, T29N, R11W

NO.: 30-045-29002



8-5/8", 48#/ft, Surface Casing @ 830'

TOC: Surface Hole Size: 11.0"

Tubing: 2-7/8", Acid Resistant Fluoroline Cement Lined

Wt of Tubing: 6.5 #/ft

Wt of Tubing Lined: 7.55 #/ft

Tubing ID: 2.128"
Tubing Drift ID: 2.000"

Minimum ID @ Packer: ~1.87" estimated

Packer: Unknown Packer Type @ 3221'
Could be a Guiberson or similar model Uni-6

Perforations: 3276' - 3408' 4JSPF 0.5 EHD Top of the Cliff House Formation: 3276'

Fill was cleaned out of well on 4/20/06 Fill was orginally tagged at 3325'

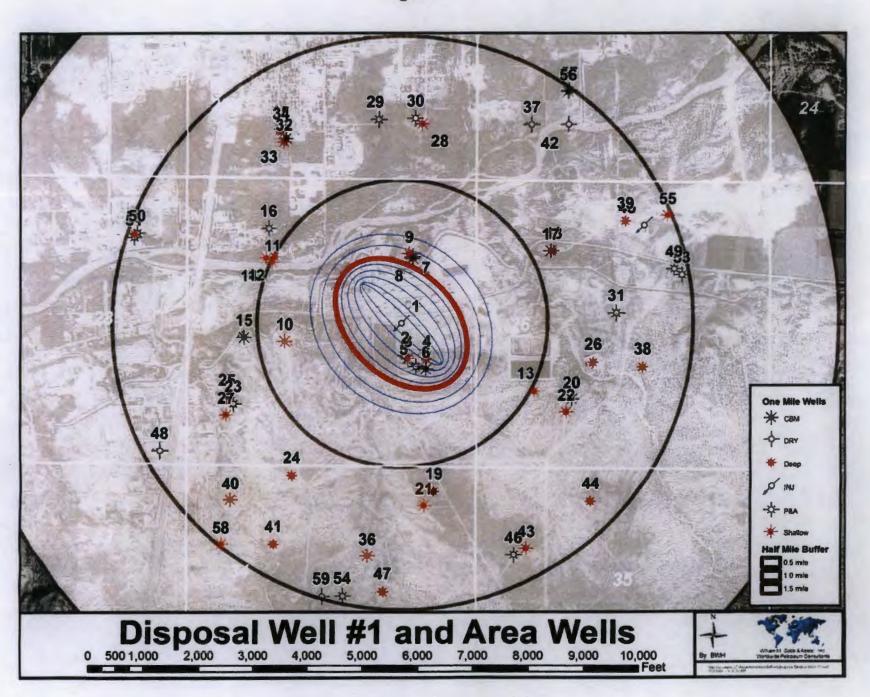
Perforations: 3435' - 3460' 4JSPF 0.5 EHD Top of the Menefee Formation: 3400'

RBP: 3520'

5-1/2", 15.5#/ft, Production Casing @3600'

TOC: Surface Hole Size: 7-7/8"

Figure 3



TABLES

TABLE 1

WESTERN REFINING SOUTHWEST, INC. - BLOOMFIELD TERMINAL P.O. BOX 159 **BLOOMFIELD, NEW MEXICO 87413**

MONTHLY INJECTION WELL REPORT **DISCHARGE PLAN GW-130** NE1/4 SE1/4 SECTION 27, T29N, R11W NMPM, SAN JUAN COUNTY, NEW MEXICO

	AMOUNT OF WATER	AMOUNT TO SOLAR	TOTALIZER AMOUNT	DOWN-	10.1	ECTION PRESSU	IDE		INUI AD DDESSU	IDE		ON-LINE	
								ANNULAR PRESSURE					
PERIOD	FROM RIVER	EVAP PONDS	INJECTED	TIME	MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG
2013	(GALLONS)	(GALLONS)	(GALLONS)	(HRS)	(PSIA)	(PSIA)	(PSIA)	(PSIA)	(PSIA)	(PSIA)	(GPM)	(GPM)	(GPM)
JAN	0	1,665,000	432,517	352	921	7	845	233	112	152	47	0	11.9
FEB	1,612	1,089,000	0	672	8	0	6	184	151	171	0	0	0
MAR	561	1,107,000	0	744	2	0	1	197	184	191	0.0	0	0
APR	2,160	739,512	496,488	371	963	0	399	135	199	177	74	0	13
MAY	3	0	2,593,194	205.6	1125	0	781	198	144	156	82	0	57
JUN	3,683	1,509,000	0	720	0	0	0	146	143	145	0	0	0
JUL	4,948	3,154,725	1,545,275	426	1114	0	473	180	143	151	82	0	35
AUG	1,199	0	3,072,399	6	1119	963	1080	166	143	151	82	40	68
SEP	0	1,276,842	256,158	416	1106	0	111	124	169	147	63	0	6
OCT	0	0	1,507,869	380	1119	0	538	113	170	139	79	0	35
NOV	1,698	0	1,943,003	151	1063	0	820	243	108	142	63	0	44
DEC	1,001	641,123	263,877	686	1076	0	165	257	108	218	64	0	7

The total amount injected in 2013 is:

Colour DATE: 1/28/14

Map Seq.	Miles to DW1	WELLNAME	#	<u>APINO</u>	Perf Top	Perf Bottom	<u>Total</u> <u>Depth</u>	P&A Date	ULSTR	OPERATOR	RESERVOIR	Status	<u>Pen.</u> Inj. Zone
1	0.00	DISPOSAL	1	30-045-29002	3276	3514	3514		I-27-29N-11W	WESTERN REFINING	MESAVERDE	INJ	Yes
2	0.11	DAVIS GAS COM F	1	30-045-07825	6157	6298	6298	19-Jan-94	I-27-29N-11W	BP AMERICA	DAKOTA	P&A	Yes
3	0.12	DAVIS GAS COM G	1	30-045-23554	2827	2839	2839		I-27-29N-11W	XTO ENERGY, INC	CHACRA	Shallow	No
4	0.15	DAVIS GAS COM F	1R	30-045-30833	5314	5646	6177		I-27-29N-11W	XTO ENERGY, INC	GALLUP	Deep	Yes
5	0.16	Davis Pooled Unit	1	30-045-07812			1717	18-Oct-82	I-27-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
6	0.18	JACQUE	1	30-045-34463	1543	1714	1714		I-27-29N-11W	HOLCOMB O&G	FRUITLAND COAL	СВМ	No
7	0.23	JACQUE	2	30-045-34409	1483	1689	1689		H-27-29N-11W	HOLCOMB O&G	FRUITLAND COAL	СВМ	No
8	0.23	Davis PU/FB Umbarger	2	30-045-07883			1800	18-Aug-55	H-27-29N-11W	Pre-Ongard		P&A	No
9	0.24	DAVIS GAS COM F	1E	30-045-24084	2701	2810	6262		H-27-29N-11W	XTO ENERGY, INC	CHACRA	Shallow	Yes
10	0.41	CONGRESS	18	30-045-25673	1680	1770	5808		K-27-29N-11W	Burlington	PICTURED CLIFFS	Shallow	Yes
11	0.49	LAUREN KELLY	1	30-045-27361	1326	1354	1354		F-27-29N-11W	MANANA GAS INC	FRUITLAND SAND	Shallow	No
12	0.49	MANGUM	1E	30-045-24673	6024	6160	6160		F-27-29N-11W	Burlington	DAKOTA	Deep	Yes
13	0.51	CALVIN	1	30-045-12003	6176	6348	6348		M-26-29N-11W	Burlington	DAKOTA	Deep	Yes
14	0.52	MARIAN S	1	30-045-27365	2578	2710	2710		F-27-29N-11W	MANANA GAS INC	CHACRA	Shallow	No
15	0.55	MANGUM	1	30-045-07835	1388	1661	6214		L-27-29N-11W	Burlington	FRUITLAND COAL	CBM	Yes
16	0.56	Black Diamond	1	30-045-07896			800	09-Nov-78	C-27-29N-11W	Pre-Ongard		P&A	No
17	0.57	DAVIS GAS COM J	1	30-045-25329	1462	1645	4030		F-26-29N-11W	HOLCOMB O&G	FRUITLAND COAL	CBM	Yes
18	0.58	SULLIVAN GAS COM D	1E	30-045-24083	6086	6242	6242		F-26-29N-11W	XTO ENERGY, INC	DAKOTA	Deep	Yes
19	0.60	CONGRESS	16	30-045-25657	6086	6148	6148		A-34-29N-11W	Burlington	GALLUP	Deep	Yes
20	0.64	CALVIN	100	30-045-31118	1468	1760	1760		N-26-29N-11W	Burlington	FRUITLAND COAL	CBM	No
21	0.64	SUMMIT	9	30-045-24574	2747	2857	2857		A-34-29N-11W	Burlington	CHACRA	Shallow	No
22	0.64	CONGRESS	9	30-045-24572	2746	2869	2869		N-26-29N-11W	ENERGEN	CHACRA	Shallow	No
23	0.64	Garland "B"	1	30-045-07903	1664	1747	1747	27-Jun-75	M-27-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
24	0.65	SUMMIT	15	30-045-25707	5326	5970	5970		C-34-29N-11W	ENERGEN	GALLUP	Deep	Yes

Table 2

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	P&A Date	ULSTR	OPERATOR	RESERVOIR	<u>Status</u>	Pen. Inj. Zone
25	0.65	GARLAND	3	30-045-24573	2668	2790	2790		M-27-29N-11W	ENERGEN	CHACRA	Shallow	No
26	0.67	CALVIN	3	30-045-25612	5295	5870	5870		K-26-29N-11W	Burlington	GALLUP	Deep	Yes
27	0.68	GARLAND B	1R	30-045-21732	1648	1678	1678		M-27-29N-11W	Burlington	PICTURED CLIFFS	Shallow	No
28	0.70	NANCY HARTMAN	2	30-045-26721	2627	2754	2754		P-22-29N-11W	MANANA GAS INC	CHACRA	Shallow	No
29	0.71	GRACE PEARCE	1	30-045-07959	1380	1466	1466	02-Mar-00	O-22-29N-11W	JOHN C PICKETT	FRUITLAND SAND	P&A	No
30	0.72	HARTMAN	1	30-045-07961	6072	6274	6274	14-Jun-99	P-22-29N-11W	MANANA GAS INC	DAKOTA	P&A	Yes
31	0.73	Davis	1	30-045-07776			1917	11-Nov-58	M-26-29N-11W	Pre-Ongard	(N/A)	P&A	No
32	0.75	MARY JANE	1	30-045-26731	2622	2732	2732		N-22-29N-11W	MANANA GAS INC	CHACRA	Shallow	No
33	0.76	ROYAL FLUSH	1	30-045-34312	1440	1608	1608		N-22-29N-11W	MANANA GAS INC	FRUITLAND COAL	CBM	No
34	0.79	соок	1	30-045-07940	6052	6226	6226		N-22-29N-11W	MANANA GAS INC	DAKOTA	Deep	Yes
35	0.79	соок	2	30-045-13089	1390	1410	1410		N-22-29N-11W	MANANA GAS INC	FRUITLAND SAND	Shallow	No
36	0.82	SHELLY	2	30-045-20755	1726	1736	1736		G-34-29N-11W	CHAPARRAL O&G	PICTURED CLIFFS	Shallow	No
37	0.82	HARE	3	30-545-02123			2335		M-23-29N-11W	Pre-Ongard	FARMINGTON	DRY	No
38	0.84	CALVIN	1F	30-045-33093	6172	6430	6430		J-26-29N-11W	Burlington	DAKOTA	Deep	Yes
39	0.85	SULLIVAN GAS COM D	1	30-045-07733	6047	6160	6160		B-26-29N-11W	XTO ENERGY, INC	DAKOTA	Deep	Yes
40	0.85	ELLEDGE FEDERAL 34	11	30-045-24834	1060	1064	1525		D-34-29N-11W	MCELVAIN O&G	FARMINGTON,NORTH	Shallow	No
41	0.89	CONGRESS	7E	30-045-24835	6202	6347	6347		F-34-29N-11W	Burlington	DAKOTA	Deep	Yes
42	0.90	HARE	4	30-545-02124			2015		O-23-29N-11W	Pre-Ongard	FARMINGTON	DRY	No
43	0.90	CONGRESS	4E	30-045-24837	2784	2906	6328		E-35-29N-11W	Burlington	CHACRA	Shallow	Yes
44	0.90	CONGRESS	15	30-045-25675	5369	5943	5943		C-35-29N-11W	Burlington	GALLUP	Deep	Yes
45	0.90	ASHCROFT SWD	1	30-045-30788	6952	7070	7382		B-26-29N-11W	XTO ENERGY, INC	MORRISON BLUFF EN	INJ	Yes
46	0.90	LEA ANN	1	30-045-20752	1776	1790	1790	18-Dec-99	E-35-29N-11W	CHAPARRAL O&G	PICTURED CLIFFS	P&A	No
47	0.94	CONGRESS	5	30-045-07672	6171	6340	6340		G-34-29N-11W	Burlington	DAKOTA	Deep	Yes
48	0.94	Viles EE	1	30-045-07751			870		P-28-29N-11W	Pre-Ongard		DRY	No

Table 2

Map Seq.	Miles to DW1	WELLNAME	Ħ	APINO	Perf Top	Perf Bottom	<u>Total</u> <u>Depth</u>	P&A Date	ULSTR	OPERATOR	RESERVOIR	Status	Pen. Inj. Zone
49	0.95	Sullivan	1X	30-045-29107			900	23-Jun-55	G-26-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
50	0.97	Madsen Selby Pooled Unit	2	30-045-07895			1600	05-May-78	A-28-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
51	0.97	Masden-Selby	3	30-045-07762			600	05-Jun-78	A-28-29N-11W	Pre-Ongard		P&A	No
52	0.97	MASDEN GAS COM	1	30-045-07894	6023	6125	6125		A-28-29N-11W	XTO ENERGY, INC	DAKOTA	Deep	Yes
53	0.97	Sullivan	1	30-045-07870			1420	31-Aug-53	G-26-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
54	0.98	CONGRESS	1	30-045-07674			PC	30-Oct-53	J-34-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
55	0.98	EARL B SULLIVAN	1	30-045-23163	2750	2761	2761		B-26-29N-11W	XTO ENERGY, INC	CHACRA	Shallow	No
56	0.99	STATE GAS COM BS	1	30-045-23550	1470	1648	2761		K-23-29N-11W	HOLCOMB O&G	FRUITLAND COAL	СВМ	No
57	0.99	PEARCE GAS COM	1	30-045-07985	6154	6182	6182	10-Mar-97	K-23-29N-11W	BP AMERICA	DAKOTA	P&A	Yes
58	0.99	CHAPARRAL	1	30-045-20609	1712	1731	1731		E-34-29N-11W	CHAPARRAL O&G	PICTURED CLIFFS	Shallow	No
59	0.99	CONGRESS	2	30-545-02151			FrtInd		-34-29N-11W	Pre-Ongard	FRUITLAND SAND	DRY	No

	<u>Total</u>	Pen Inj. Zone			
<u>Status</u>	Wells	Yes	No		
P&A	15	3	12		
Dry	4	0	4		
INJ	2	2	0		
СВМ	7	2	5		
Shallow	17	3	14		
Deep	14	14	0		
Total	59	24	35		

Injection Well 2013 Quarterly Analytical Summary

r	Toxicity				
	Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Volatile Organic Compounds (ug/L)	Characteristics	13t Quarter	4/24/2013	7/22/2013	11/7/2013
1,1,1,2-Tetrachloroethane		ns	<2.0	< 1.0	< 1.0
1,1,1-Trichloroethane	,	ns	<2.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		ns	<4.0	< 2.0	< 2.0
1,1,2-Trichloroethane		ns	<2.0	< 1.0	< 1.0
1,1-Dichloroethane		ns	<2.0	< 1.0	< 1.0
1,1-Dichloroethene		ns	<2.0	< 1.0	< 1.0
1,1-Dichloropropene		ns	<2.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene 1,2,3-Trichloropropane		ns	<2.0 <4.0	< 1.0 < 2.0	< 1.0 < 2.0
1,2,4-Trichlorobenzene		ns ns	<2.0	< 1.0	< 1.0
1,2,4-Trientorobenzene		ns	<2.0	< 1.0	1.0
1,2-Dibromo-3-chloropropane		ns	<4.0	< 2.0	< 2.0
1,2-Dibromoethane (EDB)		ns	<2.0	< 1.0	< 1.0
1,2-Dichlorobenzene		ns	<2.0	< 1.0	< 1.0
1,2-Dichloroethane (EDC)	500	ns	<2.0	< 1.0	< 1.0
1,2-Dichloropropane		ns	<2.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene		ns	<2.0	< 1.0	< 1.0
1,3-Dichlorobenzene		ns	<2.0	< 1.0	< 1.0
1,3-Dichloropropane		ns	<2.0	< 1.0	< 1.0
1,4-Dichlorobenzene	7500	ns	<2.0	< 1.0	< 1.0
I-Methylnaphthalene		ns	<8.0	< 4.0	< 4.0
2,2-Dichloropropane		ns	<4.0	< 2.0	< 2.0
2-Butanone		ns	<20	< 10	< 10
2-Chlorotoluene		ns	<2.0	< 1.0	< 1.0
2-Hexanone		ns	<20	< 10	< 10
2-Methylnaphthalene		ns	<8.0	< 4.0	< 4.0
4-Chlorotoluene		ns	<2.0	< 1.0	< 1.0
4-Isopropyltoluene		ns	<2.0	< 1.0	< 1.0
4-Methyl-2-pentanone		ns	<20 81	< 10 78	< 10 34
Acetone Benzene	500	ns	<2.0	< 1.0	< 1.0
Bromobenzene	300	ns ns	<2.0	< 1.0	< 1.0
Bromodichloromethane		ns	<2.0	< 1.0	< 1.0
Bromoforin		ns	<2.0	< 1.0	< 1.0
Bromomethane		ns	<6.0	< 3.0	< 3.0
Carbon disulfide		ns	<20	< 10	< 10
Carbon Tetrachloride	500	ns	<2.0	< 1.0	< 1.0
Chlorobenzene	100000	ns	<2.0	< 1.0	< 1.0
Chloroethane		ns	<4.0	< 2.0	< 2.0
Chloroform	6000	ns	<2.0	< 1.0	< 1.0
Chloromethane		ns	<6.0	< 3.0	< 3.0
cis-1,2-DCE		ns	<2.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		ns	<2.0	< 1.0	< 1.0
Dibroinochloromethane		ns	<2.0	< 1.0	< 1.0
Dibromomethane		ns	<2.0	< 1.0	< 1.0
Dichlorodifluoromethane		ns	<2.0	< 1.0	< 1.0
Ethylbenzene Hexachlorohutadiene	500	ns	<2.0 <2.0	< 1.0 < 1.0	< 1.0 < 1.0
Isopropylbenzene	300	ns ns	<2.0	< 1.0	< 1.0
Methyl tert-butyl ether (MTBE)		ns	<2.0	< 1.0	< 1.0
Methylene Chloride		ns	<6.0	< 3.0	< 3.0
Naphthalene		ns	<4.0	< 2.0	< 2.0
n-Butylbenzene		ns	<2.0	< 1.0	< 1.0
n-Propylbenzene		ns	<2.0	< 1.0	< 1.0
sec-Butylbenzene		ns	<2.0	< 1.0	< 1.0
Styrene		ns	<2.0	< 1.0	< 1.0
tert-Butylbenzene		ns	<2.0	< 1.0	< 1.0
Tetrachloroethene (PCE)		ns	<2.0	< 1.0	< 1.0
Toluene		ns	<2.0	< 1.0	< 1.0
trans-1,2-DCE		ns	<2.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		ns	<2.0	< 1.0	< 1.0
Trichloroethene (TCE)		ns	<2.0	< 1.0	< 1.0
Trichlorofluoromethane	200	ns	<2.0	< 1.0	< 1.0
Vinyl chloride	200	ns	<2.0	< 1.0	< 1.0
Xylenes, Total	L	ns	<3.0	< 1.5	< 1.5

Injection Well 2013 Quarterly Analytical Summary

	Toxicity	1-4 0	2-40	2-4 0	Ath Owerton
Semi-Volatile Organic Compounds (ug/L)	Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1,2,4-Trichlorobenzene		ns	< 50	<50	< 50
1,2-Dichlorobenzene		ns	< 50	<50	< 50
1,3-Dichlorobenzene		ns	< 50	<50	< 50
1,4-Dichlorobenzene	7500	ns	< 50	<50	< 50
1-Methylnaphthalene		ns	< 50	<50	< 50
2,4,5-Trichlorophenol	2000	ns	< 50	<50	< 50 < 50
2,4,6-Trichlorophenol 2,4-Dichlorophenol	2000	ns	< 50 < 100	<50 <100	< 100
2,4-Dimethylphenol		ns ns	< 50	<50	< 50
2,4-Dinitrophenol		ns	< 100	<100	< 100
2,4-Dinitrotoluene	130	ns	< 50	< 50	< 50
2,6-Dinitrotoluene		ns	< 50	< 50	< 50
2-Chloronaphthalene		ns	< 50	< 50	< 50
2-Chlorophenol		ns	< 50	< 50	< 50
2-Methylnaphthalene		ns	< 50	< 50	< 50
2-Methylphenol		ns	< 50	< 50	< 50
2-Nitroaniline	İ	ns	< 50	< 50	< 50
2-Nitrophenol		πs	< 50	< 50	< 50
3,3'-Dichlorobenzidine		ns	< 50 < 50	< 50 < 50	< 50 < 50
3+4-Methylphenol 3-Nitroaniline	ł	ns	< 50	< 50	< 50
4,6-Dinitro-2-methylphenol		ns ns	< 100	< 100	< 100
4-Bromophenyl phenyl ether	•	ns	< 50	< 50	< 50
4-Chloro-3-methylphenol		ns	< 50	< 50	< 50
4-Chloroaniline		ns	< 50	< 50	< 50
4-Chlorophenyl phenyl ether	· ·	ns	< 50	< 50	< 50
4-Nitroaniline]	ns	< 50	< 50	< 50
4-Nitrophenol		ns	< 50	< 50	< 50
Acenaphthene		ns	< 50	<50	< 50
Acenaphthylene		ns	< 50	<50	< 50
Aniline		ns	< 50	<50	< 50
Anthracene		ns	< 50 < 50	<50 <50	< 50 < 50
Azobenzene Benz(a)anthracene		ns	< 50	<50 <50	< 50
Benzo(a)pyrene	ł	ns ns	< 50	<50	< 50
Benzo(b)fluoranthene		ns	< 50	<50	< 50
Benzo(g,h,i)perylene	t	ns	< 50	<50	< 50
Benzo(k)fluoranthene	i	ns	< 50	<50	< 50
Benzoic acid		ns	< 100	<100	<200
Benzyl alcohol		ns	< 50	< 50	< 50
Bis(2-chloroethoxy)methane	Ì	ns	< 50	<50	< 50
Bis(2-chloroethyl)ether		ns	< 50	<50	< 50
Bis(2-chloroisopropyl)ether	ļ	ns	< 50	<50	< 50
Bis(2-ethylhexyl)phthalate		ns	< 50	<50	< 50
Butyl benzyl phthalate	l	ns	< 50	<50	< 50
Carbazole Chrysene	-	ns	< 50 < 50	<50 <50	< 50 < 50
Dibenz(a,h)anthracene	ł	ns ns	< 50 < 50	<50 <50	< 50
Dibenzofuran	i	ns	< 50	<50	< 50
Diethyl phthalate	1	ns	< 50	<50	< 50
Dimethyl phthalate		ns	< 50	<50	< 50
Di-n-butyl phthalate		ns	< 50	<50	< 50
Di-n-octyl phthalate		ns	< 100	<50	< 100
Fluoranthene		ns	< 50	<50	< 50
Fluorene		ns	< 50	<50	< 50
Hexachlorobenzene	130	ns	< 50	<50	< 50
Hexachlorogyalopentadiene	500	ns	< 50 < 50	<50 <50	< 50 < 50
Hexachlorocyclopentadiene Hexachloroethane	3000	ns	< 50 < 50	<50 <50	< 50 < 50
Indeno(1,2,3-cd)pyrene	5000	ns ns	< 50	<50 <50	< 50
Isophorone		ns	< 50	<50 <50	< 50
Naphthalene		ns	< 50	<50	< 50
Nitrobenzene	2000	ns	< 50	<50	< 50
N-Nitrosodimethylamine		ns	< 50	<50	< 50
N-Nitrosodi-n-propylamine		ns	< 50	<50	< 50
N-Nitrosodiphenylamine		ns	< 50	<50	< 50
Pentachlorophenol	100000	ns	< 100	<100	< 100
Phenanthrene		ns	< 50	<50	< 50
Phenol		ns	< 50	<50	< 50
Pyrene	5000	ns	< 50	<50	< 50
Pyridine	5000	ns	< 50	<50	< 50

Injection Well 2013 Quarterly Analytical Summary

	Toxicity				
	Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
General Chemistry (mg/L unless otherwi	se stated)				
Specific Conductance (umhos/cm)		ns	5100	3400	4400
Chloride		ns	1400	840	1300
Sulfate		ns	11	39	23
Total Dissolved Solids		ns	3360	2140	2940
pH (pH Units)	Ì	ns	7.40	7.41	7.42
Bicarbonate (As CaCO3)		ns	490	340	430
Carbonate (As CaCO3)	i	ns	<2.0	<2.0	<2.0
Calcium	1	ns	230	100	190
Magnesium		ns	51	26	51
Potassium	1	ns	17	10	21
Sodium	1	ns	750	350	670
Total Alkalinity (as CaCO3)		ns	490	340	430
Total Metals (mg/L)					
Arsenic	5.0	ns	< 0.020	< 0.020	< 0.020
Barium	100.0	ns	0.47	0.27	0.34
Cadmium	1.0	ns	< 0.0020	<0.0020	< 0.0020
Chromium	5.0	ns	< 0.0060	< 0.0060	0.014
Lead	5	ns	0.0066	0.0063	< 0.0050
Selenium	1	ns	< 0.050	<0.050 *	< 0.050
Silver	5	ns	< 0.0050	<0.050	< 0.0050
Mercury	0.2	ns	< 0.0010	na	< 0.00020
gnitability, Corrosivity, and Reactivity				The Mark	
Reactive Cyanide (mg/L)		ns	<0.1	<0.01	<1
Reactive Sulfide (mg/kg)		ns	<1.0	<1.0	2.32
Ignitability (°F)	< 140° F	ns	>200	>200	>200
Corrosivity (ph Units)	<2 or≥ 12.5	ns	7.28	6.74	6.98

Notes:

* = Selenium was qualified as an estimate due to the fact that the opening QC was outside of the normal accepted limits.

na = inadvertantly not analyzed by the laboratory.

APPENDIX A

Krakow, Matt

From:

Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]

Sent:

Wednesday, September 18, 2013 1:04 PM

To:

Krakow, Matt

Cc:

Kuehling, Monica, EMNRD

Subject:

RE: MIT, Bradenhead and high pressure test

Attachments:

C-103 Sundry Approval 9-18-2013.pdf

Follow Up Flag: Flag Status:

Follow up Flagged

Matt:

Please find attached the OCD C-103 Sundry approval of the above subject tests.

Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Department

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Drive, Santa Fe, New Mexico 87505

Office: (505) 476-3490

E-mail: CarlJ.Chavez@State.NM.US

Website: http://www.emnrd.state.nm.us/ocd/

"Why Not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward With the Rest of the

Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at

http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental

From: Krakow, Matt [mailto:Matt.Krakow@wnr.com]

Sent: Tuesday, September 17, 2013 2:04 PM

To: Chavez, Carl J, EMNRD

Subject: RE: MIT, Bradenhead and high pressure test

Carl,

The High Pressure Test is to verify that the well shuts off below the approved maximum well pressure so it is not the Fall Off Test. The MIT is the standard Annulus Test. We have coordinated it all with Monica as well.

THANKS,
MATTHEW KRAKOW
Environmental Coordinator

Western Refining Southwest Inc.

111 County Road 4990 Bloomfield, NM 87413

P: 505-632-4169 F: 505-632-4021

matt.krakow@wnr.com

www.wnr.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Tuesday, September 17, 2013 1:20 PM

To: Krakow, Matt

Cc: Kuehling, Monica, EMNRD

Subject: RE: MIT, Bradenhead and high pressure test

Matt:

Good afternoon. The MIT is the Standard Annulus Test I believe? What is the "High Pressure Shutdown Test"? Is this a Fall-Off Test?

Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Department

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Drive, Santa Fe, New Mexico 87505

Office: (505) 476-3490

E-mail: CarlJ.Chavez@State.NM.US

Website: http://www.emnrd.state.nm.us/ocd/

"Why Not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward With the Rest of the

Nation?" To see how, please go to: "Pollution Prevention & Waste Minimization" at

http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental

From: Krakow, Matt [mailto:Matt.Krakow@wnr.com]

Sent: Tuesday, September 17, 2013 1:05 PM

To: Chavez, Carl J, EMNRD

Subject: MIT, Bradenhead and high pressure test

Carl,

Western Refining has scheduled a MIT, Bradenhead and High Pressure Test on Thursday Sept. 19. Monica Kuehling is scheduled to observe the tests. I have attached the C-103.

THANKS,
MATTHEW KRAKOW
Environmental Coordinator

Western Refining Southwest Inc.

111 County Road 4990 Bloomfield, NM 87413

P: 505-632-4169 F: 505-632-4021

matt.krakow@wnr.com

www.wnr.com

Submit 1 Copy To Appropriate District Office	State of New Me	xico	Form C-103			
District 1 - (575) 393-6161	Energy, Minerals and Natu	ral Resources	Revised August 1, 2011			
1625 N. French Dr., Hobbs, NM 88240 District II - (575) 748-1283			WELL API NO. 30-045-29002-00			
811 S. First St., Artesia, NM 88210	OIL CONSERVATION		5. Indicate Type of Lease			
<u>District III</u> (505) 334-6178 1000 Rio Brazos Rd., Aztec, NM 87410	1220 South St. Fran		STATE ☐ FEE ☒			
District IV - (505) 476-3460	Santa Fe, NM 87	75 05	6. State Oil & Gas Lease No.			
1220 S. St. Francis Dr., Santa Fe, NM 87305			N/A			
	SUNDRY NOTICES AND REPORTS ON WELLS					
	(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH					
PROPOSALS.) 1. Type of Well: Oil Well	Gus Well 🔀 Other – (Disposal V	U-11\	8. Well Number: #001			
	fining Co. / Western Refining South		9. OGRID Number: 037218			
Bloomfield Refinery		repopulation	7. OGACID I (MARINO). 03/216			
3. Address of Operator			10. Pool name or Wildcat:			
# 50 Road 4990, Bloomfield, NM,	87413	. 1911	Blanco/Mesa Verde			
4. Well Location						
Unit Letter I : 24	142 feet from the south	line and12:	50 feet from the East line			
Section 27	Township 29 S	Range 11 E	NMPM County San Juan			
	11. Elevation (Show whether DR,	RKB, RT, GR, etc.,				
12 Check	Appropriate Box to Indicate N	ature of Notice	Report or Other Date			
12. CHOCK	Appropriate box to maicate it	aime of money,	Report of Outer Data			
NOTICE OF IN	ITENTION TO:	SUB	SEQUENT REPORT OF:			
PERFORM REMEDIAL WORK	PLUG AND ABANDON 🔲	REMEDIAL WOR				
TEMPORARILY ABANDON	CHANGE PLANS	COMMENCE DRI				
PULL OR ALTER CASING	MULTIPLE COMPL	CASING/CEMEN	TJOB []			
DOWNHOLE COMMINGLE						
OTHER: Annual MIT, Bradenhead,	High Pressure Shutdown Test 🗵	OTHER:				
13. Describe proposed or comp	oleted operations. (Clearly state all p	pertinent details, an	d give pertinent dates, including estimated date			
		C. For Multiple Co	mpletions: Attach wellbore diagram of			
proposed completion or rec	ompletion.					
Western Refining Southwest, Inc	Bloomfield Refinery requests permi	ission to perform th	e annual MIT, Bradenhead and High Pressure			
			on Thursday, September 19th, 2013. Monica			
Kuchling has agreed to be here to m		•	, , , , , , , , , , , , , , , , , , , ,			
Spud Date:	Rig Release Da	ite:				
- L		<u> </u>				
I hereby certify that the information	above is true and complete to the be	est of my knowledg	e and belief.			
20 -11	<i>[</i>					
SIGNATURE /	TITLE EO	vironmental Coord	inator DATE 9/17/2013			
WAY - WAY A WARE A STREET OF THE STREET OF T	1 2 2 444	· · · · · · · · · · · · · · · · · · ·	7/1//2015			
Type or print nameMatthew Kr	akow E-mail address	: <u>matt.krakow@</u>	w.mr.com PHONE: _505-632-4169			
For State Use Only		•				
APPROVED BY: Land	him TITLE Envi	11-	man aliabasa			
Conditions of Approval (if apy):	THILE ENVI	COMMENTAL EN	DATE 9/18/2013			

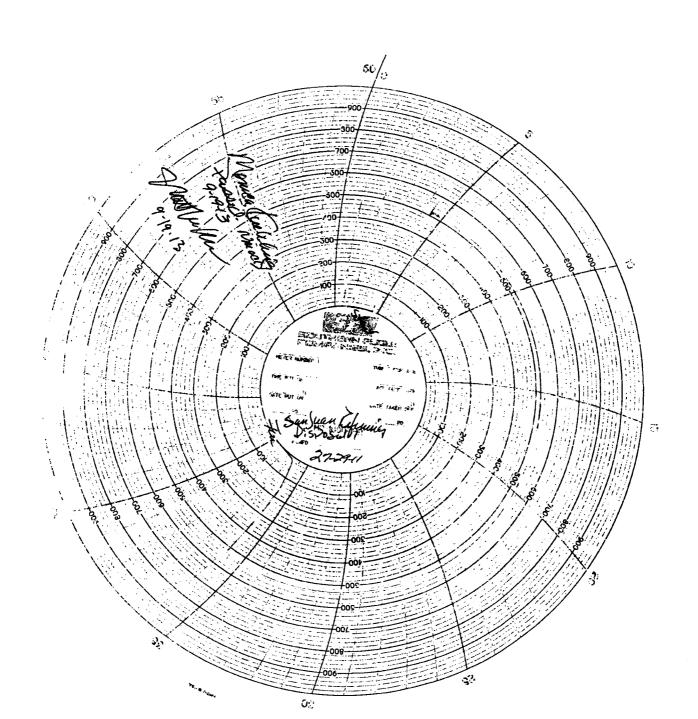


7-17-13

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

MECHANICAL INTEGRITY TEST REPORT

	(TA OR UIC)	
Date of Test 9-19-13 O Property Name WS Sul		ang API # 30-0
Property Name Wish Sul	Well # Loc	cation: Unit I Seco Two Rge //
Land Type: State Federal Private/ Indian	P	Water Injection It Water Disposal Gas Injection roducing Oil/Gas essure obervation
Temporarily Abandoned Well (Y/N):_	TA Expires:	
Casing Pres. Bradenhead Pres. Tubing Pres. Int. Casing Pres.	Tbg. SI Pres	Max. Inj. Pres
Pressured annulus up to 550	psi. for 30 mins.	Test passed failed
REMARKS:	3221	
Variation of the second	1 3208-3276	· · · · · · · · · · · · · · · · · · ·
Tay pr	1 3208 3216	
Welliose to 530	last 15 min of tes	54.
K:115 at 1136		
	Witness Nouce	a Kuhling
(Position)		Revised 02-11-02
mike Charlie witnesse	of the test	•





NEW MEXICO ENERGY, MINERALS & NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
AZTEC DISTRICT OFFICE
1000 RIO BRAZOS ROAD
AZTEC NM 87410
(505) 334-6178 FAX: (505) 334-6170
http://emnrd.state.nm.us/ocd/District III/3distric.htm

BRADENHEAD TEST REPORT

(submit 1 copy to above address) Well No. / Location: Unit / Section / Township Range // Property Name/ Well Status (Shut-In or Producing) Initial PSI: Tubing & Intermediate 1/1 OPEN BRADENHEAD AND INTERMEDIATE TO ATMOSPHERE INDIVIDUALLY FOR 15 MINUTES EACH **PRESSURE** FLOW CHARACTERISTICS Bradenhead **INTERM** Testing BRADENHEAD INTERMEDIATE BH Int Csg Int Csg TIME Steady Flow 5 min 10 min Surges Down to Nothing 15 min 20 min Nothing 25 min Gas & Water 30 min Water If bradenhead flowed water, check all of the descriptions that apply below: CLEAR FRESH SALTY SULFUR BLACK BRADENHEAD **5 MINUTE SHUT-IN PRESSURE** (Position) E-mail address ____

APPENDIX B



Hall Environmental Analysis Laboratory
4901 Hawkins NE

Albuquerque, NM 87109

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

May 23, 2013

Kelly Robinson

Western Refining Southwest, Inc.

#50 CR 4990

Bloomfield, NM 87413

TEL: (505) 632-4135 FAX (505) 632-3911

RE: Injection Well 2nd Otr 4-24-13

OrderNo.: 1304A43

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 4/25/2013 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

Lab Order 1304A43

Date Reported: 5/23/2013

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

Project: Injection Well 2nd Qtr 4-24-13

Collection Date: 4/24/2013 10:15:00 AM

Lab ID: 1304A43-001

Matrix: AQUEOUS

Received Date: 4/25/2013 9:10:00 AM

Analyses	Result	RL Q	ıal Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS	· · · · · · · · · · · · · · · · · · ·				Analyst	JRR
Chloride	1400	50	mg/L	100	4/25/2013 10:59:38 PM	R10139
Sulfate	11	5.0	mg/L	10	4/25/2013 10:47:14 PM	R10139
EPA METHOD 7470: MERCURY					Analyst	: IDC
Mercury	ND	0.0010	mg/L	5	4/26/2013 5:09:18 PM	7179
EPA 6010B: TOTAL RECOVERABLE	E METALS				Analyst	JLF
Arsenic	ND	0.020	mg/L	1	5/3/2013 6:51:56 PM	7191
Barium	0.47	0.020	mg/L	1	5/3/2013 6:51:56 PM	7191
Cadmium	ND	0.0020	mg/L	1	5/3/2013 6:51:56 PM	7191
Calcium	230	5.0	mg/L	5	5/6/2013 3:16:19 PM	7191
Chromium	ND	0.0060	mg/L	1	5/3/2013 6:51:56 PM	7191
Lead	0.0066	0.0050	mg/L	1	5/3/2013 6:51:56 PM	7191
Magnesium	51	5.0	mg/L	5	5/6/2013 3:16:19 PM	7191
Potassium	17	5.0	mg/L	5	5/6/2013 3:16:19 PM	7191
Selenium	ND	0.050	mg/L	1	5/3/2013 6:51:56 PM	7191
Silver	ND	0.0050	mg/L	1	5/3/2013 6:51:56 PM	7191
Sodium	750	10	mg/L	10	5/6/2013 3:18:31 PM	7191
EPA METHOD 8270C: SEMIVOLATI	LES		·		Analyst	: JDC
Acenaphthene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Acenaphthylene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Aniline	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Anthracene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Azobenzene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Benz(a)anthracene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Benzo(a)pyrene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Benzo(b)fluoranthene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Benzo(g,h,i)perylene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Benzo(k)fluoranthene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Benzoic acid	ND	100	μg/L	1	5/2/2013 5:17:31 PM	7235
Benzyl alcohol	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Bis(2-chloroethoxy)methane	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Bis(2-chloroethyl)ether	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Bis(2-chloroisopropyl)ether	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Bis(2-ethylhexyl)phthalate	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
4-Bromophenyl phenyl ether	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Butyl benzyl phthalate	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Carbazole	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
4-Chloro-3-methylphenol	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
4-Chloroaniline	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
2-Chloronaphthalene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting LimitR RPD outside accepted recovery limits
- Page 1 of 17
- R RPD outside accepted recovery limits
 S Spike Recovery outside accepted recovery limits

Lab Order 1304A43

Date Reported: 5/23/2013

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

Project: Injection Well 2nd Qtr 4-24-13

Collection Date: 4/24/2013 10:15:00 AM

Lab ID: 1304A43-001

Matrix: AQUEOUS Received Date: 4/25/2013 9:10:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLA	ATILES				Analys	t: JDC
2-Chlorophenol	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
4-Chlorophenyl phenyl ether	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Chrysene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Di-n-butyl phthalate	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Di-n-octyl phthalate	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Dibenz(a,h)anthracene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Dibenzofuran	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
1,2-Dichlorobenzene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
1,3-Dichlorobenzene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
1,4-Dichlorobenzene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
3,3'-Dichlorobenzidine	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Diethyl phthalate	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Dimethyl phthalate	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
2,4-Dichlorophenol	ND	100	μg/L	1	5/2/2013 5:17:31 PM	7235
2,4-Dimethylphenol	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
4,6-Dinitro-2-methylphenol	ND	100	μg/L	1	5/2/2013 5:17:31 PM	7235
2,4-Dinitrophenol	ND	100	μg/L	1	5/2/2013 5:17:31 PM	7235
2,4-Dinitrotoluene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
2,6-Dinitrotoluene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Fluoranthene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Fluorene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Hexachlorobenzene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Hexachlorobutadiene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Hexachlorocyclopentadiene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Hexachloroethane	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Indeno(1,2,3-cd)pyrene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Isophorone	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
1-Methylnaphthalene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
2-Methylnaphthalene	ND	50	µg/L	1	5/2/2013 5:17:31 PM	7235
2-Methylphenol	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
3+4-Methylphenol	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
N-Nitrosodi-n-propylamine	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
N-Nitrosodimethylamine	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
N-Nitrosodiphenylamine	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Naphthalene	ND	50	µg/L	1	5/2/2013 5:17:31 PM	7235
2-Nitroaniline	ND	50	μ g /L	1	5/2/2013 5:17:31 PM	7235
3-Nitroaniline	ND	50	μ g /L	1	5/2/2013 5:17:31 PM	7235
4-Nitroaniline	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Nitrobenzene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
2-Nitrophenol	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 2 of 17

- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

Lab Order 1304A43

Date Reported: 5/23/2013

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

Collection Date: 4/24/2013 10:15:00 AM Injection Well 2nd Qtr 4-24-13 Lab ID: 1304A43-001 Matrix: AQUEOUS Received Date: 4/25/2013 9:10:00 AM

Analyses	Result	RL Q	ual Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILE	s				Analys	t: JDC
4-Nitrophenol	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Pentachlorophenol	ND	100	μg/L	1	5/2/2013 5:17:31 PM	7235
Phenanthrene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Phenol	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Pyrene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Pyridine	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
1,2,4-Trichlorobenzene	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
2,4,5-Trichlorophenol	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
2,4,6-Trichlorophenol	ND	50	μg/L	1	5/2/2013 5:17:31 PM	7235
Surr: 2,4,6-Tribromophenol	84.5	41.5-117	%REC	1	5/2/2013 5:17:31 PM	7235
Surr: 2-Fluorobiphenyl	71.0	29.1-112	%REC	1	5/2/2013 5:17:31 PM	7235
Surr: 2-Fluorophenol	45.3	11.9-98.6	%REC	1	5/2/2013 5:17:31 PM	7235
Surr: 4-Terphenyl-d14	66.6	46-111	%REC	1	5/2/2013 5:17:31 PM	7235
Surr: Nitrobenzene-d5	68.6	34.9-112	%REC	1	5/2/2013 5:17:31 PM	7235
Surr: Phenol-d5	45.1	17.5-88.3	%REC	1	5/2/2013 5:17:31 PM	7235
EPA METHOD 8260B: VOLATILES					Analys	t: RAA
Benzene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
Toluene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
Ethylbenzene	NO	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
Methyl tert-butyl ether (MTBE)	СN	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
1,2,4-Trimethylbenzene	NO	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
1,3,5-Trimethylbenzene	C ₁ N	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
1,2-Dichloroethane (EDC)	CN	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
1,2-Dibromoethane (EDB)	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
Naphthalene	ND	4.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
1-Methylnaphthalene	ND	8.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
2-Methylnaphthalene	ND	8.0	μg/L	2	4/29/2013 12:25:05 PM	/I R1019
Acetone	81	20	μg/L	2	4/29/2013 12:25:05 PM	/I R1019
Bromobenzene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
Bromodichloromethane	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
Bromoform	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
Bromomethane	ND	6.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
2-Butanone	ND	20	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
Carbon disulfide	NO	20	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
Carbon Tetrachloride	NO	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
Chlorobenzene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
Chloroethane	NID	4.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
Chloroform	NID	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
Chloromethane	NID	6.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019
2-Chlorotoluene	CIM	2.0	μg/L	2	4/29/2013 12:25:05 PM	/ R1019

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range
- Analyte detected below quantitation limits
- Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

- Analyte detected in the associated Method Blank
- Η Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 3 of 17

- RPD outside accepted recovery limits R
- Spike Recovery outside accepted recovery limits

Lab Order 1304A43

Date Reported: 5/23/2013

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Injection Well 2nd Qtr 4-24-13

Lab ID: 1304A43-001

Project:

Client Sample ID: Injection Well

Collection Date: 4/24/2013 10:15:00 AM

Received Date: 4/25/2013 9:10:00 AM

Analyses	Result	RL Q	ual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst	: RAA
4-Chlorotoluene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
cis-1,2-DCE	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
cis-1,3-Dichloropropene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
1,2-Dibromo-3-chloropropane	ND	4.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
Dibromochloromethane	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
Dibromomethane	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
1,2-Dichlorobenzene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
1,3-Dichlorobenzene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
1,4-Dichlorobenzene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
Dichlorodifluoromethane	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
1,1-Dichloroethane	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
1,1-Dichloroethene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
1,2-Dichloropropane	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
1,3-Dichloropropane	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
2,2-Dichloropropane	ND	4.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
1,1-Dichloropropene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
Hexachlorobutadiene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
2-Hexanone	ND	20	μg/L	2	4/29/2013 12:25:05 PM	R10192
Isopropylbenzene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
4-Isopropyltoluene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
4-Methyl-2-pentanone	ND	20	μg/L	2	4/29/2013 12:25:05 PM	R10192
Methylene Chloride	ND	6.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
n-Butylbenzene	ND	6.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
n-Propylbenzene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
sec-Butylbenzene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
Styrene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
tert-Butylbenzene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
1,1,1,2-Tetrachloroethane	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
1,1,2,2-Tetrachloroethane	ND	4.0	μg/L	2	4/29/2013 12:25:05 PM	R10192
Tetrachloroethene (PCE)	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	1 R10192
trans-1,2-DCE	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	1 R10192
trans-1,3-Dichloropropene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	1 R10192
1,2,3-Trichlorobenzene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	1 R10192
1,2,4-Trichlorobenzene	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	1 R10192
1,1,1-Trichloroethane	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	1 R10192
1,1,2-Trichloroethane	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	1 R10192
Trichloroethene (TCE)	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	1 R10192
Trichlorofluoromethane	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	1 R10192
1,2,3-Trichloropropane	ND	4.0	μg/L	2	4/29/2013 12:25:05 PM	1 R10192
Vinyl chloride	ND	2.0	μg/L	2	4/29/2013 12:25:05 PM	1 R10192

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Page 4 of 17
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

Lab Order 1304A43

Date Reported: 5/23/2013

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Injection Well 2nd Qtr 4-24-13

Lab ID: 1304A43-001

Client Sample ID: Injection Well

Collection Date: 4/24/2013 10:15:00 AM

Received Date: 4/25/2013 9:10:00 AM

Result	RL (Qual	Units	DF	Date Analyzed	Batch
'					Analys	: RAA
ND	3.0		μg/L	2	4/29/2013 12:25:05 PM	R10192
85.4	70-130		%REC	2	4/29/2013 12:25:05 PM	R10192
88.3	69.5-130		%REC	2	4/29/2013 12:25:05 PM	R10192
81.0	70-130		%REC	2	4/29/2013 12:25:05 PM	1 R10192
84.6	70-130		%REC	2	4/29/2013 12:25:05 PM	R10192
					Analys	t: JML
5100	0.010		µmhos/cm	1	4/29/2013 6:42:20 PM	R10197
					Analys	t: JML
7.40	1.68	Η	pH units	1	4/29/2013 6:42:20 PM	R10197
					Analys	t: JML
490	20		mg/L CaCO3	1	4/29/2013 6:42:20 PM	R10197
ND	2.0		mg/L CaCO3	1	4/29/2013 6:42:20 PM	R10197
490	20		mg/L CaCO3	1	4/29/2013 6:42:20 PM	R10197
OLIDS					Analys	t: KS
3360	100	٠	mg/L	1	5/1/2013 3:31:00 PM	7222
	ND 85.4 88.3 81.0 84.6 5100 7.40 490 ND 490 SOLIDS	ND 3.0 85.4 70-130 88.3 69.5-130 81.0 70-130 84.6 70-130 5100 0.010 7.40 1.68 490 20 ND 2.0 490 20 SOLIDS	ND 3.0 85.4 70-130 88.3 69.5-130 81.0 70-130 84.6 70-130 5100 0.010 7.40 1.68 H 490 20 ND 2.0 490 20 SOLIDS	ND 3.0 μg/L 85.4 70-130 %REC 88.3 69.5-130 %REC 81.0 70-130 %REC 84.6 70-130 %REC 5100 0.010 μmhos/cm 7.40 1.68 Η pH units 490 20 mg/L CaCO3 ND 2.0 mg/L CaCO3 490 20 mg/L CaCO3	ND 3.0 μg/L 2 85.4 70-130 %REC 2 88.3 69.5-130 %REC 2 81.0 70-130 %REC 2 84.6 70-130 %REC 2 5100 0.010 μmhos/cm 1 7.40 1.68 Η pH units 1 490 20 mg/L CaCO3 1 ND 2.0 mg/L CaCO3 1 490 20 mg/L CaCO3 1	Analysi ND 3.0 μg/L 2 4/29/2013 12:25:05 PM 85.4 70-130 %REC 2 4/29/2013 12:25:05 PM 88.3 69.5-130 %REC 2 4/29/2013 12:25:05 PM 81.0 70-130 %REC 2 4/29/2013 12:25:05 PM 84.6 70-130 %REC 2 4/29/2013 12:25:05 PM Analysi 5100 0.010 μmhos/cm 1 4/29/2013 6:42:20 PM Analysi 7.40 1.68 Η pH units 1 4/29/2013 6:42:20 PM Analysi 490 20 mg/L CaCO3 1 4/29/2013 6:42:20 PM ND 2.0 mg/L CaCO3 1 4/29/2013 6:42:20 PM 490 20 mg/L CaCO3 1 4/29/2013 6:42:20 PM Analysi Analysi Analysi Analysi Analysi Analysi Analysi Analysi Analysi

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit Page 5

Page 5 of 17

- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

CASE NARRATIVE

May 21, 2013

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM

Project Tracking No.: 1304A43 Anatek Batch: 130430038

Project Summary: One (1) water sample was received on 4/30/2013 for RCI analysis. The sample was received

in good condition and with the appropriate chain of custody. The samples was received at 2.7C.

Client Sample ID

Anatek Sample ID Method/Prep Method

<u>Client Sample ID</u>

1304A43-001E / INJECTION

Anatek Sample ID

130430038-001

SW846 Ch7/EPA 1010/150.1

WELL

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Υ	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Υ	NA
Method Blank(s) Valid?	Υ	NA
Tune(s) Valid?	NA	NA
Internal Standard Responses Valid?	NA	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

1. Holding Time Requirements

No problems encountered.

2. GC/MS Tune Requirements

NA.

3. Calibration Requirements

No problems encountered.

4. Surrogate Recovery Requirements

NA.

5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

6. Method Blank Requirements

The method blanks were non-detect (<MDL) for all analytes. No problems encountered.

7. Internal Standard(s) Response Requirements

N/A

8. Comments

NA

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by:

Page 2 of 17

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Client: Address: HALL ENVIRONMENTAL ANALYSIS LAB

4901 HAWKINS NE SUITE D

ALBUQUERQUE, NM 87109

Attn:

ANDY FREEMAN

Batch #:

130430038

Project Name:

1304A43

Analytical Results Report

Sample Number

130430038-001

Sampling Date 4/24/2013

Date/Time Received 4/30/2013 12:18 PM

Sampling Time 10:15 AM

Client Sample ID Matrix 1304A43-001E / INJECTION WELL

Water

Sample Location

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	0.1	5/14/2013	CRW	SW846 CH7	
Flashpoint	>200	°F		5/10/2013	KFG	EPA 1010	
pН	7.28	ph Units		5/6/2013	AJT	EPA 150.1	
Reactive suifide	ND	mg/L	1	5/3/2013	AJT	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL

EPA's Maximum Contaminant Level

ND

Not Detected

PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated.

Soll/solid results are reported on a dry-weight basis unless otherwise noted.

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Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

130430038

Address:

4901 HAWKINS NE SUITE D **ALBUQUERQUE, NM 87109**

Project Name:

1304A43

Attn:

ANDY FREEMAN

Analytical Results Report Quality Control Data

Lab Control Sai	mple										
Parameter		LCS Resul	t Units	LCS	Spike	%Rec	AR	%Rec	Prep	Date	Analysis Date
Cyanide (reactive)		0.528	mg/L	. (0.65	105.6	80	-120	5/14/	2013	5/14/2013
Reactive sulfide		0.18	mg/L		D.2	90.0	80)-120	5/3/2	2013	5/3/2013
Lab Control Sa	mple Duplicate										
Parameter		LCSD Result	Units	LCSD	'%Rec	%RF	n 4	AR KRPD	Prep D	3-4a	Analysis Date
Reactive sulfide		0.16	mg/L	Spike 0.2	80.0	11.8		0-20	•	2013	5/3/2013
Matrix Spike											
Sample Number	Parameter		Sample Result	MS Result	Unit		MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
130501035-001	Reactive sulfide		ND	17.93	mg/L		эріке 20	89.7	70-130	5/3/201	
130430038-001	Cyanide (reactive)		ND	0.493	mg/l		0.5	98.6	80-120	5/14/201	
Matrix Spike Du	uplicate										
•		MSD	** **	MSD				AR	_		
Parameter		Result	Units	Spike	%R		4RPD	%RPD		p Date	Analysis Date
Cyanide (reactive)		0.481	mg/L	0.5	96	.2	2.5	0-25	5/1	4/2013	5/14/2013
Method Blank											
Parameter			Re	sult	Ųr	nits		PQL	P	rep Date	Analysis Date
Cyanide (reactive)			N	i D	m	g/L		0.1	5/1	14/2013	5/14/2013
Reactive sulfide			N	I D	m	g/L		1	5	/3/2013	5/3/2013

AR

Acceptable Range

ND

Not Detected

PQL

Practical Quantitation Limit

RPD

Relative Percentage Difference

Comments:

Certifications held by Anates Lisbs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anates Lisbs WA: EPA:WA00169; ID:WA00169; WA:C586; MT:Cert0095

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Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB

Order ID:

130430038

4901 HAWKINS NE SUITE D

Order Date:

4/30/2013

ALBUQUERQUE

NM

87109

Contact Name: ANDY FREEMAN

Project Name: 1304A43

Comment:

Sample #:	1304300	38-001	Customer Sample #:	1304A43-001E / INJECTION	WELL
Recv'd:	7	Co	llector:	Date Collected:	4/24/2013

Quantity:

Matrix:

Water

13

4/30/2013 12:18:00 PM Date Received:

Comment:

Test	Lab	Method	Due Date	Priority
CYANIDE REACTIVE	М	SW846 CH7	5/10/2013	Normal (6-10 Days)
FLASHPOINT	M	EPA 1010	5/10/2013	Normal (6-10 Days)
pН	M	EPA 150.1	5/10/2013	Normal (6-10 Days)
SULFIDE REACTIVE	M	SW846 CH7	5/10/2013	Normal (6-10 Days)

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	2.7
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1	OP: 1

130430 038 HALL Last 5/10/2013 1st SAMP 4/24/2013 1st RCVD 4/30/2013

SUB CC	NIRATOR: Anate	k Labs COMPANY:	Anatek Labs, Inc.		PEONE:	(208) 883-2839	FAX:	(208) 882-9246
ADDIKE	1282 A	Alturas Dr			ACCOUNT #:		email:	
CITY, 8	CATE, ZEP: Mosco	w, ID 83843						
ПЕМ	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	ollection date	# CONTAINENS	ANALYTICA	L COMMENTS
1	1304A43-001E	Injection Well	500PLNAOH	Aqueous 4/24/2	013 10:15:00 AM	2 RCI	MWB	

SPECIAL INSTRUCTIONS / COMMEN	13:									
Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.										
Relinquisted By:	Date: 425/2013 Time: 2:21 PM	ANATEK LABS RECEIVING LIST RECEIVED INTACT LABELS & CHAINS AGREE NO HEADSPACE	REPORT TRANSMITTAL DESURED: India cost) [] FAX [] EMAIL [] ONLINE							
Relinquished By:	Date: Time:	CUSTODY SEALS PRESENT PRESERVATIVES: Zinc Acetate No. 6 H	FOR LAB USE ONLY C Attempt to Coal ?							
TAT:	ard RUSSEI	NUMBER OF CONTAINERS: SHIPPED VIA: F. DATE & TIME: 4/30/13 12/18 INSPECTED BY: BT								

Total Cyanide by Semi-Automated ColorImetry Wethod: EPA 335.4\SM-4500-CN-E Distillation Bench Sheet

Weak Acid Dissociable Cyanide by SM 4500-CN-I (check WAD column)

Free Cyanide MS/MSD/LCS Soln:

M918-03 Exp:4/16/14 M918-04 Exp:4/17/14 Method requirements: All QC +/- 10%

Equipment: Midi-vap

Instrument: ALPCHEM FIA 3000

Absorbance: 570nm

	mple ID ಳೇ	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	130501008-	seil con	Nall	50mc	259	759		
2	-lms						lul	
3	-lmso				4_			
4	-45				1×	14	+	
5	170				X	*		
<u>6</u>	130422022-7				70	700		
7	30510075-1	4			109	109		
8	130508054-6				l×_	lx		
9	130509012-6							
10	130513012-2	WW	<u> </u>	4		4_		
<u>11</u>	130430038-1	reative in	Na011	50ml	-lx	ŀΧ		
12	-Ims			j		1	lunt	
13							1	
14							1	
15	BL	4						
<u>16</u>	130 508054 pm						lun(
17	-bis0	*					4-	
18	30510074-1	INN						
<u>19</u>							land	
20	* If poils this solaulation	4	4	transfer baseb at	4	4	1	

^{*} If soils this calculation is taken from cyanide extraction bench sheet.

^{**} If soils, mLs of extract used for distillation.

Extraction Reagents:	Reagent #:	Analytical Reagents:	Reagent #:
	A063-01	Barbituric Acid	R038-13
18 N H ₂ SO ₄	A065-02	Sodium Phosphate	R029-16
sulfamic acid	R068-19	Chloramine-t	R048-09
0.025N NaOH	R014-16	Pyridine	R043-03
51% MgCl₂	A063-03	•	

Distillation Initials/Date Distilled: 5/14/13

Analyst Initials/Date Analyzed M/ 5/19/13



Calibration Standards Preparation Form for Methods SM4500CN-E and **EPA 335.4**

The following sample sequences have been analyzed using the standard information below on the FIA FS3000:

Cn- (Simple Cyanide) Calibration Stock Standard Number: M889-04

Cn-(Simple Cyanide) Calibration Stock Standard Concentration: 1000 ug/ mL Cn- (Simple Cyanide) Calibration Stock Standard Expiration Date: 10/31/2013

Cn- (Total Cyanide) Matrix Spiking Standard Number: M918-03

Cn- (Total Cyanide) Matrix Spiking Standard Concentration: 25 ug/ mL Cn- (Total Cyanide) Matrix Spiking Standard Expiration Date: 04/16/2014

Cn- (Simple Cyanide) Initial Calibration Verification Stock Standard Number: M898-01

Cn- (Simple Cyanide) Initial Calibration Verification Stock Standard Concentration: 1000 ug/ml Cn- (Simple Cyanide) Initial Calibration Verification Stock Standard Expiration Date: 12/26/2013

Initial Calibration Dilution Template

Desired Concentration (ppb)	Stock Concentration (ppm)	uL Standard Added	Final Volume (mL)
1000	1000	100	100
800	1000	40	50
500 (CCV)	1000	50	100
50*	1.0	2500	50
10*	1.0	500	50

^{* 50} and 10 ppb calibration standard prepared using 1.0 ppm calibration standard.

Initial Calibration Verification Dilution Template (ICV)

Tarrest Course and Course	THE TOTAL STATE OF THE PARTY OF	MANON TATTANDO	
Desired Concentration (ppb)	Stock Concentration (ppm)	uL Standard Added	Finai Volume (mL)
250	1000	25	100

Total Cyanide MS/MSD/LCS prepared by adding 1 mL of M918-03 to 50 mL sample. WAD Cyanide MS/MSD/LCS prepared by adding 1 mL of M918-04 to 50 mL sample.

Analysts Initials/Date: 4/50/15

Analysts Initials/Date: 5/14/13

Pipettes: A04003282

2751528/2752498

'ile name: T:\DATA1\FLOW4\2013\EPA335.4\051413CM.RST 'ate: May 14, 2013 'perator: CRW

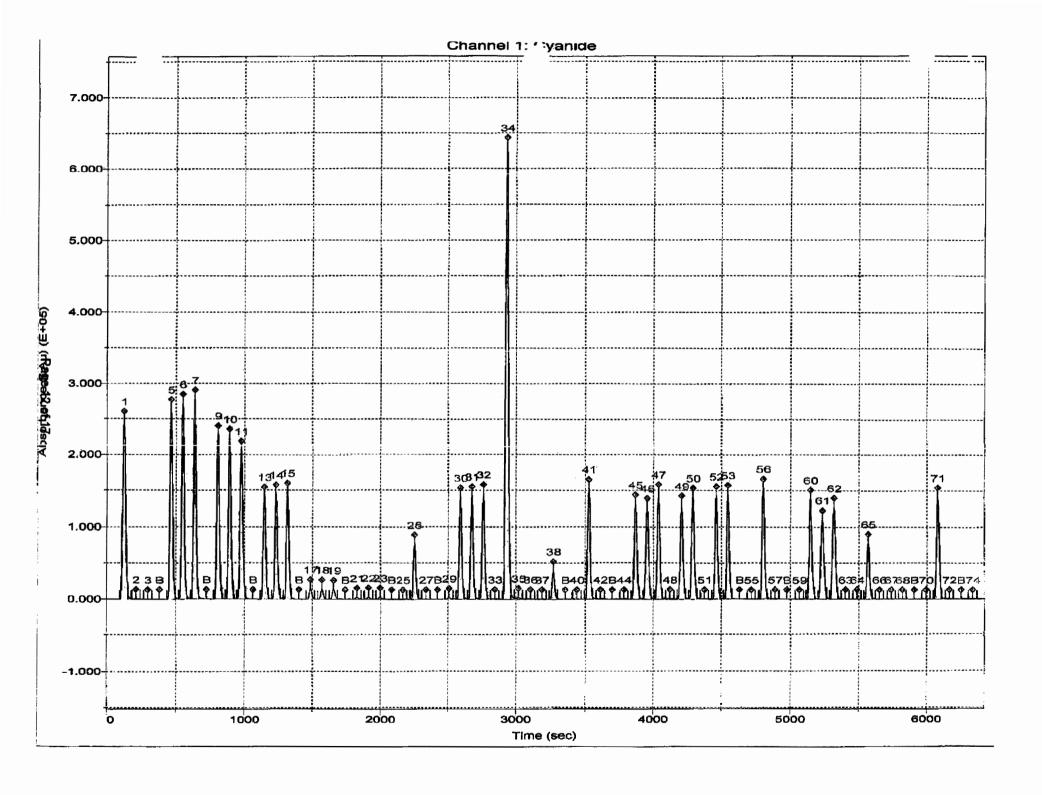
DMW 5-15-13

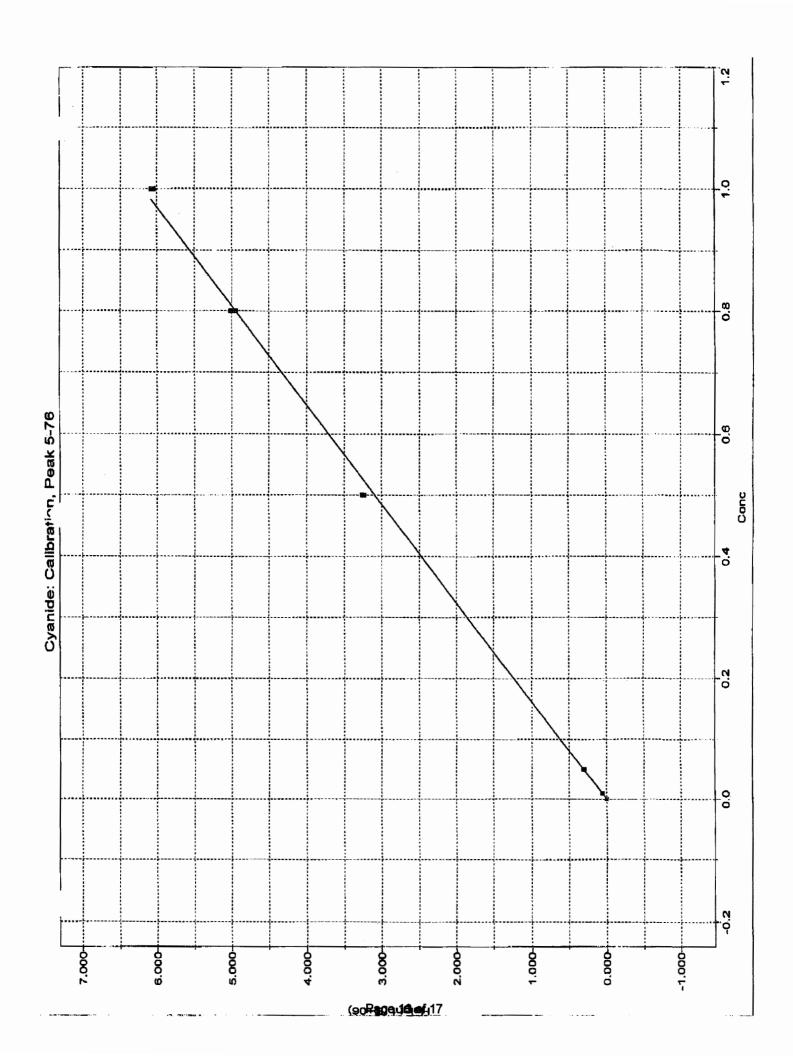
Perc	acor.	CKW		VVV	>			
'¢	Cup	Name	Type	Dil Wt		Area	Calc. (ppm)	
	2	Sync	SYNC	1	1	6038980	0.976643	
	0	Carryover	co	ī	ī	18010	0.003511	
,	ō	Carryover	co	ī	ĩ	2575	0.001016	
;	0	Baseline	RB	ī	ī	-1881	0.000296	
,	2	Cal 1.00 ppm	С	1	ī	6044285	0.977500	
;	2	Cal 1.00 ppm	С	1	1	6066860	0.981149	
,	2	Cal 1.00 ppm	Ċ	ī	1	6074882	0.982445	
3	0	Baseline	RB	1	1	-2392	0.000214	
1	3	Cal 0.80 ppm	C	1	1	4942340	0.799399	
. 0	3	Cal 0.80 ppm	С	1	1	4946887	0.800135	
.1	3	Cal 0.80 ppm	С	1	1	5011107	0.810514	
\$	0	Baseline	RB	1	1	429	0.000669	
.3	4	Cal 0.50 ppm	C	1	1	3235292	0.523500	
.4	4	Cal 0.50 ppm	С	1	1	3234827	0.523425	
.5	4	Cal 0.50 ppm	С	1	1	3256325	0.526900	
3	0	Baseline	RB	1	1	-552	0.000511	
.7	5	Cal 0.05 ppm	С	1	1	300741	0.049207	
.8	5	Cal 0.05 ppm	C	1	1	299279	0.048971	
. 9	5	Cal 0.05 ppm	С	1 .	1	304102	0.049750	
3	0	Baseline	RB	1	1	-224	0.000564	
!1	6	Cal 0.01 ppm	¢	1	1	58197	0.010006	
:2	6	Cal 0.01 ppm	С	1	1	57781	0.009939	
:3	6	Cal 0.01 ppm	С	1	1	58574	0.010067	
3	0	Baseline	RB	1	1	-308	0.000550	
?5	1	Blank	BLNK	1	1	-1103	0.000422	
<u></u> 6	7	ICV 0.25 ppm	CCA	1	1	1652560	0.267693	
:7	1	Blank	BLNK	1	1	-290	0.000553	
3	0	Baseline	RB	1	1	897	0.000745	
2:	8	130501028-001	Ü	259	1	38284	1.758032	
30	9	130501028-001MS		259	1_	3088314	129.433945	
31	10	130501028-001MS		259	, 1			
32	11 12	130501028-LCS	Ü	1	1	3260699	0.527606	
33 34	13	130501028-BL	Ü	1	1	3.377	0.001146	delitional
35	14	130422022-007	U U	20 109	1 1	14952298	48.344933 A 0.594545 0.001843	100
36	15	4 130508054-006	Ü			30035 7690	0.594545	WX,
37	16	130509042-006	Ü	1 1	1 1	914	0.001843	below
38	17	3 130513012-002	ΰ	1	ī	824775	0.133903	
3	ő	Baseline	RB	i	ī	-79	0.000587	
10	ĭ	Blank	BLNK		ī	-944	0.000448	
11	4	CCV 0.5 ppm	CCV	ī	ī	3311329	0.535790	
12	1	Blank	BLNK	ī	ī	-2419	0.000209	
3	ō	Read Baseline	RB	ī	ī	-814	0.000469	
14	18	130430038-001 Q		1	1	4148	0.001270	
15	19	130430038-001MS		ī	1	3043535	0.492508	
16	20	130430038-001MSI	ט כ	1	1		5 0.480835	
17	21	130430038-LCS	υ	1	1	3261260	0.527697	
18	22	130430038-BL	υ	1	1	-1539	0.000351	
19	23	√130508054-006MS	ΝĎ	1	1	3000574	0.485564	
50	24	√130508054-006MS		1	1	319824	2 0.517512	
51	25	-130510074-001 NA	/ ซ	ļ	1	-7577	-0.000625	
52	26	130510074-001Ms		1	1	3073429	0.497339	
53	27	130510074-001MS		1	1		5 0.492155	
3	0	Baseline	RB	1	1	-1660	0.000332	
55	1	Blank	BLNK		1	-5872	-0.000349	
56	4	CCV 0.5 ppm	CCV	1.	1	3256631	0.526949	
57	1	Blank	BLNK	1	1	-4282	-0.000092	
3	0	Read Baseline	RB	1	1	-899	0.000455	
5 !	28	130510079-001 F		1.1	1	-2333	0.000245	
56	29	130510079-001MS		1.1	1	3130370	0.557196	
61	30	130510079-001MSI		1.1	1			
62	31	130510079-LCS	U	1	1	3273632	0.529697	
63	32	130510079-BL	U	1	1	-1264	0.000396	_
64	33	130513014-001	Ŭ	1.1	1	1884	0.000995	
65	34	\$130422022-007	Ü	200	1	1775712	57.519485	
66	35	R	Ü	1	1	-1877	0.000297	

sak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
		~~~~~					
7	36	R	Ü	1	1	-236	0.000562
3	37	R	Ü	. 1	1	-552	0.000511
	0	Baseline	RB	1	1	-803	0.000470
	1	Blank	BLNK	1	1	-2064	0.000266
1	4	CCV 0.5 ppm	CCV	1	1	3305444	0.534838
2	1	Blank	BLNK	1	1	-5046	-0.000215
	0	Read Baseline	RB	1	1	-257	0.000559
4	38		U	1	1	-2169	0.000250

eak 	Cup	Flags
	200022203330444055506660171	BL
	2 0 3	BL
3	3 0 4	BL
3 4 5	4 4 0 5	BL .
8 9 :	5 5 0 6	BL
2 3 5 6 7	6 6 0	BL
	8	BL
0 1 2	9 10 11 12	
9 0 1 2 3 4 5 6 7 8	13 14 15 16	HI FL FL
8 0 1 2	17 0	BL
	1 4 1 0 18 19	BL
4 5 6 7 8 9 0 1 2 3	20 21 22	
9 0 1 2	23 24 25 26	LO
3 5 6 7	27 0 1	BL LO
7	4 1 0	LO BL

> 1-	~~~	E1
?eak	Cup	Flags
<b>5</b> 9	28	
5.0	29	
51	30	
52	31	
53	32	
54	33	
55	34	
56	35	
\$7	36	
38	37	
3	0	BL
10	1	
71	4	
12	1	ro
3	0	BL
14	38	





guntaer outspiction, seak o to

ile name: T:\DATA1\FLOW4\2013\EPA335.4\051413CM.RST ate: May 14, 2013 perator: CRW

me		Conc	Area	
Cal	1.00	ppm	1.000000	6044285.000000
Cal	1.00	ppm	1.000000	6066860.000000
Çal	1.00	ppm	1.000000	6074881.500000
Cal	0.80	ppm	0.800000	4942339.500000
Cal	0.80	ppm	0.800000	4946887.000000
Cal	0.80	ppm	0.800000	5011107.000000
Cal	0.50	ppm	0.500000	3235291.750000
Cal	0.50	ppm	0.500000	3234827.000000
Cal	0.50	ppm	0.500000	3256325.250000
Cal	0.05	ppm	0.050000	300741.343750
Çal	0.05	ppm	.0.050000	299278.562500
Çal	0.05	ppm	0.050000	304102.375000
Cal	0.01	ppm	0.010000	58197.007812
Cal	0.01	mqq	0.010000	57780.523438
Çal	0.01	mqq	0.010000	58574.269531

Calib Coef:

y=bx+a

a: (intercept) -3.7130e+03 b: -3.7130e+03 b:

0.999387 Corr Coef:

Carryover: 0.298%

No Drift Peaks

### Flashpoint Analysis

### Sample Matrix - Soil (1), Sludge (2), Oil (3), Water (4), Other (5)

	Sample ID	Analyses	Sample	Analyst	Temp - °C	Temp - °F
į		Date	Matrix	Initials		
	30306001001	3/8/2013	Linuid 5	Wa		<50°F
İ	13031200	013/14/13	Liquid/5	Mu		<50° F
	30322014-01		0:4/3	Mh		179°F
i	130327135-001	3/27/13	H20/4	in		7200F
	-002	<u></u>				
	130327025-001	3/28/2013	H201.4	M		>200°F
	130727026-001	3/29/2013	4			7200°F
	130728040-001		4.0/4	Wh		> 2000 =
	130-101026-001	4/11/2013	450/4	nen		>200°F
	130415008-001	4/15/2013	H50/4	nen		7200P
	13041603100	2/4/23/13	4014	mn		72000F
ı	13042602000	4/39/13	420/4	The		7200°F
l	<del>-</del> 202	+	٠,	1		7200°F
1	30971038-002	5/7/13	higaid/5	Me		>3000£
ŀ	-003		8			150°E
-[	-004					4442 E < 304
	-008					155°F
1	-009					177°F
-	-010		. +	4		53°₽
l	13043004500	5/10/13	Liquid/5	M		>200 E
]	36130038-01		H20/4	- I		>250°F
	130510076-00	5/15/13	lighted /5	Mr.		147°F
1			/	•		
ļ						
1						
Į						

^{*} SAFETY GLASSES RÉQUIRED.

Reagent	Solution #	Expires	Method QC F	Requirements:
pH Buffer 4 (Red)	M854-01	Sep-13	pH 7 within 0.1 pH units	LFB/Blank every 10 .
pH Buffer 7 (Yellow)	M854-02	Dec-13	Slope 95-102%	MS/MSD Every 20
pH Buffer 10 (Blue)	A055-04	Jan-14		% Recovery 85-115%
0.02N H2SO4 Titrant	A055-03	Nov-13		

Standard	Solution #	Conc.	Expires	Amount Spiked (mg/L)			
Matrix Spike Solution M891-01 1N 11/1/2013 100 (0.189 mL)							
Contriburette: CAT 10uL, sn 600055 - pH Meter: Orion Model 420A, sn 007858							

								Titrar	t vol to p	H (mL)		Alkalin	ity (mg/l	_)	
Sample	Temp (°C)	pН	pH 4 Cal	pH 10 Cal	Slope	pH 7 Buffer	Sample Vol. (mL)	A 8.3	B 4.5	C 4.2	Total	Carbonate	Bi- carbonate	Hydroxide	%
13050227-001	23.3	6.566	4,51	الإحت.	10250	7.10									
ځىد-	24.4	6.91													
_5ءد-	24.08	6,14	<u> </u>	<u> </u>											
130430036-001	11.8	7.73													
13,2507,72,026,003	24.0	7.93					_								
		<u> </u>	<u> </u>				na Ministration Princip								
						*									
										·					

Analysis Date: 5-6-2013	Analyst: AST
-------------------------	--------------

### Sulfide by SM 4500-S² F

	Expires
Iodine 0.025 N (R069-16)	Daily
HCl 6N (R066-09)	Daily
Starch Indicator 1% (A057-04)	1/11/2014
Zinc Acetate (R069-15)	1/11/2018

### **Quality Control Information**

- 1. 1 blank per batch, must be < 20 ug/L.
- 2. 1 LFB per batch must be +/- 30%.
- 3. 50  $\mu L$  iodine reacts with 0.02 mg Sulfide Spike Standard Number:

	Sample	Sample Volume	lodine amount (50 µL incremen ts)	Concentration (mg/sample)	Concentration (mg/L)	Spike Amt	Date	% Recovery	Initials
	13が50で0できーコロー(四・5月)	523 00	100	0,04	0.0705		5/3/13		AST
ٳ؞ۣ	130502017-001 ms 8.548 -003 ms 0.535	40ml	100	୭.୭ଫ୍ର	DS. 19.5 = 16.6				
	130502017-001 mi 8.548	5 m4 (15 to 1)	3400	0.14	28 24 x 0544 = 15.34				
7 of	- D 3 7 m = 0.535	5m/ PSx10	250	وا.ه.	20 2-0 x0,535 = 10.70				
7	. 205 ma 0, 447	5mc (10x H)	450	0.15	36 56=0.497=17.89				
·	130450038-201	42797 m2	<b>8</b> 50	0.34	0.4113				
	1305 0103 100) ms 5,01	50mc	150	0.00	2.8 44.01 =4.00%				
	033 ->1 m: 6.04	50m2	50	2 DX	04 = 5.04 > 2.03				
	034-421 m=4.936	50ml	מיסו	<u> </u>	०% ५ धमद्र ३,५४				
	03-5-33/ M= 4.98	Sonk	50		DH 4+1.995=1.99				
	535- wins 1	50mL	450		36 24.99 = 17.93	209.2		89.7%	
	- (5B	1000mL	450	0.14	0.1%	200		90%	
	- L F B D		400	016	0.16	_L	l	50%	

Comments forms Janusein 5/4/2013

#### **CASE NARRATIVE**

May 21, 2013

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com FL NELAP

E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM

Project Tracking No.: 1304A43 Anatek Batch: 130430038

Project Summary: One (1) water sample was received on 4/30/2013 for RCI analysis. The sample was received

in good condition and with the appropriate chain of custody. The samples was received at 2.7C.

Client Sample ID

Anatek Sample ID Method/Prep Method

1304A43-001E / INJECTION

130430038-001

SW846 Ch7/EPA 1010/150.1

WELL

#### **QA/QC Checks**

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA.
QC Sample(s) Recoveries Valid?	Y	NA ^r
Method Blank(s) Valid?	Υ	NA
Tune(s) Valid?	NA	NA.
Internal Standard Responses Valid?	NA	NA.
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA.
Comments:	Y	NA

#### 1. Holding Time Requirements

No problems encountered.

#### 2. GC/MS Tune Requirements

NA.

#### 3. Calibration Requirements

No problems encountered.

#### 4. Surrogate Recovery Requirements

NA.

#### 5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

<ol><li>Method Blank Requirement</li></ol>	i tra

The method blanks were non-detect (<MDL) for all analytes. No problems encountered.

#### 7. Internal Standard(s) Response Requirements

N/A

#### 8. Comments

NA

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by:

Page 2 of 17

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D · Spokane WA 99202 · (509) 838-3999 · Fax (509) 838-4433 · email spokane@anateklabs.com

**Client:** 

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

130430038

Address:

4901 HAWKINS NE SUITE D

**Project Name:** 

1304A43

Sampling Time 10:15 AM

ALBUQUERQUE, NM 87109

Attn:

ANDY FREEMAN

#### **Analytical Results Report**

Sample Number

130430038-001

Sampling Date 4/24/2013 Date/Time Received 4/30/2013 12:18 PM

Client Sample ID Matrix

1304A43-001E / INJECTION WELL Water

Sample Location

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifler
Cyanide (reactive)	ND	mg/L	0.1	5/14/2013	CRW	SW846 CH7	
Flashpoint	>200	°F		5/10/2013	KFG	EPA 1010	
pH	7.28	ph Units		5/6/2013	AJT	EPA 150.1	
Reactive sulfide:	ND	mg/L	. 1	5/3/2013	AJT	SW846 CH7	

**Authorized Signature** 

John Coddington, Lab Manager

MCL

EPA's Maximum Contaminant Level

ND

Not Detected

PQL

Practical Quartitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.

The results reported relate only to the samples indicated.

Soil/solid results are reported on a dry-weight basis unless otherwise noted.

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Client: Address: HALL ENVIRONMENTAL ANALYSIS LAB

4901 HAWKINS NE SUITE D

**ALBUQUERQUE, NM 87109** 

Attn:

ANDY FREEMAN

Batch #:

130430038

Project Name:

1304A43

## Analytical Results Report Quality Control Data

Lab Control Sam	ple										
Parameter		LCS Result	Units	LCS	Spike	%Rec	AR	%Rec	Prep	Date	Analysis Date
Cyanide (reactive)		0.528	mg/L	(	).5	105.6	80	-120	5/14/	2013	5/14/2013
Reactive sulfide		0.18	mg/L	(	0.2	90.0	80	)-12 <b>0</b>	5/3/2	2013	5/3/2013
Lab Control Sam	nple Duplicate										
Parameter		LCSD Result	Units	LCSD	%Rec	%R	<b>DD</b> •	AR %RPD	Prep E	leta /	Analysis Date
Reactive sulfide		0.16	mg/L	<b>Spike</b> 0.2	80.0	11	•	0-20	5/3/2		5/3/2013
Treactive surface		0.10	mg/L	U.E					0,0,0		0.0.2010
Matrix Spike											
Sample Number	Parameter		Sample Result	MS Result	Unit		MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
•	Reactive sulfide		ND	17.93	mg/L	-	20	89.7	70-130	5/3/201	•
	Cyanide (reactive)		ND	0.493	mg/l		0.5	98.6	80-120	5/14/2013	5/14/2013
Matrix Spike Duj	pilcate										
•		MSD		MSD				AR	_		
Parameter		Result	Units	Spike	%R		%RPD	,,,,		p Date	Analysis Date
Cyanide (reactive)		0.481	mg/L	0.5	96	.2	2.5	0-25	5/1	4/2013	5/14/2013
Method Blank				= = -							_
Parameter			Re	sult	Ur	ılts		PQL	P	rep Date	Analysis Date
Cyanide (reactive)			N	<b>I</b> D	m	g/L		0.1	5/1	14/2013	5/14/2013
Reactive suffice			N	<b>I</b> D	m	g/L		1	5	/3/2013	5/3/2013

AR

Acceptable Range

ND

Not Detected

PQL

Practical Quantitation Limit Relative Percentage Difference

Comments:

Certifications held by Anatak Labs ID: EPA:D00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C695 Certifications held by Anatak Labs WA: EPA:WA00169; ID:WA00169; WA:C586; MT:Cert0096

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#### Login Report:

NM

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB

Order ID:

130430038

4901 HAWKINS NE SUITE D

**Order Date:** 

4/30/2013

**ALBUQUERQUE** 

87109

**Contact Name: ANDY FREEMAN** 

Project Name: 1304A43

Comment:

Sample #:

130430038-001 Customer Sample #:

1304A43-001E / INJECTION WELL

Recvid:

Collector:

Date Collected: 4/24/2013

Quantity:

Matrix: Water **Date Received:** 

4/30/2013 12:18:00 PM

Comment:

Test	Lab	Method	Due Date	Priority
CYANIDE REACTIVE	М	SW846 CH7	5/10/2013	Normal (6-10 Days)
FLASHPOINT	M	EPA 1010	5/10/2013	Normal (6-10 Days)
рH	М	EPA 150.1	5/10/2013	Normal (6-10 Days)
SULFIDE REACTIVE	М	SW846,CH7	5/10/2013	Normal (6-10 Days)

#### SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	2.7
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

#### HALL ENVIRONMENTAL ANALYSIS LABORATORY

### CHAIN OF CUSTODY RECORD

PAGE:	OF-
1	· 1
1 1	ı

130430	038 HALL Last	⁶ 5/10/2013
I ISI SWIEP	4/24/2013 1st RCV	4/30/2012
1304A43		W0012013

SUB CC	NTRATOR: Anato	k Labs COMPANY:	Anatek Labs, Inc.		PHONE:	(208) 883-2839	7AX:	(208) 882-9246
ADDRE	ss: 1282 /	Alturas Dr			ACCOUNT #:		RMAÎL:	
CITY, 8	TATE, ZIP: Mosci	ow, ID 83843						
пем	SAMPLE	CLIENT SAMPLE ID	9OTTLE TYPE	MATRIX	OLLECTION DATE	D CONTAINERS	ANALYTICA	AL COMMENTS
1	1304A43-001E	Injection Well	500PLNAOI	Aqueous 4/24/2	013 10:15:00 AM	2 RCI	MWB	

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.							
Referented By:	Date: 4/25/2013	Time:	ANATEK LABS RECEIVING LIST RECEIVED INTACT LABELS & CHAINS AGREE	REPO	RT TRANSMIT	TAL DESTRED:	·
Relinquished By:  Relinquished By:	Dute:	2:21 PM	NO HEADSPACE  ICE / ICE - PACKS PRESENT  CUSTODY SEALS PRESENT	extra cost)	[] PAX POR LAB USE	CNLY	① ONLINE
	and D	RUSH	PRESERVATIVES: Zinc Acetate Na 6H	<del></del>	с	Attempt to Cool ?	
	<u> </u>		NUMBER OF CONTAINERS: SHIPPED VIA: T  DATE & TIME: 4/30/73 12/18 INSPECTED BY: 8 T		· · · · · · · · · · · · · · · · · · ·		

# Total Cyanide by Semi-Automated Colorimetry Method: EPA 335.4\SM-4500-CN-E Distillation Bench Sheet

Weak Acid Dissociable Cyanide by SM 4500-CN-I (check WAD column)

Total Cyanide MS/MSD/LCS Soln: Free Cyanide MS/MSD/LCS Soln:

M918-03 Exp:4/16/14 M918-04 Exp:4/17/14 Method requirements: All QC +/- 10%

Equipment: Midi-vap

Instrument: ALPCHEM FIA 3000

Absorbance: 570nm

	mple ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	130501028-1	soil en	Null	50mc	257	759		
2		,					[ml	
3	-lmso				₹ <u> </u>		1	
4	-W5				×	14	1	
5	150				1	¥_		,
6	130422022-7				70	100		
7	130510075-1	14			100	109		
8	130508054-t	1 0000			l×_	!x		
9	130513012-6 130513012-2	4						
10	130513012-2	WW	₹	المحراج ا	¥	4		
11	130430038-1	reactive un	NABH	50ml	lx.	ŀΧ		100.000
12	-Ims		, ,	ļi		1	line	
13	-lons1						1 1	
14	WS						1	
15	BL	+						
16		dw					tmC	
17	-6180						+	
18	30510074-1	ININ						
19	Ims						lone	
20	-limoco	4	4	1	4	4	,4	

^{*} If soils this calculation is taken from cyanide extraction bench sheet.

^{**} If soils, mLs of extract used for distillation.

Extraction Passantus	Because #	Anabitlant Bassantas	Bassant #
Extraction Reagents:		Analytical Reagents:	Reagent #:
methyl red indicator	A063-01	Barbilluric Acid	R038-13
18 N H ₂ SO ₄	A065-02	Sodium Phosphate	R029-16
sulfamic acid	R068-19	Chloramine-t	R048-09
0.025N NaOH	R014-16	Pyridine	R043-03
51% MgCl ₂	A063-03		

Distillation Initials/Date Distilled: 5/14/13

Analyst Initials/Date Analyzed M/ 5/14/13



#### Calibration Standards Preparation Form for Methods SM4500CN-E and **EPA 335.4**

The following sample sequences have been analyzed using the standard information below on the FIA FS3000:

Cn- (Simple Cyanide) Calibration Stock Standard Number: M889-04

Cn-(Simple Cyanide) Calibration Stock Standard Concentration: 1000 ug/ mL Cn- (Simple Cyanide) Calibration Stock Standard Expiration Date: 10/31/2013

Cn- (Total Cyanide) Matrix Spiking Standard Number: M918-03

Cn- (Total Cyanide) Matrix Spiking Standard Concentration: 25 ug/ mL Cn- (Total Cyanide) Matrix Spiking Standard Expiration Date: 04/16/2014

Cn- (Simple Cyanide) Initial Calibration Verification Stock Standard Number: M898-01

Cn- (Simple Cyanide) Initial Calibration Verification Stock Standard Concentration: 1000 ug/ml Cn- (Simple Cyanide) Initial Calibration Verification Stock Standard Expiration Date: 12/26/2013

**Initial Calibration Dilution Template** 

Desired Concentration (ppb)	Stock Concentration (ppm)	uL Standard Added	Final Volume (mL)
1000	1000	100	100
800	1000	40	50
500 (CCV)	1000	50	100
50*	1.0	2500	50
10*	1.0	500	50

^{* 50} and 10 ppb calibration standard prepared using 1.0 ppm calibration standard.

Initial Calibration Verification Dilution Template (ICV)

Antial Campiation Volumention District Available (10 1)								
Desired Concentration (ppb)	Stock Concentration (ppm)	ul. Standard Added	Final Volume (mL)					
250	1600	25	100					

Total Cyanide MS/MSD/LCS prepared by adding 1 mL of M918-03 to 50 mL sample. WAD Cyanide MS/MSD/LCS prepared by adding 1 mL of M918-04 to 50 mL sample.

Standard Prep Date: 4/30/13

Analysts Initials/Date: 5/14/17

Pipettes: A04003282

2751528/2752498

'eak table: Cyanide

5-1-117

'ile name: T:\DATA1\FLOW4\2013\EPA335.4\051413CM.RST Date: May 14, 2013 Operator: CRW

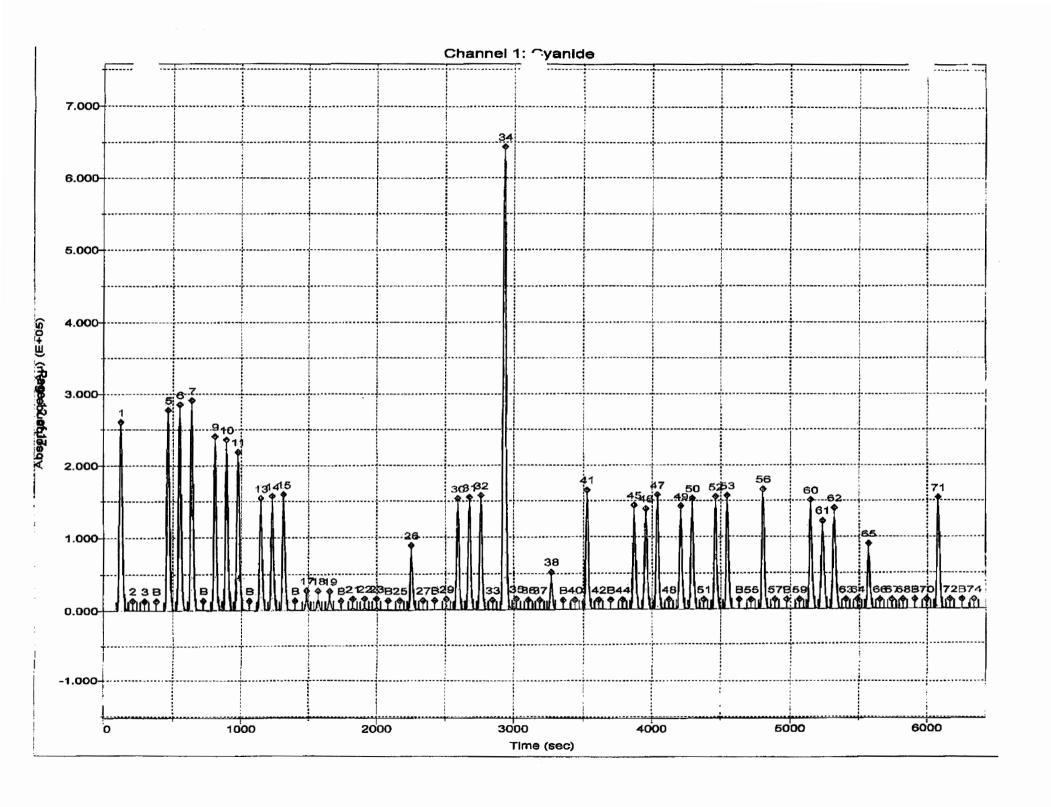
DW 5-15-13

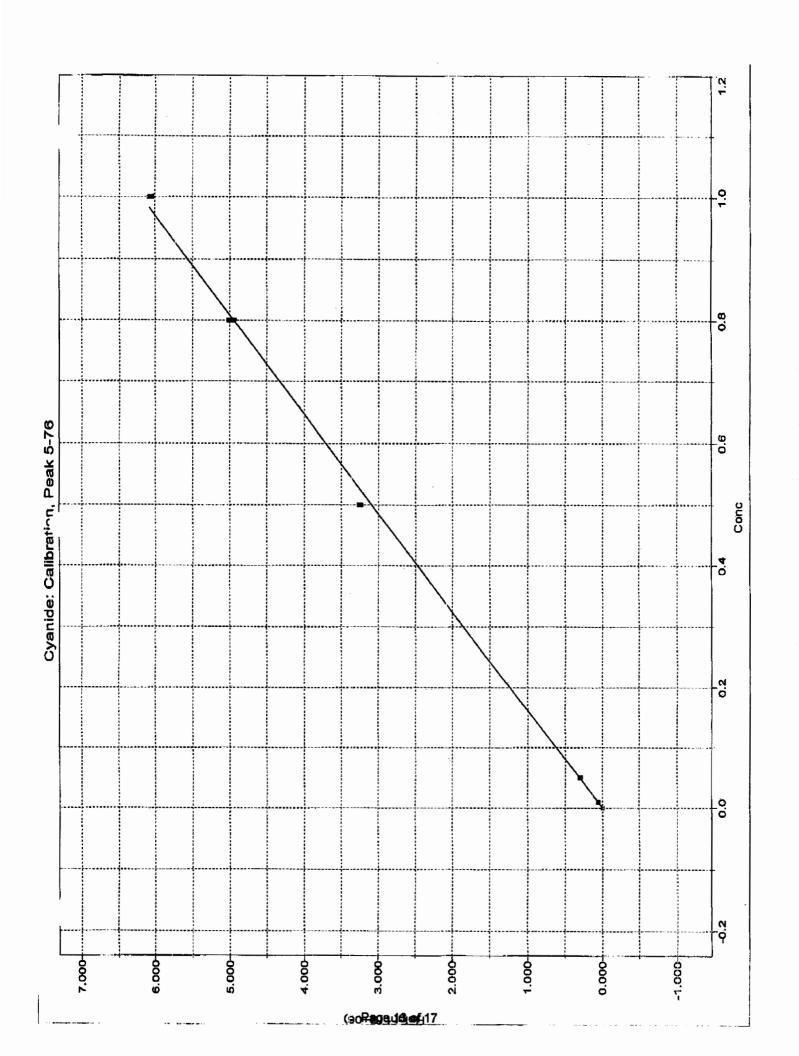
				VVV					
,(	Cup	Name	Type	Dil Wt	A	Area	Calc.	(ppm)	
	2	Sync	SYNC	1	1	6038980		0.976643	
,	ō	Carryover	CO	i		18010		0.003511	
į	ŏ	Carryover	co	1	1	2575		0.003311	
3	ŏ	Baseline	RB	i	i	-1881		0.000296	
í	2	Cal 1.00 ppm	C	i	ī	6044285		0.977500	
;	2	Cal 1.00 ppm	č	ī	1	6066860		0.981149	
,	2	Cal 1.00 ppm	Ç	i	1	6074882		0.982445	
3	ō	Baseline	RB	ī	1	-2392		0.000214	
)	3	Cal 0.80 ppm	Ç	î	ī	4942340		0.799399	
. 0	3	Cal 0.80 ppm	č	ī	ī	4946887		0.800135	
.1	3	Cal 0.80 ppm	C	ī	ī	5011107		0.810514	
3	0	Baseline	RB	1	1	429		0.000669	
.3	4	Cal 0.50 ppm	C	1	1	3235292		0.523500	
.4	4	Cal 0.50 ppm	C	1	1	3234827		0.523425	
.5	4	Cal 0.50 ppm	С	1	1	3256325		0.526900	
3	0	Baseline	RB	1	1	-552		0.000511	
.7	5	Cal 0.05 ppm	C	1	1	300741		0.049207	
.8	5	Cal 0.05 ppm	C	1	1	299279		0.048971	
.9	5	Cal 0.05 ppm	С	1	1	304102		0.049750	
3	0	Baseline	RB	1	1	-224		0.000564	
?1	6	Cal 0.01 ppm	C	1	1	58197		0.010006	
22	6	Cal 0.01 ppm	C	1	1	57781		0.009939	
23	6	Cal 0.01 ppm	C	1	1	58574		0.010067	
3	О	Baseline	RB	1	1	-308		0.000550	
?5	1	Blank:	BLNK	1	1	-1103		0.000422	
26	7	ICV 0.25 ppm	CCA	1	1	1652560		0.267693	
27	1	Blank:	BLNK	1	1	-290		0.000553	
3	0	Baseline	RB	1	1	897		0.000745	
2:	8 ~	130501028-001	Ü	259	1	38284		1.758032	
30	9	130501028-001MS		259	1	3088314		.29.433945	
31	10	130501028-001MS		259	1	310250	5	130.028030	
32	11	130501028-LCS	U	1	1	3260699		0.527606	
33	12	130501028-BL	Ü	1	1	3377		0.001146_	additional
34		130422022-007	Ü	20	1	14952298		48.344933	and invited
35		130510075-001	Ü	109	1	30035		0.594545	WK,
36	15	130508054-006	Ū	1	1	7690		0.001043	below
37 38	16	£ 130509042-006	Ü	1	1	914		0.000748	•
3	17 0	130513012-002 Baseline	Ü	1 1	1	824775		0.133903	
10	1	Blank	RB BLNK	1	1 1	-79 -944		0.000587	
11	4	CCV 0.5 ppm	CCV	1	1	3311329		0.000448	
12	1	Blank	BLNK	i	î	-2419		0.535790 0.000209	
3	ō	Read Baseline	RB	i	ī	-814		0.000209	
14	18	130430038-001 L		î	ī	4148		0.001270	
45	19	130430038-001MS		ī	ī	3043535		0.492508	
46	20	130430038-001MS		~ ₁	1	297131	5	0.480835	
47	21	130430038-LCS	ับ	1	1	3261260		0.527697	
48	22	130430038-BL	Ü	ī '	1	-1539		0.000351	
49	23	√130508054-006MS		ī	ī	3000574		0.485564	
50	2.4	√130508054-006MS		_ 1	1	319824	2	0.517512	
51		4130510074-001 NA		1	1	-7577		-0.000625	
52	26	130510074-001MS	ับ	1	1	3073429		0.497339	
53	27	130510074-001MS	ט ס	1	1	304135	5	0.492155	
В	0	Baseline	RB	1	1	-1660		0.000332	
55	1	Blank	BLNK	1	1	-5872		-0.000349	
56	4	CCV 0.5 ppm	CCV	1	1	3256631		0.526949	
57	1	Blank	BLNK	1	1	-4282		-0.000092	
₿	0	Read Baseline	RB	1	1	-899		0.000455	
5!	28	130510079-001 F	Ü	1.1	1	-2333		0.000245	
66	2.9	130510079-001MS	U	1.1	1	3130370		0.557196	
61	30	130510079-001MS	ט ס	1.1	1	279248	2	0.497125	
62	31	130510079-LCS	Ü	1	1	3273632		0.529697	
63	32	130510079-BL	U	1	1	-1264		0.000396	
64	33	130513014-001	U	1.1	1	1884		0.000995	
65	34	<b>∮</b> 130422022-007	ט	200	1	1775712		57.519485	
66	35	R	U	1	1	-1877		0.000297	

eak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
7	36	R	U	1	1	-236	0.000562
8	37	R	U	1	1	-552	0.000511
	٥	Baseline	RB	1	1	-803	0.000470
1	1	Blank	BLNK	1	1	-2064	0.000266
1	4	CCV 0.5 ppm	CCV	1	1	3305444	0.534838
2	1	Blank	BLNK	1	1	-5046	-0.000215
	0	Read Baseline	RB	1	1	-257	0.000559
4	38		U	1	1	-2169	0.000250

226	Cun	Flagg
eak 	Cup	Flags
	2	
	o o	
	0 2	BL
	2	
	0	BI,
^	3	
0 1	3	
	0	BL
3 4 5	4	
5	4	DT
7	5	BL
7 8 9	5	
	0	BL
2	6	
2 3 5 6 7	000222033304440555066601	
5	0 1	BL
6	7	
7	1 0	BL
9	.8	
1	9 10	
9 0 1 2 3 4	1.1	
4	12 13	ні
5 6	14 15	FL FL
7	16	211
8	1.7 0	BI.
0	1	
1 2	4 1	
i 4	0 18	BL
5	19	
6 7	20 21	
8	22	
9	23 24	
.1	25	LO
₁2 ₁3	26 27	
3	0	BL
5 6	1 4	LO
i7	1	LO
}	0	BL

'eak	Cup	Flags
. – –		
i 9	28	
50	29	
51	30	
32	31	
<b>3</b> 3	32	
54	33	
55	34	
56	35	
\$7	36	
58	37	
3	O	BL
70	1	
11	4	
12	1	LO
3	0	BL
14	38	





yantus. Calibracion, reak o-10

'ile name: T:\DATA1\FLOW4\2013\EPA335.4\051413CM.RST

hate: May 14, 2013

perator: CRW

	me			Conc	Area
	Cal	1.00	ppm	1.000000	6044285.000000
	Cal	1.00	ppm	1.000000	6066860.000000
-	Cal	1.00	ppm	1.000000	6074881.500000
	Cal	0.80	ppm	0.800000	4942339.500000
	Cal	0.80	ppm	0.800000	4946887.000000
	Cal	0.80	ppm	0.800000	5011107.000000
-	Cal	0.50	ppm	0.500000	3235291.750000
	Cal	0.50	ppm	0.500000	3234827.000000
	Cal	0.50	ppm	0.500000	3256325.250000
	Cal	0.05	ppm	0.050000	300741.343750
	Cal	0.05	ppm	0.050000	299278.562500
-	Cal	0.05	ppm	0.050000	304102.375000
	Cal	0.01	mqq	0.010000	58197.007812
	Cal	0.01	ppm	0.010000	57780.523438
	Cal	0.01	mqq	0.010000	58574.269531

Calib Coef:

y=bx+a

a: (intercept) -3.7130e+03 b: 6.1872e+06

Corr Coef:

0.999387

Carryover:

0.298%

No Drift Peaks

# Flashpoint Analysis

# Sample Matrix - Soil (1), Sludge (2), Oil (3), Water (4), Other (5)

Sample II	Analyses Date	Sample Matrix	Analyst Initials	Temp - °C	Temp - °F
13030600H	0 3/8/2013	Linuid/5	WZ		150°F
	2-00] 3/14/13	Liquid/5	Mi	_	<50° F
130322014	201 3/27/13	0:4/3	Mu		178 of
130322035-0		H20/4	m		72000 F
-01					
130327025-1	013/28/2013	H201,4	m		>200°F
130327026-0		<u> </u>	<del></del>		7200°F
1303280404			n/h		> 2000
130401026-		150/4	nin-		>200°F
130915008	00 4/15/2013	H20/4	Win-		7206°P
	002 4/23/13	420/4	mu		72000F
130126020		420/4	Jug w		7200°F
	25/2/13	1. 1/2	20/4		>200°F
130472038-0	<u>9215/7/13</u>	higaid/5	My		150°E
00					ELLYD FLSOOF
900-		<del>  </del>	<del></del>		USTOF.
-00			<i> </i>		177°E
0		<del>  </del>			53°F
130430045		Lianid/5	inte		>700 F
130/30038		1120/4	1		>250°F
130510076	00 5/15/13	liquid 15	M		147° F
		/			
				·	
					<u> </u>
	<u> </u>				<del>                                     </del>
		<u> </u>	<u> </u>		

^{*} SAFETY GLASSES REQUIRED.

Reagent	Solution #	Expires	Method QC F	Requirements:
pH Buffer 4 (Red)	M854-01	Sep-13	pH 7 within 0.1 pH units	LFB/Blank every 10
pH Buffer 7 (Yellow)	M854-02	Dec-13	Slope 95-102%	MS/MSD Every 20
pH Buffer 10 (Blue)	A055-04	Jan-14		% Recovery 85-115%
0.02N H2SO4 Titrant	A055-03	Nov-13		

Standard	Solution #	Conc.	Expires	Amount Spiked (mg/L)
Matrix Spike Solution	M891-01	1N	11/1/2013	100 (0.189 mL)
Contrib	urette: CAT 10uL, sn	600055 - pH Mete	r: Orion Model 420A,	sn 007858

								Titran	t vol to p	H (mL)		Aikalini	ty (mg/L	-}	
Sample	Temp (°C)	рH	pH 4 Cal	pH 10 Cal	Slope	pH 7 Buffer	Sample Vol. (mL)	A 8.3	B 4.5	C 4.2	Total	Carbonate	BI- carbonate	Hydroxide	%
13050227-001	Z3.3	6.56	4,51	10.00	10250	2.10									
ر ند <i>-</i>	24.4	6.91													
-205	24.0%	8.14													
1304300350001	24.0°C 71.8 42	7.78													
130502026-03	240	7.93													
	<u> </u>														
				·											
* * * * * * * * * * * * * * * * * * *						-									

Analysis Date: 5 - 6 - 20/3	Analysis Date: 5-6-2013		Analyst: _AST	
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# Sulfide by SMI 4500-5" F

	Expires
Iodine 0.025 N (R069-16)	Daily
HCl 6N (R066-09)	Daily
Starch Indicator 1% (A057-04)	1/11/2014
Zinc Acetate (R069-15)	1/11/2018

### **Quality Control Intormation**

- 1. 1 blank per batch, must be < 20 ug/L.
- 2. 1 LFB per batch must be +/- 30%.
- 3. 50  $\mu L$  iodine reacts with 0.02 mg Sulfide Spike Standard Number:

	Sample	Sample Volume	lodine amount (50 µL incremen ts)	Concentration (mg/sample)	Concentration (mg/L)	Spike Amt	Date	% Recovery	Initials
	130502025-001 (四年19)	523 OO	100	0,54	0.0745		5/3/13		AST
Pa	130423044-001-(106.00)	50m2	100	5.54	88 - 14.5 = 15.6		İ		
Page 1	130502017-001 ms 0.548	5 m4 (15 01)	350	0.14	28 24 x 0546 = 15.34				
17 of 17	-005 m=0535	5m/ 19x10	250	0.10	20 20 10.535 = 10.70				
17	. 005 mc 0.447	5mc. (10x 2)	1450	ાં કે	36 56=0.497:17.89				
	130450088-201	427.97 mc	<b>8</b> 5 ⊃	0.34	0.7113				
	1305 0103 1001 ms 5.01	Some	136	Ø.0₽	0.8 44.01 =4.004				
	033 -01 m= 5.04	SOML	50	୍ ୭୪	0.4 × 5.04 × 2.03				
	234-421 m: 4.936	50-6	ספו	0 04	08 2 483 = 3.54				
	03-5-33/ M= 4.98	FonL	50	<u> </u>	D4 4-1.685=199				
	535-23/ms I	50ml	450	-	36 24.99 = 17.93	2001		89.7%	
	- 45B	1000mL	450	0.14	0.15	200,4		90%	
	-LFBD		400	014	عا: د	$\perp$		80%	

Comments January 5/2/2013

### Hall Environmental Analysis Laboratory, Inc.

WO#: 1304A43

23-May-13

Client: Western Refining Southwest, Inc.

Project: Injection Well 2nd Qtr 4-24-13

Sample ID MB TestCode: EPA Method 300.0: Anions SampType: MBLK Client ID: PBW Batch ID: R10139 RunNo: 10139 SeqNo: 288955 Prep Date: Analysis Date: 4/25/2013 Units: mg/L Analyte Result **PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD **RPDLimit** Qual ND 0.50 Chloride Sulfate ND 0.50

Sample ID LCS-b TestCode: EPA Method 300.0: Anions SampType: LCS RunNo: 10139 Client ID: LCSW Batch ID: R10139 Prep Date: Analysis Date: 4/25/2013 SeqNo: 288967 Units: mg/L SPK value SPK Ref Val %REC HighLimit %RPD **RPDLimit** Qual Result **PQL** LowLimit Analyte 90 110 4.7 0.50 5.000 93.4 Chloride Sulfate 9.5 0.50 10.00 0 95.2 90 110

Sample ID MB SampType: MBLK TestCode: EPA Method 300.0: Anions RunNo: 10139 Client ID: **PBW** Batch ID: R10139 SeqNo: 289009 Units: mg/L Prep Date: Analysis Date: 4/26/2013 %RPD **RPDLimit** Qual SPK value SPK Ref Val %REC HighLimit Analyte Result PQL LowLimit ND 0.50 Chloride ND Sulfate 0.50

Sample ID LCS TestCode: EPA Method 300.0: Anions SampType: LCS Client ID: LCSW Batch ID: R10139 RunNo: 10139 Analysis Date: 4/26/2013 Prep Date: SeqNo: 289010 Units: mg/L %RPD Result SPK value SPK Ref Val %REC LowLimit HighLimit **RPDLimit** Qual Analyte **PQL** 4.7 0.50 5.000 0 93.5 90 110 Chloride Sulfate 9.6 0.50 10.00 0 95.8 90 110

#### Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

Analyte detected below quantitation limits

P Sample pH greater than 2 for VOA and TOC only.

RL Reporting Detection Limit

B Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S Spike Recovery outside accepted recovery limits

Page 6 of 17

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1304A43

23-May-13

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Otr 4-24-13

Project: Injection	Well 2nd (									
Sample ID 5ml-rb	SampT	уре: <b>МЕ</b>	BLK	Test	Code: EF	A Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	ID: <b>R1</b>	0158	R	unNo: 10	0158				
Prep Date:	Analysis D	ate: 4/	26/2013	s	eqNo: 2	89475	Units: %RE	С		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	8.6		10.00		86.4	70	130			
Surr: 4-Bromofluorobenzene	8.6		10.00		85.8	69.5	130			
Surr: Dibromofluoromethane	8.6		10.00		86.0	70	130			
Surr: Toluene-d8	8.6		10.00		85.7	70	130		· · · · · · · · · · · · · · · · · · ·	
Sample ID 100ng Ics	SampT	ype: LC	s	Test	Code: El	A Method	8260B: VOL	ATILES		
Client ID: LCSW	Batch	ID: <b>R1</b>	0158	R	unNo: 1	0158				
Prep Date:	Analysis D	ate: 4/	26/2013	S	eqNo: 2	<b>8947</b> 7	Units: %RE	С		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	8.4		10.00		83.5	70	130			
Surr: 4-Bromofluorobenzene	8.7		10.00		86.9	69.5	130			
Surr: Dibromofluoromethane	8.1		10.00		81.0	70	130			
Surr: Toluene-d8	8.5		10.00		84.7	70	130			
Sample ID b2	SampT	ype: ME	BLK	Test	Code: El	PA Method	8260B: VOL	ATILES		,
Client ID: PBW	Batch	1D: <b>R1</b>	0158	R	RunNo: 1	0158				
Prep Date:	Analysis D	ate: 4	/27/2013	S	eqNo: 2	89501	Units: %RE	С		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	8.7		10.00		86.8	70	130			
Surr: 4-Bromofluorobenzene	8.3		10.00		83.3	69.5	130			
Surr: Dibromofluoromethane	8.6		10.00		86.1	70	130			
Surr: Toluene-d8	8.7									
			10.00		86.6	70	130			
Sample ID 100ng Ics2		ype: LC		Tes		====	130 8260B: VOL	ATILES	***************************************	
Sample ID 100ng Ics2 Client ID: LCSW	SampT	ype: LC	:s			PA Method		ATILES		
	SampT	h ID: <b>R</b> 1	CS 10158	F	tCode: E	PA Method 0158				
Client ID: LCSW	SampT Batch	h ID: <b>R</b> 1	CS 10158 /27/2013	F	tCode: El	PA Method 0158	8260B: VOL		RPDLimit	Qual
Client ID: LCSW Prep Date:	SampT Batch Analysis D	n ID: R1	CS 10158 /27/2013	F	tCode: El RunNo: 1 SeqNo: 2	PA Method 0158 89503	8260B: VOL	С	RPDLimit	Qual
Client ID: LCSW Prep Date: Analyte	SampT Batcl Analysis D Result	n ID: R1	CS 10158 /27/2013 SPK value	F	tCode: El RunNo: 1 SeqNo: 2 %REC	PA Method 0158 89503 LowLimit	8260B: VOL  Units: %RE  HighLimit	С	RPDLimit	Qual
Client ID: LCSW Prep Date: Analyte Surr: 1,2-Dichloroethane-d4	SampT Batcl Analysis D Result 8.8	n ID: R1	CS 10158 /27/2013 SPK value 10.00	F	RunNo: 1 SeqNo: 2 %REC 87.9	PA Method 0158 89503 LowLimit	8260B: VOL Units: %RE HighLimit 130	С	RPDLimit	Qual
Client ID: LCSW Prep Date: Analyte Surr: 1,2-Dichloroethane-d4 Surr: 4-Bromofluorobenzene	SampT Batcl Analysis D Result 8.8 8.3	n ID: R1	CS 10158 /27/2013 SPK value 10.00 10.00	F	RunNo: 1 SeqNo: 2 %REC 87.9 83.2	PA Method 0158 89503 LowLimit 70 69.5	8260B: VOL  Units: %RE  HighLimit  130  130	С	RPDLimit	Qual
Client ID: LCSW Prep Date: Analyte Surr: 1,2-Dichloroethane-d4 Surr: 4-Bromofluorobenzene Surr: Dibromofluoromethane	SampT Batcl Analysis D Result 8.8 8.3 8.8 8.4	n ID: R1	SPK value 10.00 10.00 10.00 10.00	F SPK Ref Val	RunNo: 1 SeqNo: 2 %REC 87.9 83.2 87.7 84.0	PA Method 0158 89503 LowLimit 70 69.5 70 70	8260B: VOL  Units: %RE  HighLimit  130  130  130	C %RPD	RPDLimit	Qual
Client ID: LCSW Prep Date: Analyte Surr: 1,2-Dichloroethane-d4 Surr: 4-Bromofluorobenzene Surr: Dibromofluoromethane Surr: Toluene-d8	SampT Batch Analysis D Result 8.8 8.3 8.8 8.4	PQL	SPK value 10.00 10.00 10.00 10.00 BLK	SPK Ref Val	RunNo: 1 SeqNo: 2 %REC 87.9 83.2 87.7 84.0	PA Method 0158 89503 LowLimit 70 69.5 70 70	8260B: VOL  Units: %RE  HighLimit  130  130  130  130	C %RPD	RPDLimit	Qual
Client ID: LCSW Prep Date: Analyte Surr: 1,2-Dichloroethane-d4 Surr: 4-Bromofluorobenzene Surr: Dibromofluoromethane Surr: Toluene-d8  Sample ID 5ml-rb	SampT Batch Analysis D Result 8.8 8.3 8.8 8.4	PQL  Type: Mih ID: R1	SPK value 10.00 10.00 10.00 10.00 10.00 BLK	SPK Ref Val  Tes	tCode: Et RunNo: 1 SeqNo: 2 %REC 87.9 83.2 87.7 84.0	PA Method 0158 89503 LowLimit 70 69.5 70 70 PA Method 0192	8260B: VOL  Units: %RE  HighLimit  130  130  130  130	C %RPD	RPDLimit	Qual
Client ID: LCSW Prep Date: Analyte Surr: 1,2-Dichloroethane-d4 Surr: 4-Bromofluorobenzene Surr: Dibromofluoromethane Surr: Toluene-d8  Sample ID 5ml-rb Client ID: PBW	SampT Batcl Analysis E Result 8.8 8.3 8.8 8.4 SampT Batcl	PQL  Type: Mih ID: R1	SPK value 10.00 10.00 10.00 10.00 10.00 10.00 10.00	SPK Ref Val  Tes	tCode: Ei RunNo: 1 ReqNo: 2 %REC 87.9 83.2 87.7 84.0 tCode: E RunNo: 1 SeqNo: 2	PA Method 0158 89503 LowLimit 70 69.5 70 70 PA Method 0192	8260B: VOL  Units: %RE  HighLimit  130  130  130  130  8260B: VOL	C %RPD	RPDLimit RPDLimit	Qual

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- Reporting Detection Limit

- Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded

Spike Recovery outside accepted recovery limits

- Not Detected at the Reporting Limit
- RPD outside accepted recovery limits

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### Hall Environmental Analysis Laboratory, Inc.

WO#: 1304A43

23-May-13

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-24-13

Sample ID 5ml-rb	SampT	ype: <b>MBLK</b>		Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	ID: <b>R10192</b>		F	RunNo: 1	0192				
Prep Date:	Analysis D	ate: 4/29/20	)13	5	SeqNo: 2	90505	Units: µg/L			
Analyte	Result	PQL SPH	( value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
	_	_								

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
   ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

Page 8 of 17

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1304A43

23-May-13

Client:

Western Refining Southwest, Inc.

**Project:** 

Injection Well 2nd Qtr 4-24-13

Sample ID 5ml-rb	SampT	ype: ME	ILK	Tes	tCode: El	A Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	ID: R1	0192	F	RunNo: 10	0192				
Prep Date:	Analysis D	ate: 4/	29/2013	S	SeqNo: 2	90505	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	8.5		10.00		85.0	70	130			
Surr: 4-Bromofluorobenzene	8.6		10.00		86.3	69.5	130			
Surr: Dibromofluoromethane	8.3		10.00		82.9	70	130			
Surr: Toluene-d8	8.3	·	10.00		83.2	70	130			

Sample ID 100ng Ics	SampT	ype: LC	s	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: LCSW	Batch	1D: <b>R1</b>	0192	F	RunNo: 1	0192				
Prep Date:	Analysis D	ate: 4/	29/2013	S	SeqNo: 2	90512	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	20	1.0	20.00	0	102	70	130			
Toluene	22	1.0	20.00	0	112	80	120			
Chlorobenzene	21	1.0	20.00	0	106	70	130			
1,1-Dichloroethene	19	1.0	20.00	0	97.0	85.8	133			
Trichloroethene (TCE)	20	1.0	20.00	0	101	70	130			
Surr: 1,2-Dichloroethane-d4	8.7		10.00		87.2	70	130			

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range
- Analyte detected below quantitation limits
- Sample pH greater than 2 for VOA and TOC only.
- RLReporting Detection Limit

- В Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded Η

Spike Recovery outside accepted recovery limits

- ND Not Detected at the Reporting Limit
- RPD outside accepted recovery limits

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### Hall Environmental Analysis Laboratory, Inc.

WO#: 1304A43

23-May-13

Client: Western Refining Southwest, Inc.

Project: Injection Well 2nd Qtr 4-24-13

Sample ID 100ng Ics	SampT	ype: LC	s	Test	Code: El	e: EPA Method 8260B: VOLATILES				
Client ID: LCSW	Batch	ID: <b>R1</b>	10192	R	tunNo: 1	0192				
Prep Date:	Analysis D	ate: 4	/29/2013	S	eqNo: 2	90512	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	8.3		10.00		83.4	69.5	130			
Surr: Dibromofluoromethane	8.2		10.00		82.3	70	130			
Surr: Toluene-d8	8.3		10.00		83.1	70	130			

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded

Spike Recovery outside accepted recovery limits

- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1304A43

23-May-13

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-24-13

Sample ID mb-7235	SampTy	pe: MBLK	Tes	tCode: EPA Method	8270C: Semiv	olatiles		
Client ID: PBW	Batch	ID: <b>7235</b>	ı	RunNo: 10279				
Prep Date: 5/1/2013	Analysis Da	te: 5/2/2013	:	SeqNo: <b>293096</b>	Units: µg/L			
Analyte	Result		ue SPK Ref Val	%REC LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10						
Acenaphthylene	ND	10						
Aniline	ND	10						
Anthracene	ND	10						
Azobenzene	ND	10						
Benz(a)anthracene	ND	10						
Benzo(a)pyrene	ND	10						
Benzo(b)fluoranthene	ND	10						
Benzo(g,h,i)perylene	ND	10						
Benzo(k)fluoranthene	ND	10						
Benzoic acid	ND	20						
Benzyl alcohol	ND	10						
Bis(2-chloroethoxy)methane	ND	10						
Bis(2-chloroethyl)ether	ND	10						
Bis(2-chloroisopropyl)ether	ND	10						
Bis(2-ethylhexyl)phthalate	ND	10						
4-Bromophenyl phenyl ether	ND	10						
Butyl benzyl phthalate	ND	10						
Carbazole	ND	10						
4-Chloro-3-methylphenol	ND	10						
4-Chloroaniline	ND	10						
2-Chloronaphthalene	ND	10						
2-Chlorophenol	ND	10						
4-Chlorophenyl phenyl ether	ND	10						
Chrysene	ND	10						
Di-n-butyl phthalate	ND	10						
Di-n-octyl phthalate	ND	10						
Dibenz(a,h)anthracene	ND	10						
Dibenzofuran	ND	10						
1,2-Dichlorobenzene	ND	10						
1,3-Dichlorobenzene	ND	10						
1,4-Dichlorobenzene	ND	10						
3,3'-Dichlorobenzidine	ND	10						
Diethyl phthalate	ND	10						
Dimethyl phthalate	ND	10						
2,4-Dichlorophenol	ND	20						
2,4-Dimethylphenol	ND	10						
4,6-Dinitro-2-methylphenol	ND	20						
2,4-Dinitrophenol	ND	20						
2,4-Dinitrotoluene	ND	10						

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded

Spike Recovery outside accepted recovery limits

- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

Page 11 of 17

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1304A43 23-May-13

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-24-13

Sample ID mb-7235	SampTy	pe: MB	LK	Tes	tCode: El	PA Method	8270C: Semi	volatiles		
Client ID: PBW	Batch	ID: <b>72</b> 3	35	F	RunNo: 1	0279				
Prep Date: 5/1/2013	Analysis Da	ate: 5/2	2/2013	S	SeqNo: 2	93096	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,6-Dinitrotoluene	ND	10								
Fluoranthene	ND	10								
Fluorene	ND	10								
Hexachlorobenzene	ND	10								
Hexachlorobutadiene	ND	10								
Hexachlorocyclopentadiene	ND	10								
Hexachloroethane	ND	10								
Indeno(1,2,3-cd)pyrene	ND	10								
Isophorone	ND	10								
1-Methylnaphthalene	ND	10								
2-Methylnaphthalene	ND	10								
2-Methylphenol	ND	10								
3+4-Methylphenol	ND	10								
N-Nitrosodi-n-propylamine	ND	10								
N-Nitrosodimethylamine	ND	10								
N-Nitrosodiphenylamine	ND	10								
Naphthalene	ND	10								
2-Nitroaniline	ND	10								
3-Nitroaniline	ND	10								
4-Nitroaniline	ND	10								
Nitrobenzene	ND	10								
2-Nitrophenol	ND	10								
4-Nitrophenol	ND	10								
Pentachlorophenol	ND	20								
Phenanthrene	ND	10								
Phenol	ND	10								
Pyrene	ND	10								
Pyridine	ND	10								
1,2,4-Trichlorobenzene	ND	10								
2,4,5-Trichlorophenol	ND	10								
2,4,6-Trichlorophenol	ND	10								
Surr: 2,4,6-Tribromophenol	180		200.0		90.7	41.5	117			
Surr: 2-Fluorobiphenyl	75		100.0		75.5	29.1	112			
Surr: 2-Fluorophenol	130		200.0		65.0	11.9	98.6			
Surr: 4-Terphenyl-d14	87		100.0		86.6	46	111			
Surr: Nitrobenzene-d5	77		100.0		77.3	34.9	112			
Surr: Phenol-d5	95		200.0		47.6	17.5	88.3			

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- Analyte detected below quantitation limits
- Sample pH greater than 2 for VOA and TOC only.
- Reporting Detection Limit RL

- Analyte detected in the associated Method Blank В
- Holding times for preparation or analysis exceeded Н

Spike Recovery outside accepted recovery limits

- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

Page 12 of 17

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1304A43

23-May-13

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-24-13

Sample ID Ics-7235	SampT	ype: LC	S	Tes	tCode: El	PA Method	8270C: Semi	volatiles		
Client ID: LCSW	Batch	n ID: 72	35	F	RunNo: 1	0279				
Prep Date: 5/1/2013	Analysis D	Date: 5/	2/2013	S	SeqNo: 2	93097	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	67	10	100.0	0	67.1	53.3	92.5			
4-Chloro-3-methylphenol	160	10	200.0	0	78.2	55.9	93.9			
2-Chlorophenol	140	10	200.0	0	71.9	51.1	85.8			
1,4-Dichlorobenzene	63	10	100.0	0	63.5	41.5	86.7			
2,4-Dinitrotoluene	79	10	100.0	0	78.6	57.5	102			
N-Nitrosodi-n-propylamine	76	10	100.0	0	75.8	52.1	99.7			
4-Nitrophenol	78	10	200.0	0	39.2	27.2	53			
Pentachlorophenol	110	20	200.0	0	55.9	33.7	77.7			
Phenol	83	10	200.0	0	41.3	23.3	66.3			
Pyrene	79	10	100.0	0	78.8	57	88.7			
1,2,4-Trichlorobenzene	67	10	100.0	0	67.3	46.7	87.8			
Surr: 2,4,6-Tribromophenol	200		200.0		102	41.5	117			
Surr: 2-Fluorobiphenyl	78		100.0		77.8	29.1	112			
Surr: 2-Fluorophenol	120		200.0		62.1	11.9	98.6			
Surr: 4-Terphenyl-d14	93		100.0		93.0	46	111			
Surr: Nitrobenzene-d5	81		100.0		80.7	34.9	112			
Surr: Phenol-d5	96		200.0		48.0	17.5	88.3			

Sample ID Icsd-7235	SampType: LCSD TestCode: EPA Method 8270C: Semivolatiles										
Client ID: LCSS02	Batch	ID: <b>72</b> 3	35	F	RunNo: 10	0279					
Prep Date: 5/1/2013	Analysis D	ate: 5/2	2/2013	S	SeqNo: 2	93098	Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Acenaphthene	70	10	100.0	0	70.4	53.3	92.5	4.80	25		
4-Chloro-3-methylphenol	150	10	200.0	0	75.8	55.9	93.9	3.03	32.7		
2-Chloropheno!	130	10	200.0	0	66.8	51.1	85.8	7.44	20		
1,4-Dichlorobenzene	62	10	100.0	0	62.3	41.5	86.7	1.94	20		
2,4-Dinitrotoluene	81	10	100.0	0	80.9	57.5	102	2.93	29.9		
N-Nitrosodi-n-propylamine	70	10	100.0	0	70.4	52.1	99.7	7.42	23.1		
4-Nitrophenol	85	10	200.0	0	42.6	27.2	53	8.12	40.5		
Pentachlorophenol	110	20	200.0	0	56.6	33.7	77.7	1.24	37.3		
Phenol	78	10	200.0	0	39.0	23.3	66.3	5.90	20		
Pyrene	75	10	100.0	0	75.4	57	88.7	4.33	26.5		
1,2,4-Trichlorobenzene	69	10	100.0	0	69.2	46.7	87.8	2.73	27.2		
Surr: 2,4,6-Tribromophenol	180		200.0		92.3	41.5	117	0	0		
Surr: 2-Fluorobiphenyl	82		100.0		81.7	29.1	112	0	0		
Surr: 2-Fluorophenol	110		200.0		56.1	11.9	98.6	0	0		
Surr: 4-Terphenyl-d14	88		100.0		87.6	46	111	0	0		
Surr: Nitrobenzene-d5	80		100.0		79.5	34.9	112	0	0		
Surr: Phenol-d5	90		200.0		45.0	17.5	88.3	0	0		

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded

Spike Recovery outside accepted recovery limits

- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

Page 13 of 17

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1304A43

23-May-13

Client: Western Refining Southwest, Inc.

Project: Injection Well 2nd Qtr 4-24-13

Sample ID MB-7179 SampType: MBLK TestCode: EPA Method 7470: Mercury

Client ID: PBW Batch ID: 7179 RunNo: 10168

Prep Date: 4/26/2013 Analysis Date: 4/26/2013 SeqNo: 289731 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.00020

Sample ID LCS-7179 SampType: LCS TestCode: EPA Method 7470: Mercury

Client ID: LCSW Batch ID: 7179 RunNo: 10168

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0051 0.00020 0.005000 0 101 80 120

Sample ID 1304A43-001DMS SampType: ms TestCode: EPA Method 7470: Mercury

Client ID: Injection Well Batch ID: 7179 RunNo: 10168

Prep Date: 4/26/2013 Analysis Date: 4/26/2013 SeqNo: 289742 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0054 0.0010 0.005000 0 108 75 125

Sample ID 1304A43-001DMSD SampType: msd TestCode: EPA Method 7470: Mercury

Client ID: Injection Well Batch ID: 7179 RunNo: 10168

Prep Date: 4/26/2013 Analysis Date: 4/26/2013 SeqNo: 289743 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury 0.0055 0.0010 0.005000 0 109 75 125 0.900 20

#### Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH greater than 2 for VOA and TOC only.

RL Reporting Detection Limit

B Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S Spike Recovery outside accepted recovery limits

Page 14 of 17

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1304A43

23-May-13

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-24-13

Project:	Injecti	on Well 2nd	Qtr 4-24	ŀ-13 							
Sample ID	MB-7191	SampT	ype: MB	LK	Tes	tCode: E	PA 6010B:	Total Recover	rable Meta	ils	
Client ID:	PBW	Batch	1D: <b>71</b> 9	91	F	RunNo:	10315				
Prep Date:	4/29/2013	Analysis D	ate: 5/3	3/2013	8	SeqNo: 2	2938 <b>9</b> 6	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
rsenic		ND	0.020								
Barium		ND	0.020								
Cadmium		ND	0.0020								
Chromium		ND	0.0060								
.ead		ND	0.0050								
Selenium		ND	0.050								
Silver		ND	0.0050								
Sample ID	LCS-7191	SampT	ype: LC	s	Tes	tCode: E	PA 6010B:	Total Recove	rable Meta	als	
Client ID:	LCSW	Batch	1D: <b>71</b> 9	91	F	RunNo:	10315				
Prep Date:	4/29/2013	Analysis D	ate: 5/3	3/2013	5	SeqNo:	293897	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic		0.50	0.020	0.5000	0	99.2	80	120			
Barium		0.46	0.020	0.5000	0	92.3	80	120			
Cadmium		0.47	0.0020	0.5000	0	93.3	80	120			
Chromium		0.46	0.0060	0.5000	0	91.5	80	120			
.ead		0.46	0.0050	0.5000	0	92.9	80	120			
Selenium		0.46	0.050	0.5000	0	91.3	80	120			
Silver		0.10	0.0050	0.1000	0	99.5	80	120			
Sample ID	MB-7191	SampT	уре: МЕ	BLK	Tes	tCode: I	PA 6010B:	Total Recove	rable Meta	als	
Client ID:	PBW	Batch	n ID: <b>71</b> 9	91	F	Run <b>N</b> o:	10423				
Prep Date:	4/29/2013	Analysis D	ate: 5/	6/2013	5	SeqNo:	294880	Units: mg/L			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium		ND	1.0								
<i>M</i> agnesium		ND	1.0								
Potassium		ND	1.0								
Sodium		ND	1.0								
Sample ID	LCS-7191	SampT	ype: LC	S	Tes	tCode: I	EPA 6010B:	Total Recove	rable Met	als	
Client ID:	LCSW	Batch	h ID: <b>71</b>	91	F	RunNo:	10423				
Prep Date:	4/29/2013	Analysis D	Date: 5/	6/2013	5	SeqNo:	294881	Units: mg/L			
Analyte		Result	PQL		SPK Ref Val	%REC		HighLimit	%RPD	RPDLimit	Qual
Calcium		49	1.0	50.00	0	97.2		120			
Magnesium		49	1.0	50.00	0	98.1		120			
otassium		48	1.0	50.00	0	95.3		120			
Sodium		49	1.0	50.00	0	97.4		120			

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Page 15 of 17
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1304A43

23-May-13

	Western Refining Southwest, Inc. Injection Well 2nd Qtr 4-24-13			
Sample ID mb-1 Client ID: PBW	SampType: mblk Batch ID: R10197	TestCode: <b>SM2320B: A</b> RunNo: <b>10197</b>	lkalinity	
Prep Date:	Analysis Date: 4/29/2013	SeqNo: 290702	Units: mg/L CaCO3	
Analyte Total Alkalinity (as CaCO3		SPK Ref Val %REC LowLimit	HighLimit %RPD	RPDLimit Qual
Sample ID Ics-1	SampType: Ics	TestCode: SM2320B: A	lkalinity	
Client ID: LCSW	Batch ID: R10197	RunNo: 10197		
Prep Date:	Analysis Date: 4/29/2013	SeqNo: 290703	Units: mg/L CaCO3	
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD	RPDLimit Qual
Total Alkalinity (as CaCO3	8) 80 20 80.00	0 99.6 90	110	
Sample ID mb-2	SampType: mblk	TestCode: SM2320B: A	lkalinity	
Client ID: PBW	Batch ID: R10197	RunNo: 10197	-	
Prep Date:	Analysis Date: 4/29/2013	SeqNo: 290720	Units: mg/L CaCO3	
Analyte	Result PQL SPK value	SPK Ref Val %REC LowLimit	HighLimit %RPD	RPDLimit Qual
Total Alkalinity (as CaCO3		7,110	7	
Sample ID Ics-2	SampType: Ics	TestCode: SM2320B: A	lkalinity	
Client ID: LCSW	Batch ID: <b>R10197</b>	RunNo: 10197		
Prep Date:	Analysis Date: 4/29/2013	SeqNo: 290721	Units: mg/L CaCO3	
Analyte	•	SPK Ref Val %REC LowLimit	HighLimit %RPD	RPDLimit Qual
Total Alkalinity (as CaCO			110	Krbbillili Quai
		T		
Sample ID mb-3	SampType: mblk	TestCode: SM2320B: A	ikalinity	
Client ID: PBW	Batch ID: R10197	RunNo: 10197	11-11-1 11 0.000	
Prep Date:	Analysis Date: 4/30/2013	SeqNo: <b>290732</b>	Units: mg/L CaCO3	
Analyte Total Alkalinity (as CaCO		SPK Ref Val %REC LowLimit	HighLimit %RPD	RPDLimit Qual
Sample ID Ics-3	SampType: Ics	TestCode: SM2320B: A	lkalinity	
Client ID: LCSW	Batch ID: <b>R10197</b>	RunNo: 10197		
Prep Date:	Analysis Date: 4/30/2013	SeqNo: 290733	Units: mg/L CaCO3	

#### Qualifiers:

Analyte

Total Alkalinity (as CaCO3)

* Value exceeds Maximum Contaminant Level.

Result

80

PQL

20

SPK value SPK Ref Val

80.00

E Value above quantitation range

J Analyte detected below quantitation limits

P Sample pH greater than 2 for VOA and TOC only.

RL Reporting Detection Limit

B Analyte detected in the associated Method Blank

LowLimit

HighLimit

110

%RPD

**RPDLimit** 

Qual

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

%REC

100

R RPD outside accepted recovery limits

S Spike Recovery outside accepted recovery limits

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1304A43

23-May-13

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd Qtr 4-24-13

Sample ID MB-7222

SampType: MBLK

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: PBW Batch ID: 7222

RunNo: 10240

Prep Date: 4/30/2013

Analysis Date: 5/1/2013

SeqNo: 292008

Units: mg/L

Analyte

Result

**PQL** SPK value SPK Ref Val %REC LowLimit HighLimit %RPD

**RPDLimit** 

Qual

Total Dissolved Solids

Client ID: LCSW Prep Date: 4/30/2013

Sample ID LCS-7222

ND

20.0

SampType: LCS Batch ID: 7222 TestCode: SM2540C MOD: Total Dissolved Solids RunNo: 10240

SeqNo: 292009

Units: mg/L

**RPDLimit** 

Qual

Analyte

Result PQL

1040

SPK value SFK Ref Val %REC LowLimit

104

HighLimit

%RPD

Total Dissolved Solids

20.0

Analysis Date: 5/1/2013

1000

0

120

Qualifiers:

Value exceeds Maximum Contaminant Level.

Е Value above quantitation range

Analyte detected below quantitation limits

P Sample pH greater than 2 for VOA and TOC only.

Reporting Detection Limit

В Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

Page 17 of 17



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87105 TEL: 505-345-3975 FAX: 505-345-410;

Website: www.hallenvironmental.com

### Sample Log-In Check List

Western Refining Southw Work Order Number: 1304A43 RcptNo: 1 Client Name: Received by/date: Logged By: Lindsay Mangin 4/25/2013 9:10:00 AM Completed By: Lindsay Mangin 4/25/2013 2:05:25 PM Reviewed By: Chain of Custody Yes 🗌 No 🗆 Not Present 1. Custody seals intact on sample bottles? No 🗆 Yes 🗹 Not Present 2. Is Chain of Custody complete? 3. How was the sample delivered? UPS <u>Log In</u> No 🗆 NA 🗆 Yes 🗹 4. Was an attempt made to cool the samples? 5. Were all samples received at a temperature of >0° C to 6.0°C Yes 🗹 No 🗆 NA 🗆 No 🗌 6. Sample(s) in proper container(s)? Yes 🔽 No 🗆 7. Sufficient sample volume for indicated test(s)? Yes 🗸 No 🗆 Yes 🔽 8. Are samples (except VOA and ONG) properly preserved? No 🗹 NA 🗆 Yes 🗌 9. Was preservative added to bottles? No VOA Vials Yes 🗸 No 🗀 10.VOA vials have zero headspace? Yes No 🗹 11. Were any sample containers received broken? # of preserved bottles checked/ for pH: No 🗌 Yes 🗹 12. Does paperwork match bottle labels? (Note discrepancies on chain of custody) unless noted) No 🗆 Yes 🗹 13. Are matrices correctly identified on Chain of Custody? No 🗌 Yes 🔽 14, is it clear what analyses were requested? 15. Were all holding times able to be met? Yes 🔽 No 🗆 Checked by: (If no, notify customer for authorization.) Special Handling (if applicable) Yes 🗌 No  $\square$ NA 🗹 16. Was client notified of all discrepancies with this order? Person Notified: Date: By Whom: Via: eMail Phone Fax In Person Regarding: Client Instructions: 17. Additional remarks: 18. Cooler Information Cooler No Temp C Condition Seal Intact Seal No Seal Date Signed By 1.5 Good Yes

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Date	Time	Matrix	Sample Request ID	Container	Preservative	igresit	A NE PER	BTEX + MTBE	X + MTE			8) s,	A 8	) SE	8260R (VOA)	(Se	1 de	Penelivit	式	걸릴
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1-27-13 Date:	3:00	Vobe	Kraken =	Received by:	$\Rightarrow 04/6$	95 <u>  1</u> 3	0910													İ
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		1	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s																	
If	necessary,	samples subt	nitted to Hall Environmental may be subc	contracted to other a	ccredited laboratorie	ss. This serve	es as notice of this	possibil	ity. Any	sub-cor	ntracte	d data v	Milibe c	learly n	otated	on the a	nalytic	al report	Ł	



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

January 29, 2014

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990

Bloomfield, NM 87413 TEL: (505) 632-4135 FAX (505) 632-3911

RE: Injection Well 7-22-13 OrderNo.: 1307A17

#### Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 2 sample(s) on 7/23/2013 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued August 09, 2013.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to <a href="www.hallenvironmental.com">www.hallenvironmental.com</a> or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman

Laboratory Manager

andid

4901 Hawkins NE

Albuquerque, NM 87109



Hall Environmental Analysis Laboratory 45'01 Hawkins NE Albuquerque, NM 87109

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com **Case Narrative** 

WO#:

1307A17

Date:

1/29/2014

CLIENT:

Western Refining Southwest, Inc.

Project:

Injection Well 7-22-13

Analytical Notes Regarding Selenium:

Selenium is being reported with an "E" flag to indicate that the result is estimated. The selenium result is <0.05mg/L, however the opening QC was outside of the normal accepted limits.

Lab Order 1307A17

Date Reported: 1/29/2014

### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 7-22-13

Lab ID: 1307A17-001 Client Sample ID: Injection Well

**Collection Date:** 7/22/2013 2:00:00 PM Received Date: 7/23/2013 9:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst	: JRR
Chloride	840	50		mg/L	100	7/24/2013 4:29:19 PM	R12176
Sulfate	39	5.0		mg/L	10	7/24/2013 4:16:55 PM	R12176
EPA METHOD 200.7: METALS						Analyst	: ELS
Arsenic	ND	0.020		mg/L	1	8/1/2013 5:51:32 PM	8646
Barium	0.27	0.0020		mg/L	1	8/1/2013 5:51:32 PM	8646
Cadmium	ND	0.0020		mg/L	1	8/1/2013 5:51:32 PM	8646
Calcium	100	10		mg/L	10	8/1/2013 5:53:49 PM	8646
Chromium	ND	0.0060		mg/L	1	8/1/2013 5:51:32 PM	8646
Lead	0.0063	0.0050		mg/L	1	8/1/2013 5:51:32 PM	8646
Magnesium	26	1.0		mg/L	1	8/1/2013 5:51:32 PM	8646
Potassium	10	1.0		mg/L	1	8/1/2013 5:51:32 PM	8646
Selenium	ND	0.050	Ε	mg/L	1	8/1/2013 5:51:32 PM	8646
Silver	ND	0.050		mg/L	10	8/1/2013 5:53:49 PM	8646
Sodium	350	10		mg/L	10	8/1/2013 5:53:49 PM	8646
EPA METHOD 8270C: SEMIVOLATIL	.ES					Analyst	: DAM
Acenaphthene	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Acenaphthylene	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Aniline	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Anthracene '	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Azobenzene	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Benz(a)anthracene	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Benzo(a)pyrene	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Benzo(b)fluoranthene	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Benzo(g,h,i)perylene	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Benzo(k)fluoranthene	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Benzoic acid	ND	100		μg/L	1	7/24/2013 12:05:54 PM	8534
Benzyl alcohol	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Bis(2-chloroethoxy)methane	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Bis(2-chloroethyl)ether	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Bis(2-chloroisopropyl)ether	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Bis(2-ethylhexyl)phthalate	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
4-Bromophenyl phenyl ether	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Butyl benzyl phthalate	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
Carbazole	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
4-Chloro-3-methylphenol	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
4-Chloroaniline	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
2-Chloronaphthalene	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534
2-Chlorophenol	ND	50		μg/L	1	7/24/2013 12:05:54 PM	8534

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- Analyte detected below quantitation limits
- RSD is greater than RSDlimit 0
- RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Not Detected at the Reporting Limit Page 2 of 21 Sample pH greater than 2 for VOA and TOC only. P
- Reporting Detection Limit

#### Lab Order 1307A17

Date Reported: 1/29/2014

### Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project: Injection Well 7-22-13

Lab ID: 1307A17-001

Client Sample ID: Injection Well

Collection Date: 7/22/2013 2:00:00 PM

Received Date: 7/23/2013 9:00:00 AM

Analyses	Result	RL Qu	al Units	DF Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLA	TILES	,		Anal	yst: <b>DAM</b>
4-Chlorophenyl phenyl ether	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Chrysene	ND	50	μg/L	1 7/24/2013 12:05:54	
Di-n-butyl phthalate	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Di-n-octyl phthalate	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Dibenz(a,h)anlhracene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Dibenzofuran	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
1,2-Dichlorobenzene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
1,3-Dichlorobenzene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
1,4-Dichlorobenzene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
3,3'-Dichlorobenzidine	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Diethyl phthalate	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Dimethyl phthalate	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
2,4-Dichlorophenol	ND	100	μg/L	1 7/24/2013 12:05:54	PM 8534
2,4-Dimethylphenol	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
4,6-Dinitro-2-methylphenol	ND	100	μg/L	1 7/24/2013 12:05:54	PM 8534
2,4-Dinitrophenol	ND	100	μg/L	1 7/24/2013 12:05:54	PM 8534
2,4-Dinitrotoluene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
2,6-Dinitrotoluene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Fluoranthene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Fluorene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Hexachloroberizene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Hexachlorobutadiene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Hexachlorocyclopentadiene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Hexachloroethane	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Indeno(1,2,3-cd)pyrene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Isophorone	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
1-Methylnaphthalene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
2-Methylnaphthalene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
2-Methylphenol	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
3+4-Methylphenol	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
N-Nitrosodi-n-propylamine	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
N-Nitrosodimethylamine	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
N-Nitrosodiphenylamine	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Naphthalene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
2-Nitroaniline	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
3-Nitroaniline	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
4-Nitroaniline	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
Nitrobenzene	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534
2-Nitrophenol	ND	50	μg/L	1 7/24/2013 12:05:54	PM 8534

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit Page
  - P Sample pH greater than 2 for VOA and TOC only.
  - RL Reporting Detection Limit

### Lab Order 1307A17

Date Reported: 1/29/2014

#### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 7-22-13

1307A17-001 Lab ID:

Client Sample ID: Injection Well

Collection Date: 7/22/2013 2:00:00 PM Received Date: 7/23/2013 9:00:00 AM

Analyses	Result	RL	Qual U	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILI	ES					Analyst	DAM
4-Nitrophenol	ND	50	)	μg/L	1	7/24/2013 12:05:54 PM	8534
Pentachlorophenol	ND	100	)	μg/L	1	7/24/2013 12:05:54 PM	8534
Phenanthrene	ND	50	1	μg/L	1	7/24/2013 12:05:54 PM	8534
Phenol	ND	50	١	μg/L	1	7/24/2013 12:05:54 PM	8534
Pyrene	ND	50	)	μg/L	1	7/24/2013 12:05:54 PM	8534
Pyridine	ND	50	•	μg/L	1	7/24/2013 12:05:54 PM	8534
1,2,4-Trichlorobenzene	ND	50	ı	μg/L	1	7/24/2013 12:05:54 PM	8534
2,4,5-Trichlorophenol	ND	50	ı	μg/L	1	7/24/2013 12:05:54 PM	8534
2,4,6-Trichlorophenol	ND	50	1	μg/L	1	7/24/2013 12:05:54 PM	8534
Surr: 2,4,6-Tribromophenol	104	41.5-117		%REC	1	7/24/2013 12:05:54 PM	8534
Surr: 2-Fluorobiphenyl	75.3	29.1-112		%REC	1	7/24/2013 12:05:54 PM	8534
Surr: 2-Fluorophenol	73.0	11.9-98.6		%REC	1	7/24/2013 12:05:54 PM	8534
Surr: 4-Terphenyl-d14	88.6	46-111		%REC	1	7/24/2013 12:05:54 PM	8534
Surr: Nitrobenzene-d5	91.8	34.9-112		%REC	1	7/24/2013 12:05:54 PM	8534
Surr: Phenol-d5	60.9	17.5-88.3		%REC	1	7/24/2013 12:05:54 PM	8534
EPA METHOD 8260B: VOLATILES						Analyst:	cws
Benzene	ND	1.0	)	μg/L	1	7/23/2013 6:57:35 PM	R12139
Toluene	ND	1.0	1	μg/L	1	7/23/2013 6:57:35 PM	R12139
Ethylbenzene	ND	1.0	ı	μg/L	1	7/23/2013 6:57:35 PM	R12139
Methyl tert-butyl ether (MTBE)	ND	1.0	ı	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,2,4-Trimethylbenzene	ND	1.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
1,3,5-Trimethylbenzene	ND	1.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
1,2-Dichloroethane (EDC)	ND	1.0	i	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,2-Dibromoethane (EDB)	ND	1.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
Naphthalene	ND	2.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
1-Methylnaphthalene	ND	4.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
2-Methylnaphthalene	ND	4.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
Acetone	78	10		μg/L	1	7/23/2013 6:57:35 PM	R12139
Bromobenzene	ND	1.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
Bromodichloromethane	ND	1.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
Bromoform	ND	1.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
Bromomethane	ND	3.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
2-Butanone	ND	10		μg/L	1	7/23/2013 6:57:35 PM	R12139
Carbon disulfide	ND	10		μg/L	1	7/23/2013 6:57:35 PM	R12139
Carbon Tetrachloride	ND	1.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
Chlorobenzene	ND	1.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
Chloroethane	ND	2.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
Chloroform	ND	1.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
Chioromethane	ND	3.0		μg/L	1	7/23/2013 6:57:35 PM	R12139

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- Analyte detected below quantitation limits
- RSD is greater than RSDlimit
- RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Not Detected at the Reporting Limit Page 4 of 21 Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

### Lab Order 1307A17

Date Reported: 1/29/2014

### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Project: Injection Well 7-22-13

Lab ID: 1307A17-001

Client Sample ID: Injection Well

Collection Date: 7/22/2013 2:00:00 PM

Received Date: 7/23/2013 9:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst	cws
2-Chlorotoluene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
4-Chlorotoluene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
cis-1,2-DCE	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
Dibromochloromethane	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
Dibromomethane	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,2-Dichlorobenzene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,3-Dichlorobenzene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,4-Dichlorobenzene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
Dichlorodifluoromethane	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,1-Dichloroethane	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,1-Dichloroethene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,2-Dichloropropane	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,3-Dichloropropane	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
2,2-Dichloropropane	ND	2.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,1-Dichloropropene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
Hexachlorobutadiene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
2-Hexanone	ND	10	μ <b>g</b> /L	1	7/23/2013 6:57:35 PM	R12139
Isopropylbenzene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
4-isopropyltoluene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
4-Methyl-2-pentanone	ND	10	μg/L	1	7/23/2013 6:57:35 PM	R12139
Methylene Chloride	ND	3.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
n-Butylbenzene	ND	3.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
n-Propylbenzene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
sec-Butylbenzene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
Styrene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
tert-Butylbenzene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,1,2,2-Tetrachioroethane	ND	2.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
trans-1,2-DCE	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,1,1-Trichloroethane	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
1,1,2-Trichloroethane	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139
Trichloroethene (TCE)	ND	1.0	µg/L	1	7/23/2013 6:57:35 PM	R12139
Trichlorofluoromethane	ND	1.0	μg/L	1	7/23/2013 6:57:35 PM	R12139

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

Lab Order 1307A17

Date Reported: 1/29/2014

### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Injection Well

Project:

Injection Well 7-22-13

Collection Date: 7/22/2013 2:00:00 PM

Lab ID:

1307A17-001

Matrix: AQUEOUS

Received Date: 7/23/2013 9:00:00 AM

Analyses	Result	RL (	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst	: CWS
1,2,3-Trichloropropane	ND	2.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
Vinyl chloride	ND	1.0		μg/L	1	7/23/2013 6:57:35 PM	R12139
Xylenes, Total	ND	1.5		μg/L	1	7/23/2013 6:57:35 PM	R12139
Surr: 1,2-Dichloroethane-d4	101	70-130		%REC	1	7/23/2013 6:57:35 PM	R12139
Surr: 4-Bromofluorobenzene	92.9	70-130		%REC	1	7/23/2013 6:57:35 PM	R12139
Surr: Dibromofluoromethane	104	70-130		%REC	1	7/23/2013 6:57:35 PM	R12139
Surr: Toluene-d8	99.2	70-130		%REC	1	7/23/2013 6:57:35 PM	R12139
SM2510B: SPECIFIC CONDUCTANCE						Analyst	: JML
Conductivity	3400	0.010		µmhos/cm	1	7/23/2013 4:28:20 PM	R12146
SM4500-H+B: PH						Analyst	: JML
рН	7.41	1.68	Н	pH units	1	7/23/2013 4:28:20 PM	R12146
SM2320B: ALKALINITY						Analyst	: JML
Bicarbonate (As CaCO3)	340	20		mg/L CaCO3	1	7/23/2013 4:28:20 PM	R12146
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	7/23/2013 4:28:20 PM	R12146
Total Alkalinity (as CaCO3)	340	20		mg/L CaCO3	1	7/23/2013 4:28:20 PM	R12146
SM2540C MOD: TOTAL DISSOLVED SC	LIDS					Analyst	: KS
Total Dissolved Solids	2140	40.0	*	mg/L	1	7/25/2013 3:06:00 PM	8535

#### Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
  - Not Detected at the Reporting Limit Page 6 of 21 Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

#### Lab Order 1307A17

Date Reported: 1/29/2014

### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: TRIP BLANK

Injection Well 7-22-13 Project:

**Collection Date:** 

1307A17-002 Lab ID:

Matrix: TRIP BLANK

Received Date: 7/23/2013 9:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst	cws
Benzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
Toluene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
Ethylbenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
Naphthalene	ND	2.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
1-Methylnaphthalene	ND	4.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
2-Methylnaphthalene	ND	4.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
Acetone	ND	10	μg/L	1	7/23/2013 7:55:05 PM	R1213
Bromobenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
Bromodichloromethane	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
Bromoform	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
Bromomethane	ND	3.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
2-Butanone	ND	10	μg/L	1	7/23/2013 7:55:05 PM	R1213
Carbon disulfide	ND	10	μg/L	1	7/23/2013 7:55:05 PM	R1213
Carbon Tetrachloride	N:D	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
Chlorobenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
Chloroethane	ND	2.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
Chloroform	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
Chloromethane	ND	3.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
2-Chlorotoluene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
4-Chlorotoluene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
cis-1,2-DCE	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
Dibromochloromethane	ND	1.0	µg/L	1	7/23/2013 7:55:05 PM	R1213
Dibromomethane	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
1,2-Dichlorobenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
1,3-Dichlorobenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
1,4-Dichlorobenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
Dichlorodifluoromethane	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
1,1-Dichloroethane	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
1,1-Dichloroethene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
1,2-Dichloropropane	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
1,3-Dichloropropane	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R1213
2,2-Dichloropropane	ND	2.0	μg/L	1	7/23/2013 7:55:05 PM	R1213

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Not Detected at the Reporting Limit Page 7 of 21 Sample pH greater than 2 for VOA and TOC only.
- Reporting Detection Limit

Lab Order 1307A17

Date Reported: 1/29/2014

### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: TRIP BLANK

Project: In

Injection Well 7-22-13

**Collection Date:** 

Lab ID: 1307A17-002

Matrix: TRIP BLANK

Received Date: 7/23/2013 9:00:00 AM

Analyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analyst	cws
1,1-Dichloropropene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
Hexachlorobutadiene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
2-Hexanone	ND	10	μg/L	1	7/23/2013 7:55:05 PM	R12139
Isopropylbenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
4-Isopropyltoluene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
4-Methyl-2-pentanone	ND	10	μg/L	1	7/23/2013 7:55:05 PM	R12139
Methylene Chloride	ND	3.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
n-Butylbenzene	ND	3.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
n-Propylbenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
sec-Butylbenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
Styrene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
tert-Butylbenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
trans-1,2-DCE	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
1,1,1-Trichloroethane	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
1,1,2-Trichloroethane	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
Trichloroethene (TCE)	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
Trichlorofluoromethane	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
1,2,3-Trichloropropane	ND	2.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
Vinyl chloride	ND	1.0	μg/L	1	7/23/2013 7:55:05 PM	R12139
Xylenes, Total	ND	1.5	μg/L	1	7/23/2013 7:55:05 PM	R12139
Surr: 1,2-Dichloroethane-d4	98.3	70-130	%REC	1	7/23/2013 7:55:05 PM	R12139
Surr: 4-Bromofluorobenzene	102	70-130	%REC	1	7/23/2013 7:55:05 PM	R12139
Surr: Dibromofluoromethane	102	70-130	%REC	1	7/23/2013 7:55:05 PM	R12139
Surr: Toluene-d8	101	70-130	%REC	1	7/23/2013 7:55:05 PM	R12139

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
  - P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

# Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (203) 882-9246 • email moscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

130724030

Address:

4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109

**Project Name:** 

1307A17

Attn:

ANDY FREEMAN

### Analytical Results Report

Sample Number

130724030-001

Sampling Date

Date/Time Received 7/24/2013 11:22 AM

Client Sample ID

1307A17-001E / INJECTION WELL

Matrix

**VVater** 

Sampling Time 2:00 PM

7/22/2013

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	0.01	8/6/2013	CRW	SW846 CH7	
Flashpoint	>200	°F		8/5/2013	KFG	EPA 1010	
рН	6.74	ph Units		7/29/2013	AJT	EPA 150.1	
Reactive sulfide	ND	mg/kg	1	7/29/2013	AJT	SW846 CH7	

**Authorized Signature** 

John Coddington, Lab Manager

MCL

EPA's Maximum Contaminant Level

ND

**Not Detected** 

Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.

The results reported relate only to the samples indicated.

Soil/solid results are reported on a dry-weight basis unless otherwise noted.

### all Environmental Analysis Laboratory, Inc.

WO#: 1

1307A17 29-Jan-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-22-13

Sample ID MB-8646	Samp	Туре: МЕ	BLK	Tes	tCode: E	PA Method	200.7: Metals			
Client ID: PBW	Bato	ch ID: 86	46	F	RunNo: 1	2318				
Prep Date: 7/31/2013	Analysis	Date: 7/	31/2013	8	SeqNo: 3	50274	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.0020								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Lead	ND	0.0050								
Magnesium	ND	1.0								
Potassium	ND	1.0								
Silver	ND	0.0050								
Sodium	ND	1.0								

Sample ID LCS-8646	Samp	Type: LC	pe: LCS TestCode: EPA Method 200.7: Metals							
Client ID: LCSW	Bato	h ID: 86	46	F	RunNo: 1	2318				
Prep Date: 7/31/2013	Analysis	Date: <b>7/</b>	/31/2013	S	SeqNo: 3	50275	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.49	0.0020	0.5000	0	97.4	85	115			
^admium	0.47	0.0020	0.5000	0	93.5	85	115			
laium	51	1.0	50.00	0	101	85	115			
Chromium	0.49	0.0060	0.5000	0	98.1	85	115			
Lead	0.47	0.0050	0.5000	0	94.6	85	115			
Magnesium	52	1.0	50.00	0	104	85	115			
Potassium	51	1.0	50.00	0	101	85	115			
Silver	0.49	0.0050	0.5000	0	97.5	85	115			
Sodium	51	1.0	50.00	0	103	85	115			

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Page 9 of 21
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1307A17

29-Jan-14

Client:

Western Refining Southwest, Inc.

Project:		Injection Well 7	-22-13									
Sample ID N	ИВ	Sar	mpType:	MBLK	(	Tes	tCode: E	PA Method	300.0: Anions	)		
Client ID: P	PBW	В	atch ID:	R1217	76	i	RunNo: 1	2176				
Prep Date:		Analys	is Date:	7/24/	2013	;	SeqNo: 3	46320	Units: mg/L			
Analyte		Resu	lt PC	QL SI	PK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride		Ni	D 0.	.50								
Sulfate		NI	D 0.	.50								
Sample ID L	.cs	Sar	прТуре:	LCS		Tes	tCode: E	PA Method	300.0: Anions	;		
Client ID: L	csw	В	atch ID:	R1217	76	I	RunNo: 1	2176				
Prep Date:		Analys	is Date:	7/24/	2013	;	SeqNo: 3	46321	Units: mg/L			
Analyte		Resu	lt PC	QL SI	PK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride		4.	7 0	.50	5.000	0	93.4	90	110			
Sulfate		9.	9 0	.50	10.00	0	99.4	90	110			
Sample ID N	ив	Sar	mpType:	MBLK	(	Tes	tCode: E	PA Method	300.0: Anions	•		
Client ID: P	PBW	В	atch ID:	R1217	76	ı	RunNo: 1	2176				
Prep Date:		Analys	is Date:	7/24/	2013	;	SeqNo: 3	46374	Units: mg/L			
Analyte		Resu	lt PC	QL SI	PK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride		N	D 0.	.50								
Sulfate		N	D 0	.50								
Sample ID L	cs	Sar	mpType:	LCS		Tes	tCode: E	PA Method	300.0: Anions	3		
Client ID: L	csw	В	atch ID:	R1217	76	i	RunNo: 1	2176				
Prep Date:		Analys	is Date:	7/24/	2013	;	SeqNo: 3	346375	Units: mg/L			
Analyte		Resu	lt PC	QL SI	PK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride		4.	6 0	.50	5.000	0	91.1	90	110			
Sulfate		9.	5 0	.50	10.00	0	95.0	90	110			

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Page 10 of 21
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

### all Environmental Analysis Laboratory, Inc.

WO#: 1307A17

29-Jan-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-22-13

Sample ID 5ml rb	SampT	ype: Mi	BLK	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: PBW	Batch	ID: <b>R1</b>	2139	F	RunNo: 1	2139				
Prep Date:	Analysis D	ate: 7	23/2013	\$	SeqNo: 3	45231	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
Sutanone	ND	10								
arbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

Page 11 of 21

### Hall Environmental Analysis Laboratory, Inc.

WO#:

1307A17

29-Jan-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-22-13

Sample ID 5ml rb	SampT	ype: ME	BLK	Tes	tCode: El	'A Method	8260B: VOL	ATILES		1,41
Client ID: PBW	Batch	ID: <b>R1</b>	2139	F	RunNo: 1	2:139				
Prep Date:	Analysis D	ate: 7/	23/2013	8	SeqNo: 3	45231	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	L.owLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.7		10.00		97.0	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		104	70	130			
Surr: Dibromofluoromethane	10		10.00		102	70	130			
Surr: Toluene-d8	10		10.00		99.9	70	130			

Sample ID 100ng Ics	SampT	SampType: LCS TestCod				EF'A Method 8260B: VOLATILES							
Client ID: LCSW	Batch	1D: <b>R1</b>	2139	F	RunNo: 1	2139		,					
Prep Date:	Analysis D	ate: 7/	23/2013	S	SeqNo: 3	4-5233	Units: µg/L						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual			
Benzene	20	1.0	20.00	0	101	70	130						
Toluene	20	1.0	20.00	0	101	80	120						
Chlorobenzene	19	1.0	20.00	0	96.1	70	130						

#### Qualifiers:

- * Value exceeds Maximurn Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 12 of 21

- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

### 'all Environmental Analysis Laboratory, Inc.

WO#: **1307A17 29-Jan-14** 

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-22-13

Sample ID 100ng Ics	SampT	ype: LC	s	Tes	tCode: El	PA Method	8260B: VOL	ATILES		
Client ID: LCSW	Batch	n ID: <b>R1</b>	2139	F	RunNo: 1	2139				
Prep Date:	Analysis D	)ate: 7/	23/2013	8	SeqNo: 3	45233	Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethene	23	1.0	20.00	0	116	85.8	133			
Trichloroethene (TCE)	19	1.0	20.00	0	96.5	70	130			
Surr: 1,2-Dichloroethane-d4	9.7		10.00		97.4	70	130			
Surr: 4-Bromofluorobenzene	9.8		10.00		98.4	70	130			
Surr: Dibromofluoromethane	9.8		10.00		97.6	70	130			
Surr: Toluene-d8	10		10.00		100	70	130			

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1307A17

29-Jan-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-22-13

Sample ID mb-8534	SampTy	pe: MBLK	Tes	tCode: EPA Metho	d 8270C: Semi	volatiles		
Client ID: PBW	Batch	ID: <b>8534</b>	F	RunNo: 12174				
Prep Date: 7/24/2013	Analysis Da	ite: 7/24/201	3	SeqNo: <b>346299</b>	Units: µg/L			
Analyte	Result	PQL SPK	value SPK Ref Val	%REC LowLimi	t HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10						
Acenaphthylene	ND	10						
Aniline	ND	10						
Anthracene	ND	10						
Azobenzene	ND	10						
Benz(a)anthracene	ND	10						
Benzo(a)pyrene	ND	10						
Benzo(b)fluoranthene	ND	10						
Benzo(g,h,i)perylene	ND	10						
Benzo(k)fluoranthene	ND	10						
Benzoic acid	ND	20						
Benzyl alcohol	ND	10						
Bis(2-chloroethoxy)methane	ND	10						
Bis(2-chloroethyl)ether	ND	10						
Bis(2-chloroisopropyl)ether	ND	10						
Bis(2-ethylhexyl)phthalate	ND	10						
4-Bromophenyl phenyl ether	ND	10						
Butyl benzyl phthalate	ND	10						
Carbazole	ND	10						
4-Chloro-3-methylphenol	ND	10						
4-Chloroaniline	ND	10						
2-Chloronaphthalene	ND	10						
2-Chlorophenol	ND	10						
4-Chlorophenyl phenyl ether	ND	10						
Chrysene	ND	10						
Di-n-butyl phthalate	ND	10						
Di-n-octyl phthalate	ND	10						
Dibenz(a,h)anthracene	ND	10						
Dibenzofuran	ND	10						
1,2-Dichlorobenzene	ND	10						
1,3-Dichlorobenzene	ND	10						
1,4-Dichlorobenzene	ND	10						
3,3'-Dichlorobenzidine	ND	10						
Diethyl phthalate	ND	10						
Dimethyl phthalate	ND	10						
2,4-Dichlorophenol	ND	20						
2,4-Dimethylphenol	ND	10						
4,6-Dinitro-2-methylphenol	ND	20						
2,4-Dinitrophenol	ND	20						
-,								

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

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### Iall Environmental Analysis Laboratory, Inc.

WO#: **1307A17 29-Jan-14** 

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-22-13

Sample ID mb-8534	SampType	e: MBLK	TestC	ode: EPA Metho	d 8270C: Semivol	atiles
Client ID: PBW	Batch ID	): <b>8534</b>	Ru	nNo: 12174		
Prep Date: 7/24/2013	Analysis Date			gNo: 346299	Units: µg/L	
Analyte	•			%REC LowLimit		%RPD RPDLimit Qual
2,4-Dinitrotoluene	ND .	10	O. IV. IV.	20112	, vigite	
2,6-Dinitrotoluene	ND	10				
Fluoranthene	ND	10				
Fluorene	ND	10				
Hexachlorobenzene	ND	10				
Hexachlorobutadiene	ND	10				
Hexachlorocyclopentadiene	ND	10				
Hexachloroethane	ND	10				
Indeno(1,2,3-cd)pyrene	ND	10				
Isophorone	ND	10				
1-Methylnaphthalene	ND	10				
2-Methylnaphthalene	ND	10				
2-Methylphenol	ND	10				
3+4-Methylphenol	ND	10				
N-Nitrosodi-n-propylamine	ND	10				
N-Nitrosodimethylamine	ND	10				
'-Nitrosodiphenylamine	ND	10				
aphthalene	ND	10				
2-Nitroaniline	ND	10				
3-Nitroaniline	ND	10				
4-Nitroaniline	ND	10				
Nitrobenzene	ND	10				
2-Nitrophenol	ND	10				
4-Nitrophenol	ND	10				
Pentachlorophenol	ND	20				
Phenanthrene	ND	10				
Phenol	ND	10				
Pyrene	ND	10				
Pyridine	ND	10				
1,2,4-Trichlorobenzene	ND	10				
2,4,5-Trichlorophenol	ND	10				
2,4,6-Trichlorophenol	ND	10				
Surr: 2,4,6-Tribromophenol	170	200.0		83.0 41.5	117	
Surr: 2-Fluorobiphenyl	76	100.0		76.2 29.1		
Surr: 2-Fluorophenol	130	200.0		65.7 11.9		
Surr: 4-Terphenyl-d14	79	100.0		78.8 <b>4</b> 6		
Surr: Nitrobenzene-d5	81	100.0		81.4 34.9		
Surr: Phenol-d5	100	200.0		50.9 17.5	88.3	

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

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### Hall Environmental Analysis Laboratory, Inc.

WO#:

1307A17

29-Jan-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-22-13

Sample ID Ics-8534	TestCode: EPA Method 8270C: Semivolatiles									
Client ID: LCSW	Batch ID: 8534			RunNo: 12174						
Prep Date: 7/24/2013	Analysis Date: 7/24/2013			SeqNo: 346300			Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	90	10	100.0	0	90.3	53.3	92.5			
4-Chloro-3-methylphenol	190	10	200.0	0	93.9	55.9	93.9			S
2-Chlorophenol	200	10	200.0	0	102	51.1	85.8			s
1,4-Dichlorobenzene	89	10	100.0	0	88.6	41.5	86.7			S
2,4-Dinitrotoluene	92	10	100.0	0	92.4	57.5	102			
N-Nitrosodi-n-propylamine	120	10	100.0	0	124	52.1	99.7			S
4-Nitrophenol	91	10	200.0	0	45.6	27.2	53			
Pentachiorophenol	120	20	200.0	0	61.9	33.7	77.7			
Phenol	130	10	200.0	0	66.2	23.3	66.3			
Pyrene	120	10	100.0	0	118	57	88.7			S
1,2,4-Trichlorobenzene	89	10	100.0	0	89.4	46.7	87.8			S
Surr: 2,4,6-Tribromophenol	220		200.0		112	41.5	117			
Surr: 2-Fluorobiphenyl	76		100.0		76.1	29.1	112			
Surr: 2-Fluorophenol	160		200.0		82.3	11.9	98.6			
Surr: 4-Terphenyl-d14	130		100.0		126	46	111			S
Surr: Nitrobenzene-d5	94		100.0		94.5	34.9	112			
Surr: Phenol-d5	150		200.0		74.1	17.5	88.3			

Sample ID Icsd-8534	SampType: LCSD  Batch ID: 8534  Analysis Date: 7/24/2013			TestCode: EPA Method 8270C: Semivolatiles						
Client ID: LCSS02				RunNo: 1:2174						
Prep Date: 7/24/2013				SeqNo: <b>346301</b>			Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	83	10	100.0	0	83.2	53.3	92.5	8.09	25	
4-Chloro-3-methylphenol	190	10	200.0	0	95.6	55.9	93.9	1.79	32.7	S
2-Chlorophenol	170	10	200.0	0	84.1	51.1	85.8	19.5	20	
1,4-Dichlorobenzene	82	10	100.0	0	81.5	41.5	86.7	8.28	20	
2,4-Dinitrotoluene	86	10	100.0	0	86.5	57.5	102	6.62	29.9	
N-Nitrosodi-n-propylamine	100	10	100.0	0	102	52.1	99.7	19.5	23.1	S
4-Nitrophenol	84	10	200.0	0	42.2	27.2	53	7.95	40.5	
Pentachlorophenol	110	20	200.0	0	55.5	33.7	77.7	10.9	37.3	
Phenol	110	10	200.0	0	54.6	23.3	66.3	19.2	20	
Pyrene	90	10	100.0	0	89.8	57	88.7	27.1	26.5	RS
1,2,4-Trichlorobenzene	87	10	100.0	0	86.8	46.7	87.8	3.02	27.2	
Surr: 2,4,6-Tribromophenol	200		200.0		98.7	41.5	117	0	0	
Surr: 2-Fluorobiphenyl	80		100.0		80.3	29.1	112	0	0	
Surr: 2-Fluorophenol	140		200.0		72.3	11.9	98.6	0	0	
Surr: 4-Terphenyl-d14	100		100.0		104	46	111	0	0	
Surr: Nitrobenzene-d5	88		100.0		88.4	34.9	112	0	0	

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
  - Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

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### all Environmental Analysis Laboratory, Inc.

WO#: 1307A17 29-Jan-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-22-13

Sample ID Icsd-8534

SampType: LCSD

TestCode: EPA Method 8270C: Semivolatiles

Client ID: LCSS02

Batch ID: 8534

RunNo: 12174

Prep Date: 7/24/2013

Analysis Date: 7/24/2013

SeqNo: 346301

Units: µg/L

Analyte

PQL SPK value SPK Ref Val %REC LowLimit

HighLimit

17.5

%RPD **RPDLimit** 

Qual

88.3

Surr: Phenol-d5

130

200.0

62.9

Qualifiers:

Value exceeds Maximum Contaminant Level.

Value above quantitation range

J Analyte detected below quantitation limits

RSD is greater than RSDlimit 0

R RPD outside accepted recovery limits

S Spike Recovery outside accepted recovery limits

Analyte detected in the associated Method Blank В

Holding times for preparation or analysis exceeded Η

Not Detected at the Reporting Limit ND

Sample pH greater than 2 for VOA and TOC only. P

Reporting Detection Limit RL

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# Hall Environmental Analysis Laboratory, Inc.

WO#:

1307A17

29-Jan-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-22-13

Sample ID 1307a17-001c dup

SampType: dup

TestCode: SM2510B: Specific Conductance

Client ID: Injection Well

Batch ID: R12146

RunNo: 12146

Prep Date:

Analysis Date: 7/23/2013

SeqNo: 345610

Units: umhos/cm

Analyte

PQL

SPK value SPK Ref Val %REC LowLimit HighLimit %RPD

**RPDLimit** 

Qual

Conductivity

3400 0.010 1.05

20

Qualifiers:

Value exceeds Maximum Contaminant Level.

Value above quantitation range E

Analyte detected below quantitation limits

0 RSD is greater than RSDlimit

RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

В Analyte detected in the associated Method Blank

Holding times for preparation or analysis exceeded Н

ND Not Detected at the Reporting Limit

Sample pH greater than 2 for VOA and TOC only.

Reporting Detection Limit

Page 18 of 21

# all Environmental Analysis Laboratory, Inc.

WO#: 1307A17

29-Jan-14

Client: Western Refining Southwest, Inc.

**Project:** Injection Well 7-22-13

Sample ID 1307a17-001c dup SampType: dup TestCode: SM4500-H+B: pH

Client ID: Injection Well Batch ID: R12146 RunNo: 12146

Prep Date: Analysis Date: 7/23/2013 SeqNo: 345619 Units: pH units

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

pΗ

7.41 1.68

Qualifiers:

* Value exceeds Maximum Contaminant Level.

E Value above quantitation range

Analyte detected below quantitation limits

O RSD is greater than RSDlimit

R RPD outside accepted recovery limits

S Spike Recovery outside accepted recovery limits

B Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

P Sample pH greater than 2 for VOA and TOC only.

RL Reporting Detection Limit

Page 19 of 21

# Hall Environmental Analysis Laboratory, Inc.

WO#:

1307A17

29-Jan-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-22-13

Sample ID mb-1

SampType: mblk

TestCode: SM2320B: Alkalinity

Client ID: PBW

Batch ID: R12146 Analysis Date: 7/23/2013 RunNo: 12146

SeqNo: 345597

Units: mg/L CaCO3

Prep Date: Analyte

Result

**PQL** SPK value SPK Ref Val %REC HighLimit

%RPD **RPDLimit** 

Qual

Total Alkalinity (as CaCO3)

ND 20

Sample ID Ics-1

SampType: Ics

TestCode: SM2320B: Alkalinity

Client ID: LCSW

Batch ID: R12146

PQL

RunNo: 12146

LowLimit

Prep Date:

Analysis Date: 7/23/2013

SeqNo: 345598

Units: mg/L CaCO3

Analyte

SPK value SPK Ref Val %REC LowLimit

%RPD

**RPDLimit** 

Qual

Total Alkalinity (as CaCO3)

Result 80

80.00

0

101

HighLimit 110

#### Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

RSD is greater than RSD limit 0

RPD outside accepted recovery limits R

Spike Recovery outside accepted recovery limits

Analyte detected in the associated Method Blank В

Holding times for preparation or analysis exceeded H

Sample pH greater than 2 for VOA and TOC only.

ND Not Detected at the Reporting Limit Page 20 of 21

Reporting Detection Limit

# 'all Environmental Analysis Laboratory, Inc.

WO#: 1307A17

29-Jan-14

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 7-22-13

Sample ID MB-8535

SampType: MBLK

TestCode: SM2540C MOD: Total Dissolved Solids

Client ID: PBW

Batch ID: 8535

RunNo: 12190

Prep Date: 7/24/2013

Analysis Date: 7/25/2013

SeqNo: 346731

Units: mg/L

HighLimit

%RPD

**RPDLimit** Qual

Analyte Total Dissolved Solids

Analyte

Result **PQL** ND 20.0

Sample ID LCS-8535 Client ID: LCSW

SampType: LCS Batch ID: 8535 TestCode: SM2540C MOD: Total Dissolved Solids

RunNo: 12190

Prep Date: 7/24/2013

Analysis Date: 7/25/2013

SeqNo: 346732

Units: mg/L

%RPD **RPDLimit** Quai

**PQL** 20.0

SPK value SPK Ref Val

%REC 101

HighLimit

SPK value SPK Ref Val %REC LowLimit

**Total Dissolved Solids** 

1010

1000

120

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Value above quantitation range
- Analyte detected below quantitation limits
- RSD is greater than RSDlimit 0
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Holding times for preparation or analysis exceeded Н
- Not Detected at the Reporting Limit
- Sample pH greater than 2 for VOA and TOC only.
- Reporting Detection Limit

Page 21 of 21



Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NiA 87109

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

# Sample Log-In Check List

Client Name:	Western Refining Southw	Work Order Number	er: 1307A17		RcptNo:	
Received by/da Logged By: Completed By: Reviewed By:	Ashley Gallegos Ashley Gallegos	07/23/2013 9:00:00 AI 7/23/2013 11:56:16 / 07/27/13		A		
Chain of Cus	<u>stody</u>					
1. Custody se	als intact on sample bottles?		Yes	No i	Not Present	
2. Is Chain of	Custody complete?		Yes 🗸	No	Not Present	
3. How was th	e sample delivered?		<u>UPS</u>			
<u>Log In</u>						
4. Was an att	empt made to cool the sample	s?	Yes ✓	No :	NA	
5. Were all sa	mples received at a temperato	ure of >0°C to 6.0°C	Yes 🗸	No i i	NA	
6. Sample(s)	in proper container(s)?		Yes 🗸	No '		
7. Sufficient s	ample volume for indicated tes	st(s)?	Yes 🗸	No !		
8. Are sample	s (except VOA and ONG) proj	perly preserved?	Yes 🗸	No : !		
9. Was preser	rvative added to bottles?		Yes ! i	No 🗸	NA	
10.VOA vials h	nave zero headspace?		Yes 🗸	No !!	No VOA Vials	
11. Were any	sample containers received br	oken?	Yes	No 🗸	# of preserved bottles checked	2.2
	rwork match bottle labels? epancies on chain of custody)		Yes ♥	No :	for pH:	>12 unless noted)
13. Are matrice	s correctly identified on Chain	of Custody?	Yes 🗸	No !	Adjusted?	~ VW
14. Is it clear w	hat analyses were requested?		Yes 🗸	No		(0)
	Iding times able to be met? y customer for authorization.)		Yes 'V':	No ! !	Checked by:	AR
Special Hand	dling (if applicable)					
16. Was client	notified of all discrepancies wi	th this order?	Yes i	No !	NA 🗸	
Perso	on Notified:	Date				
By W	/hom:	Via:	eMail :	Phone Fax	in Person	
Rega	rding:			and a second control of the second		
Clien	t Instructions:	gyr y mangir i frankliker og forski fikan <u>den fik</u> iskeine i franklikerie	de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de			
17. Additional	rernarks:					
18. Cooler Inf Cooler I	No Temp °C Condition	Seal Intact   Seal No   Not Present	Seal Date	Signed By		

С	hain-	of-Cu	stody Record	Turn-Around	Time:		]								<b>.</b>			4=	<b></b>	1	
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	اعادد	176	7	Project Name			┧ 🏻													JR	
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QA/QC I	Package:	_	evel 4 (Full Validation)				8	3as	0	0	곘	MS)	শ্ব	,o	PCB's			200			
Accredi			ever 4 (Full Validation)	Sampler: M	ATT + Bot		TMB's (8021)	) H	DR			S O	٤]	02/	82			٤	Ī	团	
□ NEL		□ Othe	r	lenges	AIV T DOL	) tentri November (1987)	] =	+ TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	70) (Hear		or 8270 SIMS)	RCRA 8 Metals Ca. My Na, K	3.Z	8081 Pesticides / 8082		a	Corresiv	7	<u>,</u> ;‡	Bubbles (Y or N)
□ EDD	(Type)			Sample Refri	galeidiseins		띪	삤	(GR	H		ō	tals	8	sep		8270 (Semi-VOA)	占	坦	2	J'S
						A Section 1	MTBE	+ MTBE	5B			(8310	ğ	D, T	stici	Š	Ë	4	(3	씻	
Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative	ER MILEAL NO	#	+ ×	88	4		) s (	8 8	) SU	g.	8260B (VOA)	S) (S	ĪĠ	Leath 1	可	纤
			·	1 ype and #	Туре	Layland Top William	BTEX	BTEX	핕			PAH's (	낊	Anio	808	826	827(	2	R	17	₹Ñ
7-22-13	2:00	Hao	Injection Well	3-VOA	HCI	-001										X					
ì	1	1	,	1-Liter	Amber												X				
				1-500ml			T											X		$\Box$	
_				1-500m						X	,		$\neg$							X	
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	f necessary,	samples subr	mitted to Hall Environmental may be sub-	contracted to other a	ccredited laboratorie	s. This serves as notice of the	is poss	ibility.	Any s	ub-con	racte	d data v	will be	clear	y nota	ted or	the a	ınalytic	al repo	ort.	



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

December 06, 2013

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4135 FAX (505) 632-3911

RE: Injection Well 11-7-13 OrderNo.: 1311335

## Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 11/8/2013 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to <a href="www.hallenvironmental.com">www.hallenvironmental.com</a> or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

Lab Order 1311335

Date Reported: 12/6/2013

# Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc.

Project: Injection Well 11-7-13

**Lab ID:** 1311335-001

Client Sample ID: Inj. Well

Collection Date: 11/7/2013 8:00:00 AM

Received Date: 11/8/2013 10:00:00 AM

EPA METHOD 30.0: ANIONS	Analyses	Result	RL	Qual Units	DF	Date Analyzed	Batch
Sulfate   23   5.0   mg/L   10   11/9/2013 2:54:05 AM   R14683	EPA METHOD 300.0: ANIONS					Analyst	JRR
Marcury   ND   0.00020   mg/L   1   11/18/2013 4:58:29 PM   10368	Chloride	1300	50	mg/L	100	11/9/2013 3:06:30 AM	R14683
Mercury   ND   0.00020   mg/L   1   11/18/2013 4:58:29 PM   10368   EPA 6010B: TOTAL RECOVERABLE METALS	Sulfate	23	5.0	mg/L	10	11/9/2013 2:54:05 AM	R14683
Arsenic	EPA METHOD 7470: MERCURY					Analyst	JML
Arsenic ND 0.020 mg/L 1 11/12/2013 5:28:52 PM 10290 Cadmium 0.34 0.020 mg/L 1 11/12/2013 5:28:52 PM 10290 Cadmium ND 0.0020 mg/L 1 11/12/2013 5:28:52 PM 10290 Chromium 190 5.0 mg/L 5 11/12/2013 5:28:52 PM 10290 Chromium 0.014 0.0060 mg/L 1 11/12/2013 5:28:52 PM 10290 Chromium 0.014 0.0060 mg/L 1 11/12/2013 5:28:52 PM 10290 Lead ND 0.0050 mg/L 1 11/12/2013 5:28:52 PM 10290 Magnesium 51 1.0 mg/L 1 11/12/2013 5:28:52 PM 10290 Magnesium 21 1.0 mg/L 1 11/12/2013 5:28:52 PM 10290 Selenium ND 0.050 mg/L 1 11/12/2013 5:28:52 PM 10290 Selenium ND 0.050 mg/L 1 11/12/2013 5:28:52 PM 10290 Sodium 670 50 mg/L 1 11/12/2013 5:28:52 PM 10290 Sodium 670 50 mg/L 1 11/12/2013 5:28:52 PM 10290 Sodium 670 50 mg/L 1 11/12/2013 5:28:52 PM 10290 Sodium 670 50 mg/L 1 11/12/2013 5:24:52 PM 10290 Sodium 670 50 mg/L 1 11/12/2013 5:24:52 PM 10290 Sodium 670 50 mg/L 1 11/12/2013 5:24:52 PM 10290 Sodium 670 50 mg/L 1 11/12/2013 5:24:54 PM 10290 Sodium 670 50 mg/L 1 11/12/2013 5:24:54 PM 10290 Sodium 670 50 mg/L 1 11/12/2013 5:22:45 PM 10311 Analine ND 50 mg/L 1 11/12/2013 5:22:45 PM 10311 Analine ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Analine ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Analine ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Analine ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)anthracene ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)anthracene ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)anthracene ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)pyrene ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)myrene ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)myrene ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)myrene ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)myrene ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)myrene ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)myrene ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)myrene ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)myrene ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)myrene ND 50 mg/L 1 11/12/2013 2:22:45 PM 10311 Benz(a)myrene ND 50 mg/L 1 11/12/2013 2:22:45 PM	Mercury	ND	0.00020	mg/L	1	11/18/2013 4:58:29 PM	10368
Barlum	EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst	JLF
Cadmium         ND         0.0020         mg/L         1         11/12/2013 5:28:52 PM         10290           Calcium         190         5.0         mg/L         5         11/12/2013 5:28:52 PM         10290           Chromium         0.014         0.0060         mg/L         1         11/12/2013 5:28:52 PM         10290           Lead         ND         0.0050         mg/L         1         11/12/2013 5:28:52 PM         10290           Magnesium         51         1.0         mg/L         1         11/12/2013 5:28:52 PM         10290           Selenium         D         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           Selenium         ND         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           Selenium         ND         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           Sodium         670         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           EPA METHOD 8270C: SEMIVOLATILES          0.050         mg/L         1         11/12/2013 2:22:45 PM         10290           Acenaphthene         ND         50         µg/L         1<	Arsenic	ND	0.020	mg/L	1	11/12/2013 5:28:52 PM	10290
Calcium         190         5.0         mg/L         5         11/12/2013 5:31:33 PM         10290           Chromium         0.014         0.0060         mg/L         1         11/12/2013 5:28:52 PM         10290           Lead         ND         0.0050         mg/L         1         11/12/2013 5:28:52 PM         10290           Magnesium         51         1.0         mg/L         1         11/12/2013 5:28:52 PM         10290           Selenium         ND         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           Silver         ND         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           Solium         670         50         mg/L         1         11/12/2013 5:28:52 PM         10290           Solium         670         50         mg/L         1         11/12/2013 5:28:52 PM         10290           Solium         670         50         mg/L         1         11/12/2013 5:28:52 PM         10290           Solium         670         50         mg/L         1         11/14/2013 2:22:45 PM         10290           Solium         670         50         mg/L         1         11/14/2013 2:22:45 PM	Barium	0.34	0.020	-	1	11/12/2013 5:28:52 PM	10290
Chromium         0.014         0.0060         mg/L         1         11/12/2013 5:28:52 PM         10290           Lead         ND         0.0050         mg/L         1         11/12/2013 5:28:52 PM         10290           Magnesium         51         1.0         mg/L         1         11/12/2013 5:28:52 PM         10290           Selenium         ND         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           Silver         ND         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           Sodium         ND         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           Sodium         ND         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           Sodium         ND         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           EPA METHOD 8270C: SEMIVOLATILES         X         X         ND         50         mg/L         1         11/14/2013 5:22:245 PM         10311           Accanaphthrene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Annilse         ND         50	Cadmium	ND	0.0020	mg/L	1	11/12/2013 5:28:52 PM	10290
Lead	Calcium	190	5.0	mg/L	5	11/12/2013 5:31:33 PM	10290
Magnesium         51         1.0         mg/L         1         11/12/2013 5:28:52 PM         10290           Potassium         21         1.0         mg/L         1         11/12/2013 5:28:52 PM         10290           Selenium         ND         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           Silver         ND         0.0050         mg/L         1         11/12/2013 5:28:52 PM         10290           Sodium         670         50         mg/L         50         11/12/2013 5:28:52 PM         10290           EPA METHOD 8270C: SEMIVOLATILES         *** *** *** *** *** *** *** *** *** **	Chromium	0.014	0.0060	mg/L	1	11/12/2013 5:28:52 PM	10290
Polassium         21         1.0         mg/L         1         11/12/2013 5:28:52 PM         10290           Selenium         ND         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           Silver         ND         0.0050         mg/L         1         11/12/2013 5:28:52 PM         10290           Sodium         670         50         mg/L         1         11/12/2013 5:28:52 PM         10290           EPA METHOD 8270C: SEMIVOLATILES         Anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo anilogo	Lead	ND	0.0050	mg/L	1	11/12/2013 5:28:52 PM	10290
Potassium         21         1.0         mg/L         1         11/12/2013 5:28:52 PM         10290           Selenium         ND         0.050         mg/L         1         11/12/2013 5:28:52 PM         10290           Silver         ND         0.0050         mg/L         1         11/12/2013 5:28:52 PM         10290           Sodium         670         50         mg/L         1         11/12/2013 5:28:52 PM         10290           EPA METHOD 8270C: SEMIVOLATILES         The part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the part of the	Magnesium	51	1.0	mg/L	1	11/12/2013 5:28:52 PM	10290
Silver         ND         0.0050         mg/L         1         11/12/2013 5:28:52 PM         10290           Sodium         670         50         mg/L         50         11/12/2013 5:28:52 PM         10290           EPA METHOD 8270C: SEMIVOLATILES         Analyst: JDC           Acenaphthene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Acenaphthylene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Acenaphthylene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Acenaphthylene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Acenaphthylene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Acenaphthylene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Acenaphthylene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(a)pyrene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         103	<u> </u>	21	1.0	mg/L	1	11/12/2013 5:28:52 PM	10290
Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   Sodium   S	Selenium	ND	0.050	mg/L	1	11/12/2013 5:28:52 PM	10290
EPA METHOD 8270C: SEMIVOLATILES         Analyst: JDC           Acenaphthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Acenaphthylene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Anline         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Anthracene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Azobenzene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(a)anthracene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(a)pyrene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(b)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(c), h.i)perylene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(c), h.i)perylene         ND         50         μg/L         1         11/14/2013 2:22:45 PM	Silver	ND	0.0050	mg/L	1	11/12/2013 5:28:52 PM	10290
Acenaphthene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Acenaphthylene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Aniline         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Anthracene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Azobenzene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Benz(a)anthracene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(a)pyrene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(a)pyrene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(a)pyrene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(b)fluoranthene         ND         50         µg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         µg/L	Sodium	670	50	mg/L	50	11/12/2013 5:44:14 PM	10290
Acenaphthylene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Aniline         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Anthracene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Azobenzene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(a)anthracene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(a)pyrene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(b)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50	EPA METHOD 8270C: SEMIVOLATIL	LES				Analyst	JDC
Acenaphthylene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Aniline         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Anthracene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Azobenzene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benz(a)anthracene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(a)pyrene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(b)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50	Acenaphthene	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
Aniline ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Anthracene ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Azobenzene ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Benz(a)anthracene ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Benzo(a)pyrene ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Benzo(b)filuoranthene ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Benzo(g,h,i)perylene ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Benzo(k)filuoranthene ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Benzo(k)filuoranthene ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Benzo(c acid ND 200 µg/L 1 11/14/2013 2:22:45 PM 10311 Benzyl alcohol ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Bis(2-chloroethoxy)methane ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Bis(2-chloroethoxy)methane ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Bis(2-chloroethoxy)methane ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Bis(2-chloroethyl)ether ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Bis(2-chloroethyl)ether ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Bis(2-ethylhexyl)phthalate ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Bis(2-ethylhexyl)phthalate ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Butyl benzyl phthalate ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Butyl benzyl phthalate ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Carbazole ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Carbazole ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311	•	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
Anthracene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Azobenzene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benz(a)anthracene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(a)pyrene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(b)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(g,h,i)perylene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND		ND	50		1	11/14/2013 2:22:45 PM	10311
Azobenzene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benz(a)anthra cene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(a)pyrene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(b)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzoic acid         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzoic acid         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzoic acid         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzoic acid         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzoic acid         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bisic 2-chloroethoxy)methane         ND         50	Anthracene	ND	50		1	11/14/2013 2:22:45 PM	10311
Benzo(a)pyrene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(b)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(g,h,i)perylene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzoic acid         ND         200         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzyl alcohol         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethoxy)methane         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethoxy)methane         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroisopropyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Bromophenyl pheny	Azobenzene	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
Benzo(a)pyrene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(b)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(g,h,i)perylene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzoic acid         ND         200         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzyl alcohol         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethoxy)methane         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroisopropyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-ethylhexyl)phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Bromophenyl pheny	Benz(a)anthracene	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
Benzo(b)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(g,h,i)perylene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzoic acid         ND         200         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzyl alcohol         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethoxy)methane         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroisopropyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-ethylhexyl)phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Bromophenyl phenyl ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Butyl b	. ,	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
Benzo(k)fluoranthene         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzoic acid         ND         200         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzyl alcohol         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethoxy)methane         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroisopropyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-ethylhexyl)phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Bromophenyl phenyl ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Butyl benzyl phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Carbazole         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Chloro-3-methy	Benzo(b)fluoranthene	ND	50		1	11/14/2013 2:22:45 PM	10311
Benzoic acid         ND         200         μg/L         1         11/14/2013 2:22:45 PM         10311           Benzyl alcohol         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethoxy)methane         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroisopropyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-ethylhexyl)phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Bromophenyl phenyl ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Butyl benzyl phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Carbazole         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Chloro-3-methylphenol         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311	Benzo(g,h,i)perylene	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
Benzyl alcohol         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethoxy)methane         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroisopropyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-ethylhexyl)phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Bromophenyl phenyl ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Butyl benzyl phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Carbazole         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Chloro-3-methylphenol         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311	Benzo(k)fluoranthene	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
Bis(2-chloroethoxy)methane         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroethyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroisopropyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-ethylhexyl)phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Bromophenyl phenyl ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Butyl benzyl phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Carbazole         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Chloro-3-methylphenol         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311	Benzoic acid	ND	200	μg/L	1	11/14/2013 2:22:45 PM	10311
Bis(2-chloroethyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-chloroisopropyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-ethylhexyl)phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Bromophenyl phenyl ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Butyl benzyl phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Carbazole         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Chloro-3-methylphenol         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311	Benzyl alcohol	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
Bis(2-chloroisopropyl)ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Bis(2-ethylhexyl)phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Bromophenyl phenyl ether         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Butyl benzyl phthalate         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           Carbazole         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311           4-Chloro-3-methylphenol         ND         50         μg/L         1         11/14/2013 2:22:45 PM         10311	Bis(2-chloroethoxy)methane	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
Bis(2-ethylhexyl)phthalate       ND       50       μg/L       1       11/14/2013 2:22:45 PM       10311         4-Bromophenyl phenyl ether       ND       50       μg/L       1       11/14/2013 2:22:45 PM       10311         Butyl benzyl phthalate       ND       50       μg/L       1       11/14/2013 2:22:45 PM       10311         Carbazole       ND       50       μg/L       1       11/14/2013 2:22:45 PM       10311         4-Chloro-3-methylphenol       ND       50       μg/L       1       11/14/2013 2:22:45 PM       10311	Bis(2-chloroethyl)ether	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
4-Bromophenyl phenyl ether ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 Butyl benzyl phthalate ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 Carbazole ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 4-Chloro-3-methylphenol ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311	Bis(2-chloroisopropyl)ether	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
Butyl benzyl phthalate       ND       50       μg/L       1       11/14/2013 2:22:45 PM       10311         Carbazole       ND       50       μg/L       1       11/14/2013 2:22:45 PM       10311         4-Chloro-3-methylphenol       ND       50       μg/L       1       11/14/2013 2:22:45 PM       10311	Bis(2-ethylhexyl)phthalate	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
Carbazole ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 4-Chloro-3-methylphenol ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311	4-Bromophenyl phenyl ether	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
4-Chloro-3-methylphenol ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311		ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
	Carbazole	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
4-Chloroaniline ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311	4-Chloro-3-methylphenol	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311
	4-Chloroaniline	ND	50	μg/L	1	11/14/2013 2:22:45 PM	10311

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

Page 1 of 14

- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

Lab Order 1311335

Date Reported: 12/6/2013

## Hall Environmental Analysis Laboratory, Inc.

**CLIENT:** Western Refining Southwest, Inc. Client Sample ID: Inj. Well

Injection Well 11-7-13 Collection Date: 11/7/2013 8:00:00 AM Project: Lab ID: 1311335-001 Matrix: AQUEOUS Received Date: 11/8/2013 10:00:00 AM

Result **RL** Qual Units DF Date Analyzed Batch Analyses **EPA METHOD 8270C: SEMIVOLATILES** Analyst: JDC 11/14/2013 2:22:45 PM 10311 μg/L 2-Chloronaphthalene ND 50 1 ND 50 μg/L 11/14/2013 2:22:45 PM 10311 2-Chlorophenol ND 50 11/14/2013 2:22:45 PM 10311 4-Chlorophenyl phenyl ether μg/L 1 Chrysene ND 50 μg/L 11/14/2013 2:22:45 PM 10311 Di-n-butyl phthalate ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 Di-n-octyl phthalate ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 μg/L Dibenz(a,h)anthracene ND 50 1 11/14/2013 2:22:45 PM 10311 ND Dibenzofuran 50 μg/L 1 11/14/2013 2:22:45 PM 10311 1,2-Dichlorobenzene ND 50 μg/L 1 11/14/2013 2:22:45 PM 50 ND μg/L 1 11/14/2013 2:22:45 PM 10311 1,3-Dichlorobenzene ND 50 11/14/2013 2:22:45 PM 10311 1,4-Dichlorobenzene μg/L 1 ND 50 μg/L 3,3'-Dichlorobenzidine 1 11/14/2013 2:22:45 PM 10311 Diethyl phthalate ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 Dimethyl phthalate ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 ND 100 2,4-Dichlorophenol μg/L 1 11/14/2013 2:22:45 PM 10311 2.4-Dimethylphenol ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 ND 100 μg/L 1 11/14/2013 2:22:45 PM 10311 4,6-Dinitro-2-methylphenol 2,4-Dinitrophenol ND 100 μg/L 1 11/14/2013 2:22:45 PM ND 50 μg/L 1 2,4-Dinitrotoluene 11/14/2013 2:22:45 PM 10311 2,6-Dinitrotoluene ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 Fluoranthene ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 Fluorene Hexachlorobenzene ND 50 µg/L 1 11/14/2013 2:22:45 PM 10311 ND 50 Hexachlorobutadiene μg/L 1 11/14/2013 2:22:45 PM 10311 50 Hexachlorocyclopentadiene ND μg/L 11/14/2013 2:22:45 PM 10311 ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 Hexachloroethane ND 50 1 11/14/2013 2:22:45 PM 10311 Indeno(1,2,3-cd)pyrene μg/L ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 Isophorone 1-Methylnaphthalene ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 2-Methylnaphthalene ND 50 µa/L 1 11/14/2013 2:22:45 PM 10311 11/14/2013 2:22:45 PM 10311 2-Methylphenol ND 50 μg/L 1 3+4-Methylphenol ND 50 μg/L 11/14/2013 2:22:45 PM 10311 ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 N-Nitrosodi-n-propylamine N-Nitrosodimethylamine ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 50 N-Nitrosodiphenylamine ND μg/L 1 11/14/2013 2:22:45 PM 10311 50 ND 1 11/14/2013 2:22:45 PM 10311 Naphthalene μg/L 2-Nitroaniline ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 ND 50 1 3-Nitroaniline μg/L 11/14/2013 2:22:45 PM 10311

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

50

µg/L

ND

#### Qualifiers:

4-Nitroaniline

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Ţ Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- RPD outside accepted recovery limits R
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank R
- Holding times for preparation or analysis exceeded Н
- ND Not Detected at the Reporting Limit
  - Page 2 of 14 Sample pH greater than 2 for VOA and TOC only.

11/14/2013 2:22:45 PM 10311

Reporting Detection Limit

#### Lab Order 1311335

Received Date: 11/8/2013 10:00:00 AM

Date Reported: 12/6/2013

#### Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

1311335-001

Lab ID:

Client Sample ID: Inj. Well

Collection Date: 11/7/2013 8:00:00 AM Injection Well 11-7-13 Project: Matrix: AQUEOUS

RL Qual Units Batch Analyses Result DF Date Analyzed **EPA METHOD 8270C: SEMIVOLATILES** Analyst: JDC 11/14/2013 2:22:45 PM 10311 Nitrobenzene ND 50 μg/L ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 2-Nitrophenol ND 50 4-Nitrophenol μg/L 1 11/14/2013 2:22:45 PM 10311 Pentachlorophenol ND 100 μg/L 11/14/2013 2:22:45 PM 10311 ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 Phenanthrene Phenol ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 ND 50 μg/L 1 11/14/2013 2:22:45 PM 10311 Pyrene ND Pyridine 50 μg/L 1 11/14/2013 2:22:45 PM 10311 1,2,4-Trichlorobenzene ND 50 μg/L 11/14/2013 2:22:45 PM 10311 ND 50 11/14/2013 2:22:45 PM 10311 μg/L 2,4,5-Trichlorophenol ND 50 11/14/2013 2:22:45 PM 10311 2.4.6-Trichlorophenol μg/L %REC 56 8 22.7-98 1 11/14/2013 2:22:45 PM 10311 Surr: 2-Fluorophenol 45 3 23.4-74.9 %REC 11/14/2013 2:22:45 PM 10311 Surr: Phenol-d5 23.3-111 %REC 11/14/2013 2:22:45 PM 10311 Surr: 2,4,6-Tribromophenol 83.0 Surr: Nitrobenzene-d5 72.4 36.8-111 %REC 11/14/2013 2:22:45 PM 10311 75.7 38.3-110 %REC 11/14/2013 2:22:45 PM 10311 Surr: 2-Fluorobiphenyl 52.1-116 %REC 11/14/2013 2:22:45 PM 10311 Surr: 4-Terphenyl-d14 75.6 **EPA METHOD 8260B: VOLATILES** Analyst: cadg Benzene ND 1.0 μg/L 11/12/2013 3:55:06 PM R14754 Toluene ND 1.0 μg/L 11/12/2013 3:55:06 PM R14754 ND 1.0 μg/L 1 11/12/2013 3:55:06 PM R14754 Ethylbenzene ND 1.0 μg/L 11/12/2013 3:55:06 PM R14754 Methyl tert-butyl ether (MTBE) 1.0 11/12/2013 3:55:06 PM R14754 1.0 µg/L 1 1,2,4-Trimethylbenzene 1.3.5-Trimethylbenzene ND 1.0 μg/L 1 11/12/2013 3:55:06 PM R14754 ND 1.0 μg/L 11/12/2013 3:55:06 PM R14754 1,2-Dichloroethane (EDC) ND 1,2-Dibromoethane (EDB) 1.0 μg/L 1 11/12/2013 3:55:06 PM R14754 Naphthalene ND 2.0 μg/L 11/12/2013 3:55:06 PM R14754 1-Methylnaphthalene ND 4.0 μg/L 1 11/12/2013 3:55:06 PM R14754 2-Methylnaphthalene ND 4.0 μg/L 1 11/12/2013 3:55:06 PM R14754 34 10 μg/L 11/12/2013 3:55:06 PM R14754 Acetone ND 1.0 μg/L 1 11/12/2013 3:55:06 PM R14754 Bromobenzene Bromodichloromethane ND 1.0 µg/L 1 11/12/2013 3:55:06 PM R14754 ND 1.0 μg/L 11/12/2013 3:55:06 PM R14754 **Bromoform** ND 3.0 μg/L 1 11/12/2013 3:55:06 PM R14754 Bromomethane 10 2-Butanone ND μg/L 1 11/12/2013 3:55:06 PM R14754 ND 10 Carbon disulfide μg/L 1 11/12/2013 3:55:06 PM R14754

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

1.0

1.0

2.0

μg/L

μg/L

μg/L

ND

ND

ND

#### Qualifiers:

Carbon Tetrachloride

Chlorobenzene

Chloroethane

- Value exceeds Maximum Contaminant Level.
- E. Value above quantitation range
- Analyte detected below quantitation limits
- 0 RSD is greater than RSDlimit
- R. RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank

1

1

- Н Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit ND
- Page 3 of 14 P Sample pH greater than 2 for VOA and TOC only.

11/12/2013 3:55:06 PM R14754

11/12/2013 3:55:06 PM R14754

11/12/2013 3:55:06 PM R14754

Reporting Detection Limit

Lab Order 1311335

Date Reported: 12/6/2013

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

Client Sample ID: Inj. Well

Project: Injection Well 11-7-13

**Collection Date:** 11/7/2013 8:00:00 AM

Lab ID: 1311335-001

Matrix: AQUEOUS

Received Date: 11/8/2013 10:00:00 AM

nalyses	Result	RL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analy	st: cadg
Chloroform	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
Chloromethane	ND	3.0	μg/L	1	11/12/2013 3:55:06 P	M R147
2-Chlorotoluene	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
4-Chlorotoluene	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
cis-1,2-DCE	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	11/12/2013 3:55:06 P	M R147
Dibromochloromethane	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
Dibromomethane	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
1,2-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
1,3-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
1,4-Dichlorobenzene	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
Dichlorodifluoromethane	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
1,1-Dichloroethane	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
1,1-Dichloroethene	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
1,2-Dichloropropane	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
1,3-Dichloropropane	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R147
2,2-Dichloropropane	ND	2.0	μg/L	1	11/12/2013 3:55:06 P	M R14
1,1-Dichloropropene	ND	1.0	μg/L	1	11/12/2013 3:55:06 P	M R14
Hexachlorobutadiene	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
2-Hexanone	ND	10	μg/L	1	11/12/2013 3:55:06 F	M R14
Isopropylbenzene	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
4-Isopropyltoluene	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
4-Methyl-2-pentanone	ND	10	μg/L	1	11/12/2013 3:55:06 F	M R14
Methylene Chloride	ND	3.0	µg/L	1	11/12/2013 3:55:06 F	M R14
n-Butylbenzene	ND	3.0	μg/L	1	11/12/2013 3:55:06 F	M R14
n-Propylbenzene	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
sec-Butylbenzene	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
Styrene	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
tert-Butylbenzene	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	11/12/2013 3:55:06 F	M R14
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
trans-1,2-DCE	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
1,1,1-Trichloroethane	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14
1,1,2-Trichloroethane	ND	1.0	μg/L	1	11/12/2013 3:55:06 F	M R14

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit Page 4 of
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

## Lab Order 1311335

Date Reported: 12/6/2013

# Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.

**Project:** Injection Well 11-7-13

1311335-001

Lab ID:

Client Sample ID: Inj. Well

**Collection Date:** 11/7/2013 8:00:00 AM

Received Date: 11/8/2013 10:00:00 AM

Analyses	Result	RL C	Qual Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES					Analys	t: cadg
Trichloroethene (TCE)	ND	1.0	μg/L	1	11/12/2013 3:55:06 PM	1 R14754
Trichlorofluoromethane	ND	1.0	μg/L	1	11/12/2013 3:55:06 PM	1 R14754
1,2,3-Trichloropropane	ND	2.0	μg/L	1	11/12/2013 3:55:06 PM	1 R14754
Vinyl chloride	ND	1.0	μg/L	1	11/12/2013 3:55:06 PM	1 R14754
Xylenes, Total	ND	1.5	μg/L	1	11/12/2013 3:55:06 PM	1 R14754
Surr: 1,2-Dichloroethane-d4	102	70-130	%REC	1	11/12/2013 3:55:06 PN	1 R14754
Surr: 4-Bromofluorobenzene	92.3	70-130	%REC	1	11/12/2013 3:55:06 PM	1 R14754
Surr: Dibromofluoromethane	103	70-130	%REC	1	11/12/2013 3:55:06 PM	1 R14754
Surr: Toluene-d8	95.7	70-130	%REC	1	11/12/2013 3:55:06 PN	1 R14754
SM2510B: SPECIFIC CONDUCTANO	CE				Analys	t: JML
Conductivity	4400	0.010	µmhos/cm	1	11/8/2013 9:27:49 PM	R14690
SM4500-H+B: PH					Analys	t: JML
рН	7.42	1.68	H pH units	1	11/8/2013 9:27:49 PM	R14690
SM2320B: ALKALINITY					Analys	t: JML
Bicarbonate (As CaCO3)	430	20	mg/L CaCO3	1	11/8/2013 9:27:49 PM	R14690
Carbonate (As CaCO3)	ND	2.0	mg/L CaCO3	1	11/8/2013 9:27:49 PM	R14690
Total Alkalinity (as CaCO3)	430	20	mg/L CaCO3	1	11/8/2013 9:27:49 PM	R14690
SM2540C MOD: TOTAL DISSOLVED	SOLIDS				Analys	t: JML
Total Dissolved Solids	2940	200	* mg/L	1	11/12/2013 4:13:00 PM	1 10275

Matrix: AQUEOUS

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit Page
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

#### **CASE NARRATIVE**

#### **December 4, 2013**

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM

Project Tracking No.: 1311335 Anatek Batch: 131112008

Project Summary: One (1) water sample was received on 11/12/2013 for RCI analysis. The sample was received

with appropriate chain of custody at 2.9C.

Client Sample ID 1311335-001E / Inj Well Anatek Sample ID 131112008-001

Method/Prep Method

SW846Ch7/EPA 1010/EPA 150.1

#### QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Υ	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	N	See Note
Method Blank(s) Valid?	Υ	NA
Tune(s) Valid?	NA	NA
Internal Standard Responses Valid?	NA	NA
Initial Calibration Curve(s) Valid?	Y	NA .
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

#### 1. Holding Time Requirements

No problems encountered.

#### 2. GC/MS Tune Requirements

N/A

#### 3. Calibration Requirements

No problems encountered.

#### 4. Surrogate Recovery Requirements

N/A.

#### 5. QC Sample (LCS/MS/MSD) Recovery Requirements

MS/MSD for reactive CN failed slightly low. LCS recovery was acceptable and MS/MSD RPD were acceptable. Potential matrix affect.

#### 6. Method Blank Requirements

No problems encountered.

7. Internal	<b>Standard</b>	(s) Res	ponse Rec	ulrements
-------------	-----------------	---------	-----------	-----------

N/A.

#### 8. Comments

No problems encountered.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by

Nolw. Call

# Anatek Labs, Inc.

1282 Alturas Drive • Moscow, †D 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@aneteklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@aneteklabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

131112008

Address:

4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109 Project Name:

1311335

Attn:

ANDY FREEMAN

## **Analytical Results Report**

Sample Number

131112008-001

Water

Sampling Date

11/7/2013

Date/Time Received 11/12/2013 10:16 AM

Client Sample ID

1311335-001E / INJ. WELL

Sampling Time 8:00 AM

Sample Location

Metrix Comments

Parameter	Resuit	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	1	11/18/2013	CRW	SW846 CH7	M2
Flashpoint	>200	°F		11/14/2013	KFG	EPA 1010	
pΗ	6.98	ph Units		11/13/2013	KFG	EPA 150.1	
Reactive suffide	2.32	mg/L	1	11/19/2013	AJT	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

M2

Matrix spike recovery was low; the associated blank spike recovery was acceptable. Potential matrix effect EPA's Maximum Contaminant Level

MCL ND

Not Detected

PQL

Practicel Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.

The results reported relate only to the samples indicated.

Soil/solid results are reported on a dry-weight basis unless otherwise noted.

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Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

131112008

Address:

4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109 Project Name:

1311335

Attn:

ANDY FREEMAN

Analytical Results Report
Quality Control Data

Lab Control Sample										····
Parameter	LCS Resul	t Units	s LCS	Spike	%Rec	AR	%Rec	Prep	Date	Analysis Date
Reactive sulfide	0.16	mg/L	_ (	0.2	80.0	70	-130	11/19	/2013	11/19/2013
Cyanide (reactive)	0.491	mg/l		0.5	98.2	80	-120	11/15	/2013	11/18/2013
Lab Control Sample Duplicate										
Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RP	n .	AR &RPD	Prep [	<b>See </b>	Analysis Date
Reactive sulfide	0.18	mg/L	0.2	9().0	11.8		0-25	11/19/		11/19/2013
Matrix Spike			<del></del>							
Sample Number Parameter		Sample Result	M8 Result	Unit		MS	%Rec	AR %Rec	Bross Date	Amelania Dat
131113057-003A Reactive sulfide		ND	0.18	mg/l		<b>3pike</b> 0.2	90.0	70-130	Prep Date 11/19/2013	•
131112008-001 Cylanide (reactive)		ND	0.345	mg/1		0.5	69.0		11/15/2013	
Matrix Spike Duplicate										
•	MSD		MSD		_		AR	_		
Parameter Country	Result	Units	Spike			6RPD	%RPD		p Date	Analysis Date
Cyanide (reactive)	0.385	mg/L	0.5	77	.0	11.0	0-25	11/	15/2013	11/18/2013
Method Blank	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.									· · · · · · · · · · · · · · · · · · ·
Parameter		Re	sult	Ur	ilts		PQL	P	rep Date	Analysis Date
Cyanide (reactive)			ND	m	g/L		1	11/	15/2013	11/18/2013
Reactive sulfide		ı	ND	m	g/L		1	11/	19/2013	11/19/2013

AR

Acceptable Range

ND

Not Detected

PQL

Practical Quantitation Limit

RPD

Relative Percentage Difference

#### Comments:

Certifications held by Anatek Labe ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0026; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labe WA: EPA:WA00189; ID:WA00189; WA:C586; MT:Cert0095

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# **Login Report**

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB

Order ID:

131112008

4901 HAWKINS NE SUITE D

Order Date:

11/12/2013

**ALBUQUERQUE** 

NM 87109

**Contact Name: ANDY FREEMAN** 

Project Name: 1311335

Comment:

131112008-001 Customer Sample #: Sample #: 1311335-001E / INJ. WELL

Recv'd:

 $\mathbf{V}$ 

Collector:

Matrix:

Date Collected: 11/7/2013

Quantity:

Water

Date Received: 11/12/2013 10:16:00 AM

Comment:

Test	Lab	Method	Due Date	Priority
CYANIDE REACTIVE	M	SW846 CH7	11/22/2013	Normal (~10 Days)
FLASHPOINT	M	EPA 1010	11/22/2013	Normal (~10 Days)
ρΗ	М	EPA 150.1	11/22/2013	Normal (~10 Days)
SULFIDE REACTIVE	M	SW846 CH7	11/22/2013	Normal (~10 Days)

#### **SAMPLE CONDITION RECORD**

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	2.9
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

# CHAIN OF CUSTODY RECORD

PAGE:	1	GF: 1

131112 008 HALL Last 11/22/2013
1st SAMP 11/7/2013 1st RCVD 11/12/2013
1311335

\$UB C	ONTRATOR:	natek	Labs COMPA	Y: Anatek	Labs, Inc.		PEIONE:		(208) 883-2839	PAX:	(208) 882-9246
ADDRE	388:	282 Al	turas Dr				ACCOUNT #:			EMAR.	
CITY, S	STATE, ZIP:	loscow	, ID 83843								
ІТЕМ	SAM	1.B	CLIENT SAMPLE ID		BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS		ANALYTICA	AL COMMENTS
1	1311335	001E 1	rj. Well		various	Aqueous	11/7/2013 8:00:00 AM	3	RCI LEVEL 4		

MUB5

SPECIAL INSTRUCTIONS / COMMENTS:							
Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lah@hallenvironmental com. Please return all coolers and blue ice. Thank you.							
Relinquished By:  Date: 11/8/2015 Time: 2:19 PM  Relinquished By:  Date: Time: 7:100 PM	ANATEK LABS RECEIVING LIST RECEIVED INTACT TEMP: 2.7 °C LABELS & CHAINS AGREE NO HEADSPACE LICE / ICE - PACKS PRESENT	REPORT TRANSMITTAL DESIRED:					
Relinquished By: Date: Time:	CUSTODY SEALS PRESENT  PRESERVATIVES: No. H. Zinc Ac. e.	FOR LAB USE ONLY C Attempt to Cool 7					
TAT: Standard [] RUSH	NUMBER OF CONTAINERS: 3 SHIPPED VIA: F						

## Total Cyanide by Semi-Automated Colorimetry Method: EPA 335.4\SM-4500-CN-E Distillation Bench Sheet

Weak Acid Dissociable Cyanide by SM 4500-CN-I (check WAD column)

'otal Cyanide MS/MSD/LCS Soln:

M955-04 Exp:11/1/2014

Method requirements: All QC +/- 10%

iree Cyanide MS/MSD/LCS Soln:

M934-06 Exp:7/30/2014
M962-ON cap:11/15/14

Equipment: Midi-vap

Instrument: ALPCHEM FIA 3000

Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	131030034-1	readiresti	NaOH	Soul	16.6	16.6		
2	Ims						Inc	
3	-Imso				4	1		
4	ws				X	1×	4	
5	-130				4	+		
6	131113037-1				25.2	15.2		
7	311(2004-1	4			76.9	76.9		
8	131112008-1	reative in			IX	X		
9	Ims						Int	
10	Mags	<b>*</b>		4	4		1	
11								
12		·						
13								
14								
15								
16								
17								
18								
19								
20	I If goile this coloulation					L		

^{*} If soils this calculation is taken from cyanide extraction bench sheet.

^{**} If soils, mLs of extract used for distillation.

Extraction Reagents methyl red indicator	: Reagent#: A072-06	Analytical Reagents: Barbituric Acid	Reagent#: R038-13
18 N H ₂ SO ₄	A074-06	Sodium Phosphate	R029-16
sulfamic acid	R068-19	Chloramine-t	R083-15
0.025N NaOH	R014-16	Pyridine	R079-22
51% MgCl ₂	A075-01		

Distillation Initials/Date Distilled: WW 11/15/13

Analyst Initials/Date Analyzed: 1/18/13



# Calibration Standards Preparation Form for Methods SM4500CN-E and EPA 335.4

The following sample sequences have been analyzed using the standard information below on the FIA FS3000:

Cn- (Simple Cyanide) Calibration Stock Standard Number: M898-01

Cn- (Simple Cyanide) Calibration Stock Standard Concentration: 1000 ug/ mL Cn- (Simple Cyanide) Calibration Stock Standard Expiration Date: 12/26/2013

Cn- (Total Cyanide) Matrix Spiking Standard Number: M955-04

Cn- (Total Cyanide) Matrix Spiking Standard Concentration: 25 ug/mL Cn- (Total Cyanide) Matrix Spiking Standard Expiration Date: 11/01/2014

Cn- (Simple Cyanide) Initial Calibration Verification Stock Standard Number: M949-04

Cn- (Simple Cyanide) Initial Calibration Verification Stock Standard Concentration: 1000 ug/ml Cn- (Simple Cyanide) Initial Calibration Verification Stock Standard Expiration Date: 08/06/2014

Initial Calibration Dilution Template

Desired Concentration (ppb)	Stock Concentration (ppm)	ul. Standard Added	Final Volume (mL)
1000	1,000	100	100
800	1000	40	50
500 (CCV)	1000	50	100
50*	1.0	2500	50
10*	1.0	500	50

^{* 50} and 10 ppls calibration standard prepared using 1.0 ppm calibration standard.

Initial Calibration Verification Dilution Template (ICV)

Desired Concentration (ppb)	Stock Concentration (ppm)	ul. Standard Added	Final Volume (mL)
250	1000	25	100

Total Cyanide MS/MSD/LCS prepared by adding 1 mL of M955-04 to 50 mL sample. WAD Cyanide MS/MSD/LCS prepared by adding 1 mL of M934-06 to 50 mL sample.

Analysts Initials/Date: MW 11/18/13

Pipettes: A04003282

2751528/2752498

11 10 1/

ile name: T:\DATA1\FLOW4\2013\EPA335.4\111813CM.RST

ste: November 18, 2013 perator: CRW

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MM 11-22-13

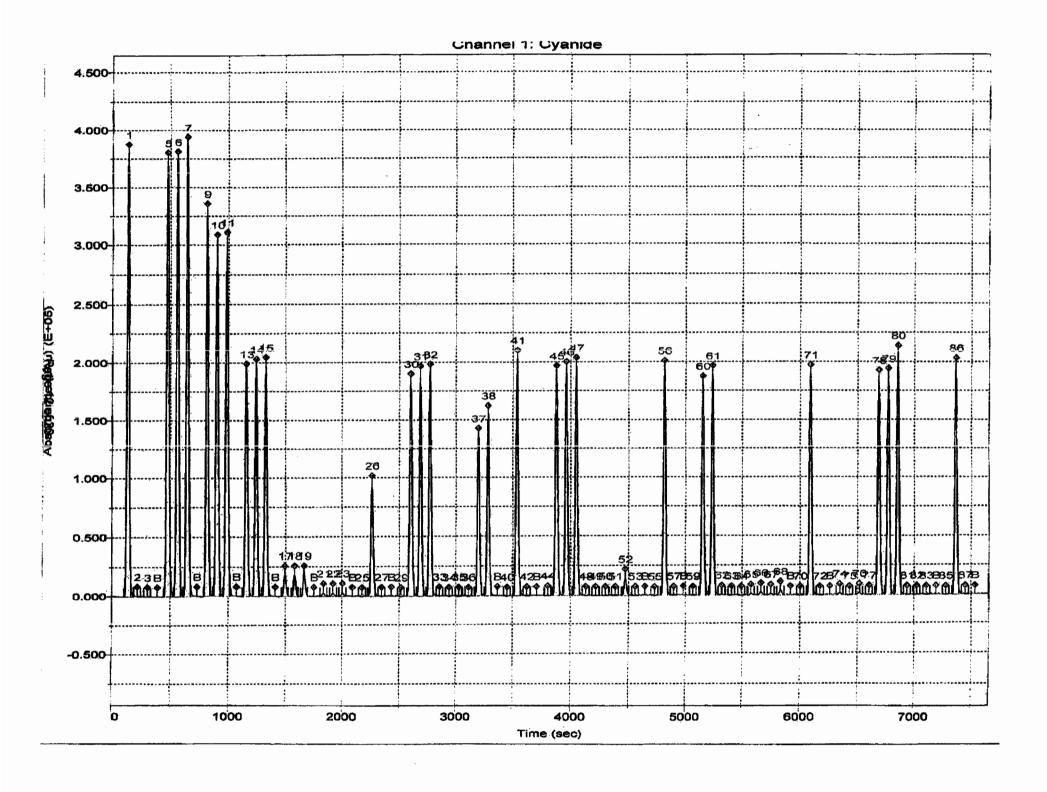
13/118 FRACNR

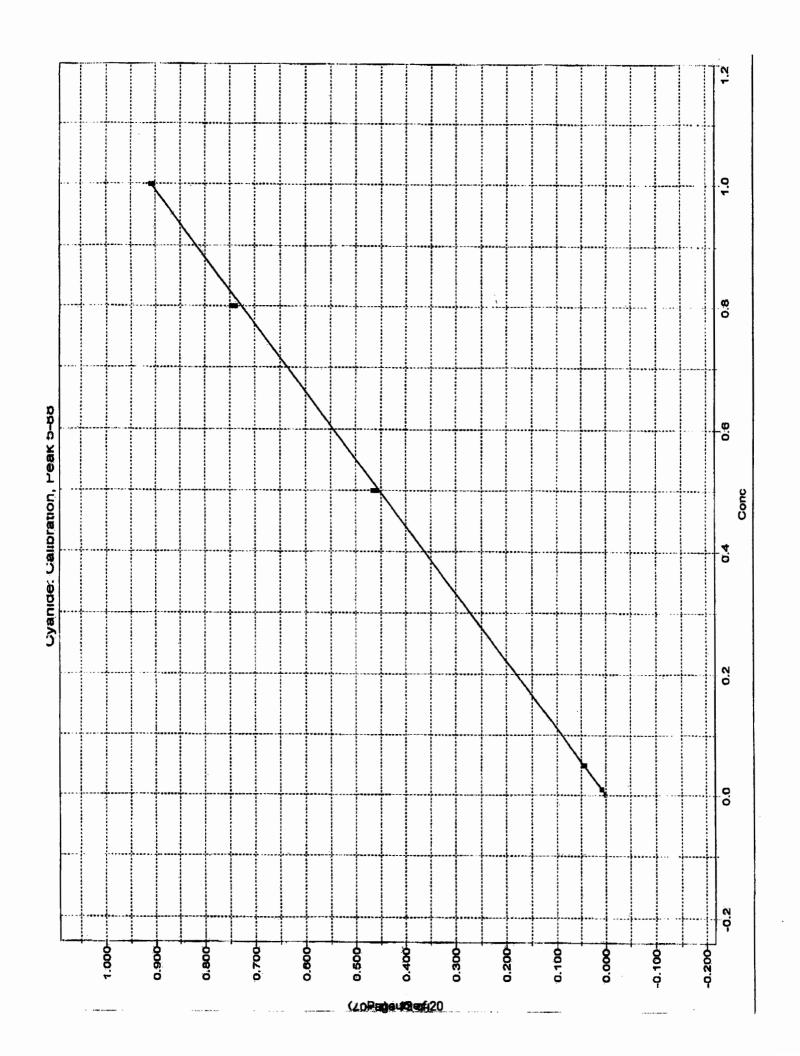
J⊕ L	acor.	CKW	Oliv	(( 00 .)				
sak	Cup	Name	Type Dil	Wt	A	rea	Calc.	(ppm)
	2	Sync	SYNC	1	1	8809582		0.969915
	0	Carryover '	CO	ī	1	27838		0.004500
	0	Carryover	CO	1	1.	4519		0.001936
	0	Baseline	RB	1	1	424		0.001486
	2	Cal 1.00 ppm	С	1	1.	9041663		0.995429
	2	Cal 1.00 ppm	С	1	1	9082788		0.999950
	2	Cal 1.00 ppm	Ç	1	1	9049468		0.996287
	0	Baseline	RB	1	1	891		0.001538
_	3	Cal 0.80 ppm	С	1	1	7390174		0.813874
3	3	Cal 0.80 ppm	С	1	1	7411172		0.816182
1	3	Cal 0.80 ppm	C	1	1	7462134		0.821784
•	0	Baseline	RB	1	1	1633		0.001619
3 4	4	Cal 0.50 ppm	C	1	1	4580863		0.505034
5	4	Cal 0.50 ppm	c	1	1	4652897		0.512953
3	Ō	Cal 0.50 ppm Baseline	C RB	1	1	4608064		0.508024
7	5	Cal 0.05 ppm	C	1 1	1 1	367		0.001480
8	5	Cal 0.05 ppm	C	1	ĺ	434773		0.049236
9	5	Cal 0.05 ppm	č	1	î	431407		0.048729 0.048866
-	Ö	Baseline	RB	1	ī	2587		0.001724
1	6	Cal 0.01 ppm	c	i	i	81992		0.010453
2	6	Cal 0.01 ppm	č	î	ī	80201		0.010453
3	6	Cal 0.01 ppm	Č	î	ī	83388		0.010607
_	Ō	Baseline	RB	ī	ī	4257		0.001908
5	1	Blank	BLNK	ī	ī	-5017		0.000888
6	7	ICV 0.25 ppm	CCV	ī	ĩ	2281102		0.252211
7	1.	Blank	BLNK	ī	ī	-5495		0.000836
	0	Baseline	RB	ī	ī	1610		0.001617
9	8	-131030034-001 R		26.6	1	-10428	3	0.007799
0	9	131030034-001MS	Ū	26.6	1	4474163		13.121881
1	10	131030034-001MS		26.6	1	451403	2	13.238467
2	11	131030034-LCS	Ų	1	1	4451327		0.490793
3	12	b 131030034-BL	ប	1	1	-9475		0.000398
4	13	131113037-001	บ	25.2	1	-13107		-0.000031
5	1.4	131112004-001	Ų	26.9	1	-15878		-0.008228
6	15	131112008-001 R		_1	1	-1879	4	-0.000626
7	16	131112008-001MS		1_	1	3125892	_	0.345083
8	17	131112008-001MS		.1	1	3486792	2	0.384758
0	0	Baseline	RB	1	1	2581		0.001723
1	1 4	Blank	BLNK	1	1	-12540		0.000061
2	1	CCV 0.5 ppm Blank	CCV Bink	1	1	4584808		0.505467
~	ō	Read Baseline	RB	1 1	1 1	-11130 2821		0.000216
4	18	-131113061-001 S		31.2	1	2018		0.001750 0.051840
5	19	131113061-001MS		31.2	1	4418416		15.199870
6	20	131113061-001MS		31.2	1	440536	6	15.155108
6 7	21	131113061-LCS	ับ	1	٦, _	4432130	_	0.488683
8	22	131113061-BL	Ū	ī	1	-4365		0.000960
9	23	• 131113061-002	U	31.3	1	4063		0.059041
0	24	4 131113061-003	Ù	29.2	1	3261		0.052506
1	25	131113061-004	Ū	29.8	1	-1440		0.038182
2	26	131107032-001	្ត	28.3	1	351001		1.132756
3	27	• 131115038-001 FV		100	1	857		0.153390
	0	Baseline	RB	1	1	1741		0.001631
5	1	Blank	BLNK	1	1	-57.95		0.000803
6 7	4	CCV 0.5 ppm	CCV	1	1	4516450		0.497953
./	1	Blank	BĻNK	1	1	-8287		0.000529
•	0	Read Baseline	RB	1	1	2906	_	0.001759
9 0	28	+131108025-001 W		. 1	. 1	-294	ю	0.001116
1	29 30	131108025-001MS 4131108025-001MS		1.	1	4309850	_	0.475240
2	31	131108025-001MS	ָט ט	1 1	1	439546	Ď.	0.484652
.3	32	131108025-002	Ü	1	1	13070 4141		0.002877
4	3.3	131108025-004	Ü	i	1	-957		0.001895 0.001334
5	34	131107069-003	Ü	i	ī	34835		0.001334
6	3.5	: 131107069-004	บ	i	ī	67639		0.005269
_		— - <del></del>	-	D 0 -400	-	0.000		Q.000073

ıak	Cup	Name	Type	Dil W	t	Area	Calc.	(ppm)
ı	36	131107069-005	U	1.	1	33117		0.005080
i	37	131107069-006	U	1.	1	91502		0.011499
	0	Baseline	RB	1	1	1355		0.001589
)	1	Blank	BLNK	1	1	-5984		0.000782
	4	CCV 0.5 ppm	CCV	1	1	4427972		0.488226
!	i	Blank	BLNK	1	1	-8501		0.000505
	0	Read Baseline	RB	1	1	368		0.001480
!	38 ,	5PPB	U	1	1	37008		0.005508
,	39	131107069-001	ប	1	1	-2636		0.001150
j	40 :	131107069-002	U	1.	ĺ	44471		0.006329
•	41 -	131107066-006 F	U	1.1	1	9284		0.002706
;	42	131107066-006MS	U	1.1	1	4432416	•	0.537586
,	43	131107066-006MS	Ü	1.1	1	4393686	5	0.532902
}	44	131107066-LCS	Ū	1.1	1	4819286		0.584369
	45 d	131107066-BL	U	1.1	1	-3057		0.001214
:	46	Ŕ	Ü	1	1.	3734		0.001850
ţ	47	R	ប	1	. 1	1624		0.001618
	0	Baseline	RB	1	· 1	1053		0.001555
•	1	Blank	BLNK	1.	1	-5131		0.000876
j	4	CCV 0.5 ppm	CCV	1	1	4552797		0.501948
•	1	Blank	BLNK	1	1	-6153		0.000763
	0	Read Baseline	RB	1	1	1874		0.001646

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ile name: T:\DATA1\FLOW4\2013\EPA335.4\111813CM.RST

ate: November 18, 2013

perator: CRW

Name		Conc	Area	
Cal 1.00 Cal 1.00 Cal 1.00 Cal 0.80 Cal 0.80 Cal 0.50 Cal 0.50 Cal 0.50 Cal 0.05 Cal 0.05 Cal 0.05	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	1.000000 1.000000 1.000000 0.800000 0.800000 0.500000 0.500000 0.500000 0.050000 0.050000	9041663.00000 9082788.00000 9049468.00000 7390174.00000 7411172.500000 7462133.500000 4580863.000000 4652897.000000 4608064.500000 434773.187500 430157.875000 431407.125000 81992.390625	
Cal 0.01 Cal 0.01	ppm ppm	0.010000 0.010000	80201.210938 83387.726562	

Calib Coef:

y=bx+a

a: (intercept) -1.3095e+04 b: 9.0963e+06

Corr Coef:

0.999823

Carryover:

0.316%

No Drift Peaks

Pag	ze #	ŧ	

# Flashpoint Analysis

# Sample Matrix - Soil (1), Sludge (2), Oil (3), Water (4), Other (5)

Sample ID	Analyses Date	Sample Matrix	Analyst Initials	Temp - °C	Temp - °F
			. 12	<u> </u>	
3/01/060-001	0/16/17	H20/4	W		72000F
300 7009-001	10/17/13	H20/4	nn		7200°₽
1310091041001		Laud/5	1		102°F
301 1098-00!		H2Q/4			79000F
31015067-001		4	4		7200°F
3/023032-09	11/03/13	H20/4	MIL		>200 F
~002	T				>200°F
-003					>200°F
ייסטיי					>2000 F
131029071-00					7200 E
131107012-001	11/14/2013	H20/4	294		> 200° 1°
31112003-007		Limid 5			72000=
311/2008001		11-0/4			720004
131120016-201	12/03/2013		Www		123°F
-002	1	L		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	18207
13417028-001	12/04/2013	3:13/3	M		>2006F
-002		1 1			>200°F
-003			1 1		721000
-004			1 .		7200°F
-005					7260F
-006		1.5	7.00		720007
31176056-002		Water 4	· · · ·   · · · · · · · · · · · · · ·		1200€F
131126078-001		* ***			>200°F
13/127038-001					>200=
- 602	L		丁 上		72000F

^{*} SAFETY GLASSES REQUIRED.

Reagent	Solution #	Expires	Method QC	Requirements:
pH Buffer 4 (Red)	M854-01	Sep-13	pH 7 within 0.1 pH units	LFB/Blank every 10
pH Buffer 7 (Yellow) pH Buffer 10 (Blue)	M854-02 A055-04	Dec-13 Jan-14	Slope 95-102%	MS/MSD Every 20 % Recovery 85-115%
0.02N H2SO4 Titrant	A055-03	Nov-13		A Necotely CO-110 N

Standard	Solution #	Conc.	Expires	Amount Spiked (mg/L)
Matrix Spike Solution	M891-01	1N	11/1/2013	100 (0.189 mL)
Contrib	urette: CAT 10uL, sn	600055 - pH Mete	r: Orion Model 420A,	sn 007858

								Titrar	it vol to p	H (mL)		Alkalin	ity (mg/l	<b>_)</b>	
Sample	Temp (°C)	рH	pH 4 Cal	pH 10 Cal	Slope	pH 7 Buffer	Sample Vol. (mL)	A 8.3	B 4.5	C 4.2	Total	Carbonate	Bi- carbonate	Hydroxide	%
3060604/6-001	14.7			10.07	1009	7:09									
31112003-002		7.4	54.00	10.00	101,1	7,01									
31112003~002	20,1	5.82				7.0	25mL								
31112008-001	15,3	6,98													
31112003-001	15,2	8.71					+								
31112004-001	219	894					5g 1 425m	_							
31113 737-001	21/	8,89	-	1	1		55 in 25m								
-1															

Analysis Date: 6-10-13 11/13/2013

Analyst: AST

Me

# Title: Sulfide by SM 4500 S2F

Reagent	ID	Expires
Iodine 0.025N	R069-16	Daily
HCI 6N	R066-09	Daily
Starch Indicator 1%	A068-10	7/18/2014
Zinc Acetate	R069-15	1/11/2018
Sulfide Spiking Std	M931-04	5/30/2016

#### **Quality Control Information**

- 1. 1 Blank per batch, must be ≤0.02 mg/L
- 2. 1 LFB per batch, must be ±30% recovery
- 3. 50 uL iodine reacts with 0.02 mg sulfide

Sample	Sample Volume (mL)	lodine Amount (50 uL increments)	Conc. (mg/sample)	Conc. (mg/L)	PQL (mg/L)	Multiplier (soils)	Spike Amt (uL)	%Rec
BLANK	1000	50	0.02	0.020	0.10			
IMB.	1000	400	0.16	0.160	0.10		200	80 %
LFBD	1000	450	0.18	0.180	0.10		200	のって
ICV (LLQ)	1000	250	0.10	0.100	0.10		100	1002
131112004-001	50	50	0.02	10.760	53.80	26.9		
131112004-001MS	50	450	0.18	96.840	53.80	26.9	200	80 Z
131113037-001	50	50	0.02	10.080	50.40	25.2		
131112008-001	464.64	2700	1.08	2.324	0.22			
131113057-003	193.46	50	0.02	0.103	0.52			
131113057-003MS	193.46	500	0.20	1.034	0.52		200	90%
131115044-001	478.02	50	0.02	0.042	0.21			
131115045-001	463.66	50	0.02	0.043	0.22			
131115047-001	495.11	50	0.02	0.040	0.20			
131115038-001	1	150	0.06	60.000	100.00			
131115051-001	25	400	0.16	6.400	4.00			

Analyst Initials: 45T Date: 11-19-13 Comments: MS 15 PTS 4
N\\Banch Sheds\Sulfide SM4500-S2F345

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Title: Sulfide by SM 4500 S2F

Reagent	ID	Expires
lodine 0.025N	R069-16	Daily
HCI 6N	R066-09	Daily
Starch Indicator 1%	A068-10	7/18/2014
Zinc Acetate	R069-15	1/11/2018
Sulfide Spiking Std	M931-04	5/30/2016

# Quality Control Information

- 1. 1 Blank per batch, must be ≤0.02 mg/L
- 2. I LFB per batch, must be ±30% recovery
  3. 50 uL iodine reacts with 0.02 mg sulfide

Sample	Sample Volume (mla)	lodine Amount (50 ül. Increments)	Conc. (mg/sample)	Conc. (mg/L)	PQL (mg/L)	Multiplier (solls)	Spike Amt (uL)	%Rec	
131115052-001	25	750	0.30	12.000	4.00		_		
131115053-001	500.2	2200	0.88	1.759	0.20				
131119009-001	263.18	50	0.02	0.076	0.38	•			
131119009-002	243.68	50	0.02	0.082	0.41				
131119009-003	266.01	50	0.02	0.075	0.38				
131119009-004	249.74	50	0.02	0.080	0.40	•			
131119010-001	50	50	0.02	0,400	2.00				· Sayle
131119032-001	50	600	0.24	4.800	2.00				Cakedak
1311150 <del>35</del> -001	5	1300	0.52	104.000	20.00				40 x 11
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Page 18 of 20 .5²

Analyst Initials: AST

Date: 11-19-13

Comments:

N:\Bench Sheets\Sulfide SM4500-S2F,xls

# Title: Sulfide by SM 4500 S2F

امد	15 PTSA N'ABEND STREET SUITED SM4500-SZF. 25	Comments: MS			Date: 11-19-13		4	Analyst Initials:
		,	4.0	6.4	0.16	400	25mL	1511KX)-1
			100	<del>مان ھ</del> 00	e.06	150	- M.C	131118038-1
			202	0.04039	0.07	Sp	11 50%	131115047-1
			0.216	F/2F0.0	0.02	So	463.66	13116048-1
-			0.209	0-04/644 761/20-0	20.0	30	20,814	13111E044-1
<u>                                     </u>	7W002		-	1.034	0.20 0.16	500	H	57-3M6
			0.516	0,1034	0.02	Şī V	193.46	131115067-3
	,		0.215	2.32	1.08	2400	464.64	134/2003-(
		25.7	17.6	1.42 × 01 1 252	20.02	50	Some	13 11/3037-1
	14002	H	7	24.2	1	450	1	9~1~S
		26.9	y S)	2.69	450 0 25°C	50	SOmc	13111204-1
F	180 /		-	0.10	0.10	250	-	שבע (גוש)
	  -\			0. Ā	ر. ا <del>د</del>	4.20		4837
ı	200			0.0%	0,16	Geh .		837
<u> </u>			ø.1	20.62	0.07	50	1 soome	BLANK
Ē	Spike Amt (ul.)	Multiplier (soils)	POL (mg/L)	Conc. (mg/L)	Conc. (mg/sample)	lodine Amount (50 uL Increments)	Sample Volume (mL)	Sample
		-03	: M898-03	Shamber d #	ICV (	5/30/2016	M931-04	Sulfide Spiking Std
						1/11/2018	R069-15	Zine Acetate
		3, 50 uL iodine reacts with 0.02 mg sulfide	e reacts with	3. 50 uL iodini		7/18/2014	A068-10	Starch Indicator 1%
		2. 1 LFB per batch, must be ±30% recovery	atch, must b	2. I LFB per b		Daily	R066-09	HCI ON
		I. I Blank ner batch, must be ≤0.02 mg/L	batch must	I. I Blank ner		Daily	R069-16	Iodine 0.025N
		3	al Tafarmafia	Quality Control Information		Fraires	3	Respent

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# Title: Sulfide by SM 4500 S2F

Reagent	ID	Expires
lodine 0.025N	R069-16	Daily
HCI 6N	R066-09	Daily
Starch Indicator 1%	A068-10	7/18/2014
Zinc Acetate	R069-15	1/11/2018
Sulfide Spiking Std	M931-04	5/30/2016

# **Quality Control Information**

- 1 Blank per batch, must be ≤0.02 mg/L
   1 LFB per batch, must be ±30% recovery
- 3. 50 uL iodine reacts with 0.02 mg sulfide

Sample	Sample Volume (mL)	lodine Amount (50 uL increments)	Conc. (mg/sample)	Conc. (mg/L)	PQL (mg/L)	Multiplier (soils)	Spike Amt (ul.)	%Rec
131115052-1	25 mL	150	<b>∂</b> .30	12	41.0			
131115053-)	500.Z	33200	ව පිළි	1,759	Ð. 199			
13114004-1	243.18 244.74	50	5.07	0.07599	D. 379			
٩٠٢	243.68	£50	0.02	0.05207	ರ.410			
9.3	26.01	60	50.0	0.07579	0.375	•		
9.4	249. 74	60	0.02	8008.e.e	୭.୯୦୦			
131119010-1	50ml	50	20.0					
13n19032-1	50mL	وه م	D. Z4					
131115038-1	5m4	1300	0,57	104	70			
·								
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			•			
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nályst initials: AST	Date: 11-19-13	Comments:
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## Hall Environmental Analysis Laboratory, Inc.

WO#:

1311335

06-Dec-13

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 11-7-13

Sample ID MB Client ID: PBW Prep Date:

SampType: MBLK Batch ID: R14683

Analysis Date: 11/8/2013

TestCode: EPA Method 300.0: Anions RunNo: 14683

SeqNo: 422656

Units: mg/L

HighLimit

**RPDLimit** %RPD

Qual

Analyte Chloride Sulfate

SPK value SPK Ref Val %REC LowLimit Result **PQL** ND 0.50 ND 0.50

Sample ID MB Client ID: PBW SampType: MBLK Batch ID: R14683

Analysis Date: 11/8/2013

TestCode: EPA Method 300.0: Anions

RunNo: 14683 SeqNo: 422710

Units: mg/L

Analyte Chloride

Prep Date:

0.50

SPK value SPK Ref Val %REC LowLimit

HighLimit

%RPD

**RPDLimit** Qual

Sulfate

ND ND

0.50

Qualifiers:

Value exceeds Maximum Contaminant Level.

E Value above quantitation range

Analyte detected below quantitation limits J

O RSD is greater than RSDlimit

R RPD outside accepted recovery limits

Spike Recovery outside accepted recovery limits

Analyte detected in the associated Method Blank В

Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Sample pH greater than 2 for VOA and TOC only.

Reporting Detection Limit RL

Page 6 of 14

# Hall Environmental Analysis Laboratory, Inc.

WO#: 1311335

06-Dec-13

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 11-7-13

Sample ID 5mL rb	SampType: <b>MBLK</b>			TestCode: EPA Method 8260B: VOLATILES						
Client ID: PBW	Batch ID: R14754			RunNo: 14754						
Prep Date:	Analysis Date: 11/12/2013		SeqNo: <b>424550</b>			Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
z,z-Didiliolopiopalie	NU	2.0								

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

Page 7 of 14

# Hall Environmental Analysis Laboratory, Inc.

WO#: 1311335 06-Dec-13

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 11-7-13

Sample ID 5mL rb	SampType: MBLK			TestCode: EPA Method 8260B: VOLATILES						
Client ID: PBW	Batch ID: R14754			RunNo: 14754						
Prep Date:	Analysis Date: 11/12/2013		SeqNo: 424550			Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzeпе	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	10		10.00		102	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		104	70	130			
Surr: Dibromofluoromethane	9.9		10.00		99.0	70	130			
Surr: Toluene-d8	9.6		10.00		95.9	70	130			

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

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# Hall Environmental Analysis Laboratory, Inc.

WO#: 1311335

06-Dec-13

Client: Western Refining Southwest, Inc.

Project: Injection Well 11-7-13

Sample ID mb-10311	SampType: MBLK			TestCode: EPA Method 8270C: Semivolatiles						
Client ID: PBW	Batch ID: 10311			RunNo: 14823						
Prep Date: 11/13/2013	Analysis Date: 11/14/2013		2013	SeqNo: 427181			Units: µg/L			
Analyte	Result	PQL SP	K value SPK	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	ND	10						-		
Acenaphthylene	ND	10								
Aniline	ND	10								
Anthracene	ND	10								
Azobenzene	ND	10								
Benz(a)anthracene	ND	10								
Benzo(a)pyrene	ND	10								
Benzo(b)fluoranthene	ND	10								
Benzo(g,h,i)perylene	ND	10								
Benzo(k)fluoranthene	ND	10								
Benzoic acid	ND	40								
Benzyl alcohol	ND	10								
Bis(2-chloroethoxy)methane	ND	10								
Bis(2-chloroethyl)ether	ND	10								
Bis(2-chloroisopropyl)ether	ND	10								
Bis(2-ethylhexyl)phthalate	ND	10								
4-Bromophenyl phenyl ether	ND	10								
Butyl benzyl phthalate	ND	10								
Carbazole	ND	10								
4-Chloro-3-methylphenol	ND	10								
4-Chloroaniline	ND	10								
2-Chloronaphthalene	ND	10								
2-Chlorophenol	ND	10								
4-Chlorophenyl phenyl ether	ND	10								
Chrysene	ND	10								
Di-n-butyl phthalate	ND	10								
Di-n-octyl phthalate	ND	10								
Dibenz(a,h)anthracene	ND	10								
Dibenzofuran	ND	10								
1,2-Dichlorobenzene	ND	10								
1,3-Dichlorobenzene	ND	10								
1.4-Dichlorobenzene	ND	10								
3,3'-Dichlorobenzidine	ND	10								
Diethyl phthalate	ND	10								
Dimethyl phthalate	ND	10								
2,4-Dichlorophenol	ND	20								
2,4-Dimethylphenol	ND	10								
4,6-Dinitro-2-methylphenol	ND	20								
	ND	20								
2,4-Dinitrophenol	ND	20								

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

Page 9 of 14

## Hall Environmental Analysis Laboratory, Inc.

WO#: 1311335

06-Dec-13

Client:

Western Refining Southwest, Inc.

**Project:** 

Injection Well 11-7-13

Sample ID mb-10311	SampType: MBLK TestCode: EPA Method 8270C: Semivolatiles						
Client ID: PBW	Batch	ID: 10311	RunNo: 1	4823			
Prep Date: 11/13/2013	Analysis Da	ate: 11/14/2013	SeqNo: 4	27181	Units: µg/L		
Analyte	Result	PQL SPK value	SPK Ref Val %REC	LowLimit	HighLimit %	RPD RPDLimit	Qual
2,4-Dinitrotoluene	ND	10					
2,6-Dinitrotoluene	ND	10					
Fluoranthene	ND	10					
Fluorene	ND	10					
Hexachlorobenzene	ND	10					
Hexachlorobutadiene	ND	10					
Hexachlorocyclopentadiene	ND	10					
Hexachioroethane	ND	10					
Indeno(1,2,3-cd)pyrene	ND	10					
Isophorone	ND	10					
1-Methylnaphthalene	ND	10					
2-Methylnaphthalene	ND	10					
2-Methylphenol	ND	10					
3+4-Methylphenol	ND	10					
N-Nitrosodi-n-propylamine	ND	10					
N-Nitrosodimethylamine	ND	10					
N-Nitrosodiphenylamine	ND	10					
Naphthalene	ND	10					
2-Nitroaniline	ND	10					
3-Nitroaniline	ND	10					
4-Nitroaniline	ND	10					
Nitrobenzene	ND	10					
2-Nitrophenol	ND	10					
4-Nitrophenol	ND	10					
Pentachlorophenol	ND	20					
Phenanthrene	ND	10					
Phenol	ND	10					
Pyrene	ND	10					
Pyridine	ND	10					
1,2,4-Trichlorobenzene	ND	10					
2,4,5-Trichlorophenol	ND	10					
2,4,6-Trichlorophenol	ND	10					
Surr: 2-Fluorophenol	100	200.0	51.9	22.7	98		
Surr: Phenol-d5	80	200.0	40.2	23.4	74.9		
Surr: 2,4,6-Tribromophenol	140	200.0	70.2	23.3	111		
Surr: Nitrobenzene-d5	65	100.0	65.0	36.8	111		
Surr: 2-Fluorobiphenyl	59	100.0	58.9	38.3	110		
Surr: 4-Terphenyl-d14	72	100.0	71.7	52.1	116		

### Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

Page 10 of 14

## Hall Environmental Analysis Laboratory, Inc.

WO#: 1311335

06-Dec-13

Client: Western Refining Southwest, Inc.

**Project:** Injection Well 11-7-13

Sample ID MB-10368 SampType: MBLK TestCode: EPA Method 7470: Mercury

Client ID: PBW Batch ID: 10368 RunNo: 14874

Prep Date: 11/17/2013 Analysis Date: 11/18/2013 SeqNo: 428799 Units: mg/L

Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual

Mercury ND 0.00020

#### Qualifiers:

* Value exceeds Maximum Contaminant Level.

E Value above quantitation range

J Analyte detected below quantitation limits

O RSD is greater than RSDlimit

R RPD outside accepted recovery limits

S Spike Recovery outside accepted recovery limits

B Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

P Sample pH greater than 2 for VOA and TOC only.

RL Reporting Detection Limit

Page 11 of 14

## Hall Environmental Analysis Laboratory, Inc.

WO#:

1311335 *06-Dec-13* 

Client:

Western Refining Southwest, Inc.

**Project:** 

Injection Well 11-7-13

Sample ID MB-10290 Client ID: PBW	•	Type: ME		TestCode: <b>EPA 6010B: T</b> RunNo: <b>14747</b>			Total Recove	rable Meta	als	
Prep Date: 11/12/2013	Analysis	Date: 11	1/12/2013	s	eqNo: 4	24481	Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.020								
Barium	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Lead	ND	0.0050								
Magnesium	ND	1.0								
Potassium	ND	1.0								
Selenium	ND	0.050								
Silver	ND	0.0050								
Sodium	ND	1.0								

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

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## Hall Environmental Analysis Laboratory, Inc.

WO#:

1311335

06-Dec-13

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 11-7-13

Sample ID mb-1

SampType: mblk

TestCode: SIM2320B: Alkalinity

LowLimit

Client ID:

Prep Date:

**PBW** 

Batch ID: R14690

RunNo: 14690

%REC

Analysis Date: 11/8/2013

SPK value SPK Ref Val

SeqNo: 422856

Units: mg/L CaCO3

HighLimit

%RPD

**RPDLimit** Qual

Analyte Total Alkalinity (as CaCO3) Result ND **PQL** 20

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- Ε Value above quantitation range
- J Analyte detected below quantitation limits
- RSD is greater than RSDlimit O
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- Sample pH greater than 2 for VOA and TOC only.
- Reporting Detection Limit

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## Hall Environmental Analysis Laboratory, Inc.

WO#: 1311335

06-Dec-13

**Client:** 

Western Refining Southwest, Inc.

**Project:** 

Injection Well 11-7-13

Sample ID MB-10275 Client ID:

Analyte

**PBW** 

SampType: MBLK Batch ID: 10275

**PQL** 

TestCode: SM2540C MOD: Total Dissolved Solids

RunNo: 14748

Prep Date: 11/11/2013

Analysis Date: 11/12/2013 Result

SeqNo: 424374

SPK value SPK Ref Val %REC LowLimit

Units: mg/L HighLimit

%RPD **RPDLimit**  Qual

Total Dissolved Solids

ND

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- Spike Recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Н Holding times for preparation or analysis exceeded
- Not Detected at the Reporting Limit ND
- Sample pH greater than 2 for VOA and TOC only.
- Reporting Detection Limit RL

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Hall Environmental Analysis Laboratory 4901 Hawkins NE

TEL: 505-345-3975 FAX: 505-345-4107 Website: www.hallenvironmental.com

# Albuquerque, NM 97105 Sample Log-In Check List

Client Name: Western Refining Southw Work Order Number	r. 1311335		RcptNo:	1
Received by/date:				
Logged By: Ashley Gallegos 11/8/2013 10:00:00 A	JM	A		
Completed By: Aşhley Gallegos 11/8/2013 2:15:08 PM	A	<del>*</del>		
Reviewed By: M.C. 11/08/13		. 0		
Chain of Custody				
1. Custody seals intact on sample bottles?	Yes	No 🗀	Not Present	
2. Is Chain of Custody complete?	Yes 🗹	No 🗆	Not Present	
3. How was the sample delivered?	Courier			
<u>Log In</u>				
4. Was an attempt made to cool the samples?	Yes 🗹	No 🗆	na 🗆	
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes 🗹	No 🗆	NA 🗆	
6. Sample(s) in proper container(s)?	Yes 🗹	No 🗆		
7. Sufficient sample volume for indicated test(s)?	Yes 🗹	No 🗌		
8. Are samples (except VOA and ONG) properly preserved?	Yes 🗹	No 🗆		
9. Was preservative added to bottles?	Yes 🔲	No 🗹	NA 🗆	
10.VOA vials have zero headspace?	Yes 🗹	No 🗆	No VOA Vials	
11. Were any sample containers received broken?	Yes	No 🗹	# of processed	
			# of preserved bottles checked	7.
12.Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes 🗹	No 📙	for pH:	>12 unless noted)
13. Are matrices correctly identified on Chain of Custody?	Yes 🗹	No 🗆	Adjusted 2	- Wi
14. Is it clear what analyses were requested?	Yes 🗹	No 🗆		\ \
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes 🗹	No 🗔	Checked by:	-d/
(				
Special Handling (if applicable)				
16. Was client notified of all discrepancies with this order?	Yes 🔲	No 🗆	NA 🗹	
Person Notified: Date:				
By Whom: Via:	eMail []	Phone 🗍 Fax	☐ In Person	
Regarding:	1 1, 1 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	Salara Barangan Salarah Salarah da	and the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second o	
Client Instructions:	94. 31			
17. Additional remarks:				
18. Cooler Information		ent to very		
Cooler No Temp °C Condition Seal Intact Seal No 1 1.0 Good Yes	Seal Date	Signed By		
1.5 556	L			

Chain-of-Custody Record			Turn-Around	Time:						44		EN	VII	20		4E	MT	- 4 1		
Client: Western Refining			Standard	□ Rush			-						IS L					_		
•				Project Name	Project Name: www.hallenvironmental.com															
Mailing	Address	#50	CR 4990	Diec	Tion W	rell 11	-7-13		4901	Haw	kins	NE -	Albud	<b>juer</b> qu	e, N	M 87	109			
Bl	אינטיני	Field	NM874/3	Project #:		•		4901 Hawkins NE - Albuquerque, NM 87109 Tel. 505-345-3975 Fax 505-345-4107												
Phone :	#. 50	5-6	32-4135					Analysis Request												
email o	r Fax#:			Project Mana	ger:			=	<u> </u>	2   6	1 2	1	Y S	3 _				工	٠	
QA/QC F	Package: dard		Level 4 (Full Validation)					TMB's (8021)	(Gas o	S C	及	8270 SIMS)	AN SAN	2 5				Correctly	Ü	
Accredi				Sampler: M	11 4 0	66		IMB.	된	5 4	1	2	<b>₹</b> }	808				यस	型	2
□ NEL		□ Othe	er	On ice		第四月1	307	$\pm$	$\pm 18$			o	2 S	§ 8		8	Ä	U	4	اِيَّ ا
□ EDD	(Type)_			Sample		494		MTBE				[일	8 Metals	Š	8	[ -	굺	Ĕ	Q.	7 S
Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type			BTEX + M	BTEX + MTBE + TPH (Gas only)	The Solid (GRO) DRO/ MIKO		PAH's (8310	RCRA 8 Metals C. N.	8081 Pesticides / 8082	8260B (VOA)	8270 (Semi-VOA)	Spitz	eacTil	e et s	Air Bubbles (Y or N)
11-7-13	8:00	Hao	Inj. Well	5-VOA	HCI		001	<u> </u>	<u> </u>	7		-	2 4	( <u> </u>	8	80	-	<u> 44-3</u>	Ш	`\
1.713	0.5	1	1	ł			001		+	+	$\vdash$			+		X	$\dashv$	+	+	+
			<del>                                     </del>	1-liter	amber		· · · · · · · · ·		+	17	╁	$\vdash$	+	+			<del>,</del>	$\mathcal{H}$	┽	
				1-500m					+	12	+	$\vdash$	-	-	-		X	<del>'</del>	_	
				1-500ml					_	×	-1		-				_		$\chi$	
				1-250ml	Hasoy				$\perp$		X		$\perp$					$\perp$		
				1-500~	HNOZ				$\perp$		-		$\mathbf{X}$							
				1-500ml	NaOH													X		
		}	\	1-500ml	ZN Aceta	<u>e</u>				$\perp$									2	
																	П		T	
Date: Time: Relinquished by: 11-7-13 1510 Robert Krakow			Received by:  Wistra	haete	Date 11/-1/3	1510	Rema	arks:	-	-	•	•	•						-	
Date:	Time:	Relinquish	ed by:	Received by:	1	Date (108/13)	Time													
16[9]	necessary,	amples sub	mitted to Hall Environmental may be subc	ontracted to other ac	credited laboratorie		as notice of this	posalbili	ty. Any	sub-co	ntracte	d data w	ill be cle	arty nota	ited on	the an	alvtical	l report		

# **APPENDIX C**



# **Hall Environmental Analysis Laboratory**

# **QUALITY ASSURANCE PLAN**

Effective Date: July 29th, 2013

**Revision 9.7** 

www.hallenvironmental.com

Control Number: 00000144

Approved By:

Andy Freeman

**Laboratory Manager** 

Approved By:

Carolyn Swanson

7/25/8013

Date

Quality Assurance/Quality Control Officer

Approved By:

John Caldwell

Date

Semi-Volatiles Technical Director

Approved By:

Rene Aguilera

Date

**Volatiles Technical Director** 

Approved By:

lan Cameron

Date

**Inorganics Technical Director** 

Approved By:

Chandler Hardison

Date

Microbiology Technical Director

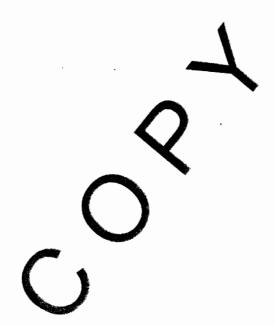
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#### 3.0 Introduction

## **Purpose of Document**

The purpose of this Quality Assurance Plan is to formally document the quality assurance policies and procedures of Hall Environmental Analysis Laboratory, Inc. (HEAL), for the benefit of its employees, clients, and accrediting organizations. HEAL continually implements all aspects of this plan as an essential and integral part of laboratory operations in order to ensure that high quality data is produced in an efficient and effective manner.

## **Objectives**

The objective of HEAL is to achieve and maintain excellence in environmental testing. This is accomplished by developing, incorporating and documenting the procedures and policies specified by each of our accrediting authorities and outlined in this plan. These activities are carried out by a laboratory staff that is analytically competent, well-qualified, and highly trained. An experienced management team, knowledgeable in their area of expertise, monitors them. Finally, a comprehensive quality assurance program governs laboratory practices and ensures that the analytical results are valid, defensible, reproducible, reconstructable and of the highest quality.

HEAL establishes and thoroughly documents its activities to ensure that all data generated and processed will be scientifically valid and of known and documented quality. Routine laboratory activities are detailed in method project standard operating procedures (SOP). All data reported meets the applicable requirements for the specific method or methods that are referenced, ORELAP, TCEQ, EPA, client specific requirements and/or State Bureaus. In the event that these requirements are ever in contention with each other, it is HEAL's policy to always follow the most prudent requirement available. For specific method requirements refer to HEAL's Standard Operating Procedures (SOP's), EPA methods, Standard Methods 20th edition, ASTM methods or state specific methods.

HEAL management ensures that this document is correct in terms of required accuracy and data reproducibility, and that the procedures contain proper quality control measures. HEAL management additionally ensures that all equipment is reliable, well-maintained and appropriately calibrated. The procedures and practices of the laboratory are geared towards not only strictly following our regulatory requirements but also allowing the flexibility to conform to client specific specifications. Meticulous records are maintained for all samples and their respective analyses so that results are well-documented and defensible in a court of law.

The HEAL Quality Assurance/Quality Control Officer (QA/QCO) and upper management are responsible for supervising and administering this quality assurance program, and ensuring each individual is responsible for its proper implementation. All HEAL

management remains committed to the encouragement of excellence in analytical testing and will continue to provide the necessary resources and environment conducive to its achievement.

#### **Policies**

Understanding that quality cannot be mandated, it is the policy of this laboratory to provide an environment that encourages all staff members to take pride in the quality of their work. In addition to furnishing proper equipment and supplies, HEAL stresses the importance of continued training and professional development. Further, HEAL recognizes the time required for data interpretation. Therefore, no analyst should feel pressure to sacrifice data quality for data quantity. Each staff member must perform with the highest level of integrity and professional competence, always being alert to problems that could compromise the quality of their technical work.

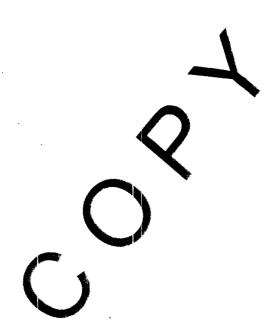
Management and senior personnel supervise analysts closely in all operations. Under no circumstance is the willful act or fraudulent manipulation of analytical data condoned. Such acts must be reported immediately to HEAL management. Reported acts will be assessed on an individual basis and resulting actions could result in dismissal. The laboratory staff is encouraged to speak with lab managers or senior management if they feel that there are any undo commercial, financial, or other pressures, which might adversely affect the quality of their work; or in the event that they dispect that data quality has been compromised in any way. HEAL's Quality Assurance/Quality Control Officer is available if any analyst and/or manager wishes to anonymously report any suspected or known breaches in data integrity.

Understanding the importance of meeting customer requirements in addition to the requirements set forth in statutory and requirements, HEAL shall periodically seek feedback from customers and evaluate the feedback in order to initiate improvements.

All proprietary rights and client information at HEAL (including national security concerns) are considered confidential. No information will be given out without the express verbal or written permission of the client. All reports generated will be held in the strictest of confidence.

HEAL shall continually improve the effectiveness of its management system through the use of the policies and procedures outlined in this Quality Assurance Plan. Quality control results, internal and external audit findings, management reviews, new and continual training and corrective and preventive actions are continually evaluated to identify possible improvements and to ensure that appropriate communication processes are taking place regarding the effectiveness of the management system. HEAL shall ensure that the integrity of the quality system is maintained when changes to the system are planned and implemented.

This is a controlled document. Each copy is assigned a unique tracking number and when released to a client or accrediting agency the QA/QCO keeps the tracking number on file. This document is reviewed on an annual basis to ensure that it is valid and representative of current practices at HEAL.



## 4.0 Organization and Responsibility

## Company

HEAL is accredited in accordance with the 2009 TNI standard (see NELAC accredited analysis list in the QA Department or on the company website), through ORELAP and TCEQ and by the Arizona Department of Health Services. Additionally, HEAL is qualified as defined under the State of New Mexico Water Quality Control Commission regulations and the New Mexico State Drinking Water Bureau. HEAL is a locally owned small business that was established in 1991. HEAL is a full service environmental analysis laboratory with analytical capabilities that include both organic and inorganic methodologies and has performed analyses of soil, water, and air as well as various other matrices for many sites in the region. HEAL's client base includes local, state and federal agencies, private consultants, commercial industries as well as individual homeowners. HEAL has performed as a subcontractor to the state of New Mexico and to the New Mexico Department of Transportation. HEAL has been acclaimed by its customers as producing quality results and as being adaptive to client-specific needs.

The laboratory is divided into an organic section, an inorganic section and a microbiology section. Each section has a designated manager/technical director. The technical directors report directly to the laboratory manager, who oversees all operations.

#### Certifications

ORELAP - NELAC Oregon Primary accrediting authority.

TCEQ - NELAC Texas Secondary accrediting authority.

The Arizona Department of Health Services

The New Mexico Drinking Water Bureau

See our website at <u>www.hallenvironmental.com</u> or the QA Office for copies of current licenses and licensed parameters,

In the event of a certification being revoked or suspended, HEAL will notify, in writing, those clients that require the affected certification.

## Personnel

HEAL management ensures the competence of all who operate equipment, perform environmental tests, evaluate results, and sign test reports. Personnel performing specific tasks shall be qualified on the basis of appropriate education, training, experience and /or demonstrated skills.

HEAL ensures that all personnel are aware of the relevance and importance of their activities and how each employee contributes to the achievement of the objectives defined throughout this document.

All personnel shall be responsible for complying with HEAL's quality assurance/quality control requirements that pertain to their technical function. Each technical staff member must have a combination of experience and education to adequately demonstrate specific knowledge of their particular function and a general knowledge of laboratory operations, test methods, quality assurance/quality control procedures, and records management.

All employees' training certificates and diplomas are kept on file with demonstrations of capability for each method they perform. An Organizational Chart can be found at the end of this section and a personnel list is available in the current Controlled Document Logbook.

## **Laboratory Director**

The Laboratory Director is responsible for overall technical direction and business leadership of HEAL. The Laboratory Manager, the Project Manager and Quality Assurance/Quality Control Officer report directly to the Laboratory Director. Someone with a minimum of 7 years of directly elated experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

## Laboratory Manager/Lead Technical Director

The Laboratory Manager stall exercise day—to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results. The Laboratory Manager shall be experienced in the fields of accreditation for which the laboratory is approved or seeking accreditation. The Laboratory Manager shall certify that personnel with appropriate educational and/or technical background perform all tests for which HEAL is accredited. Such certification shall be documented.

The Laboratory Manager shall monitor standards of performance in quality control and quality assurance and monitor the validity of the analyses performed and data generated at HEAL to assure reliable data.

The Laboratory Manager is responsible for the daily operations of the laboratory. The Laboratory Manager is the lead technical director of the laboratory and, in conjunction

with the section technical directors, is responsible for coordinating activities within the laboratory with the overall goal of efficiently producing high quality data within a reasonable time frame.

In events where employee scheduling or current workload is such that new work cannot be incorporated, without missing hold times, the Laboratory Manager has authority to modify employee scheduling, re-schedule projects or, when appropriate, allocate the work to approved subcontracting laboratories.

Additionally, the laboratory manager reviews and approves new analytical procedures and methods, and performs a final review of most analytical results. The Laboratory Manager provides technical support to both customers and HEAL staff.

The Laboratory Manager also observes the performance of supervisors to ensure that good laboratory practices and proper techniques are being taught and utilized, and to assist in overall quality control implementation and strategic planning for the future of the company. Other duties include assisting in establishing laboratory policies that lead to the fulfillment of requirements for various certification programs, assuring that all Quality Assurance and Quality Control documents are reviewed and approved, and assisting in conducting Quality Assurance Audits.

The laboratory manager addresses questions or complaints that cannot be answered by the section managers.

The Laboratory Manager shall have a bachelor a degree in a chemical, environmental, biological sciences, physical sciences or engineering field, and at least five years of experience in the environmental analysis of representative inorganic and organic analytes for which the laboratory seek, or maintains accreditation.

## Quality Assurance Quality Control Officer

The Quality Assurance/Quality Control Officer (QA/QCO) serves as the focal point for QA/QC and shall be responsible for the oversight and/or review of quality control data. The QA/QCO functions independently from laboratory operations and shall be empowered to halt unsatisfactory work and/or prevent the reporting of results generated from an out-of-control measurement system. The QA/QCO shall objectively evaluate data and perform assessments without any outside/managerial influence. The QA/QCO shall have direct access to the highest level of management at which decisions are made on laboratory policy and/or resources. The QA/QCO shall notify laboratory management of deficiencies in the quality system in periodic, independent reports.

The QA/QCO shall have general knowledge of the analytical test methods for which data review is performed and have documented training and/or experience in QA/QC procedures and in the laboratory's quality system. The QA/QCO will have a

minimum of a BS in a scientific or related field and a minimum of three years of related experience.

The QA/QCO shall schedule and conduct internal audits as per the Internal Audit SOP at least annually, monitor and trend Corrective Action Reports as per the Data Validation SOP, periodically review control charts for out of control conditions, and initiate any appropriate corrective actions.

The QA/QCO shall oversee the analysis of proficiency testing in accordance with our standards and monitor any corrective actions issued as a result of this testing.

The QA/QCO reviews all standard operating procedures and statements of work in order to assure their accuracy and compliance to method and regulatory requirements.

The QA/QCO shall be responsible for maintaining and updating this quality manual.

## **Project Managers**

The role of the project manager is to act as a liaison between HEAL and our clients. The Project Manager updates clients on the status of projects in-house, prepares quotations for new work, and is responsible for HEAL's marketing effort.

All new work is assessed by the Project Manager and reviewed with the other managers so as to not exceed the laboratory's capacity. In events where employee scheduling or current workload is such that new work cannot be incorporated without missing hold times, the Project Manager has authority to re-schedule projects.

It is also the duty of the project manager to work with the Laboratory Manager and QA/QCO to insure that before new work is undertaken, the resources required and accreditations requested are available to meet the client's specific needs.

Additionally, the Project Manager can initiate the review of the need for new analytical procedures and methods, and perform a final review of some analytical results. The Project Manager provides technical support to customers. Someone with a minimum of 2 years of directly related experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

#### Technical Directors

Technical Directors are full-time members of the staff at HEAL who exercise day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results for their department within HEAL. A Technical Director's duties shall include, but not be limited to, monitoring standards of performance in quality

control and quality assurance, monitoring the validity of the analyses performed and the data generated in their sections to ensure reliable data, overseeing training and supervising departmental staff, scheduling incoming work for their sections, and monitoring laboratory personnel to ensure that proper procedures and techniques are being utilized. They supervise and implement new Quality Control procedures as directed by the QA/QCO, update and maintain quality control records including, but not limited to, training forms, IDOCs, ADOCPs, and MDLs, and evaluate laboratory personnel in their Quality Control activities. In addition, technical directors are responsible for upholding the spirit and intent of HEAL's data integrity procedures.

As Technical Directors of their associated section, they review analytical data to acknowledge that data meets all criteria set forth for good Quality Assurance practices. Someone with a minimum of 2 years of experience in the environmental analysis of representative analytes for which HEAL seeks or maintains accreditation and a bachelor's degree in a scientific or related discipline should fill this position.

The education requirements for a Technical Director may be waived at the discretion of HEAL's accrediting agencies.

## **Section Supervisors**

Section Supervisors are full time members of stantat HEAL who exercise day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results for their department within IEAL. Section Supervisors report directly to their technical director. A Section Supervisor's duties shall include, but not be limited to, monitoring standards of performance in quality control and quality assurance, monitoring the validity of the analyses performed and the data generated in their sections to ensure reliable data, overseeing training and supervising departmental staff, scheduling incoming work for their sections, and monitoring laboratory personnel to ensure that proper procedures and techniques are being utilized. They supervise and implement new Quality control procedures as directed by the QA/QCO, update and maintain quality control records including, but not limited to, training forms, IDOCs, ADOCPs, and MDLs, and evaluate laboratory personnel in their Quality Control activities. In addition, Section Supervisors are responsible for upholding the spirit and intent of HEAL's data integrity procedures. Section Supervisors update their Technical Director on the status and needs of their departments and submit all Quality Control documents to their technical director for their review, approval and signature.

As section supervisors, they review analytical data to acknowledge that data meets all criteria set forth for good Quality Assurance practices. Someone with a minimum of 2 years of experience in the environmental analysis of representative analytes for which HEAL seeks or maintains accreditation and a bachelor's degree, or equivalent experience in a scientific or related discipline should fill this position.

## Health and Safety / Chemical Hygiene Officer

Refer to the most recent version of the Health and Safety and Chemical Hygiene Plans for the roles, responsibilities, and basic requirements of the Health and Safety Officer (H&SO) and the Chemical Hygiene Officer (CHO). These jobs can be executed by the same employee.

## Analyst I, If and III

Analysts are responsible for the analysis of various sample matrices including, but not limited to, solid, aqueous, and air, as well as the generation of high quality data in accordance with the HEAL SOPs and QA/QC guidelines in a reasonable time as prescribed by standard turnaround schedules or as directed by the Section Manager or Laboratory Manager.

Analysts are responsible for making sure all data generated is entered in the database in the correct manner and the raw data is reviewed, signed and delivered to the appropriate peer for review. An analyst reports daily to the section manager and will inform them as to material needs of the section specifically pertaining to the analyses performed by the analyst. Additional duties may include reparation of samples for analysis, maintenance of lab instruments or equipment, and cleaning and providing technical assistance to lower level laboratory state.

The senior analyst in the section may be as to perform supervisory duties as related to operational aspects of the section. The malyst may perform all duties of a lab technician.

The position of Analyst is a full or part time fourly position and is divided into three levels. Analyst I, II, and III. All employed hired into an Analyst position at HEAL must begin as an Analyst I and regardless of their education and experience. Analyst I must have a minimum of an AA in a related field or equivalent experience (equivalent experience means years of related experience can be substituted for the education requirement). An Analyst I is responsible for analysis, instrument operation, including calibration and data reduction. Analyst II must have a minimum of an AA in a related field or equivalent experience and must have documented and demonstrated aptitude to perform all functions of an Analyst II. An Analyst II is responsible for the full analysis of their test methods, routine instrument maintenance, purchase of consumables as dictated by their Technical Director, advanced data reduction, and basic data review. Analyst II may also assist Analyst III in method development and, as dictated by their Technical Director, may be responsible for the review and/or revision of their method specific SOPs. Analyst III must have Bachelors degree or equivalent experience and must have documented and demonstrated aptitude to perform all functions of an Analyst III. An Analyst III is responsible for all tasks completed by an Analyst I and II as well as advanced data review, non-routine instrument maintenance, assisting their technical director in basic supervisory duties and method development.

## Laboratory Technician

A laboratory technician is responsible for providing support to analysts in the organics, inorganics and disposal departments. Laboratory Technicians can assist analysts in basic sample preparation, general laboratory maintenance, glassware washing, chemical inventories, sample disposal and sample kit preparation. This position can be filled by someone without the education and experience necessary to obtain a position as an analyst.

## Sample Control Manager

The sample control manager is responsible for receiving samples and reviewing the sample login information after it has been entered into the computer. The sample control manager also checks the samples against the chap-of-custody for any sample and/or labeling discrepancies prior to distribution.

The sample control manager is responsible for sending out samples to the sub-contractors along with the review and shipping if field sampling bottle kits. The sample control manager acts as a liaison between the laboratory and field sampling crew to ensure that the appropriate analytical text is assigned. If a discrepancy is noted, the sample control manager or sample custodian will contact the customer to resolve any questions or problems. The sample control manager is an integral part of the customer service team.

This position should be filled by someone with a high school diploma and a minimum of 2 years of related experience and can also be filled by a senior manager.

#### Sample Custodians

Sample Custodians work directly under the Sample Control Manager. They are responsible for sample intake into the laboratory and into the LiMS. Sample Custodians take orders from our clients and prepare appropriate bottle kits to meet the clients' needs. Sample Custodians work directly with the clients in properly labeling and identifying samples as well as properly filling out legal COCs. When necessary, Sample Custodians contact clients to resolve any questions or problems associated with their samples. Sample Custodians are responsible for distributing samples throughout the laboratory and are responsible for notifying analysts of special circumstances such as short holding times or improper sample preservation upon receipt.

## Sample Disposal Custodian

The sample disposal custodian is responsible for characterizing and disposing of samples in accordance to the most recent version of the sample disposal SOP. The sample disposal custodian collects waste from the laboratory and transports it to the disposal warehouse for storage and eventual disposal. The sample disposal custodian is responsible for maintaining the disposal warehouse and following the requirements for documentation, integrity, chemical hygiene and health and safety as set forth in the various HEAL administrative SOPs. The sample disposal custodian is responsible for overseeing any laboratory technicians employed at the disposal warehouse.

This position should be filled by someone with a high school diploma and a minimum of 1 year of related experience.

## Bookkeeper

The Bookkeeper is responsible for the preparation of qualterly financials and quarterly payroll reports. The bookkeeper monitors payables, receivables, deposits, pays all bills and maintains an inventory of administrative supplies. The Bookkeeper completes final data package assembly and oversees the consignment of final reports. The Bookkeeper assists in the project management of drinking water compliance samples for NMED and NMEFC and any other tasks as assigned by the Laboratory Manager. This position should be filled by someone with a degree in accounting or a minimum of a high school diploma and at least 4 years of directly related experience.

#### Administrative Assistant

The Administrative Assistant is responsible for aiding administrative staff in tasks that include but are not limited to: the processing and consignment of final reports, and the generation of client specific spreadsheets. This position should be filled by someone with a minimum of a high school diploma.

#### IT Specialist

The IT Specialist is responsible for the induction and maintenance of all hard and software technology not maintained through a service agreement. The IT Specialist follows the requirements of this document, all regulatory documents and the EPAs Good Automated Laboratory Practices. This position should be filled by someone with a degree in a computer related field, or at least two years of directly related experience.

## Delegations in the Absence of Key Personnel

Planned absences shall be preceded by notification to the Laboratory Manager. The appropriate staff members shall be informed of the absence. In the case of unplanned absences, the superior shall either assume the responsibilities and duties or delegate the responsibilities and duties to another appropriately qualified employee.

In the event that the Laboratory Manager is absent for a period of time exceeding fifteen consecutive calendar days, another full-time staff member meeting the basic qualifications and competent to temporarily perform this function will be designated. If this absence exceeds thirty-five consecutive calendar days, HEAL will notify ORELAP in writing of the absence and the pertinent qualifications of the temporary laboratory manager.

## **Laboratory Personnel Qualification and Training**

All personnel joining HEAL shall undergo orientation and training. During this period the new personnel shall be introduced to the organization and their responsibilities, as well as the policies and procedures of the company. They shall also undergo on-the-job training and shall work with trained staff. They will be shown required tasks and be observed while performing them.

When utilizing staff undergoing training, appropriate supervision shall be dictated and overseen by the appropriate section technical director. Prior to analyzing client samples, a new employee, or an employee to a procedure, must meet the following basic requirements. The SOP and Method(s) for the analysis must be read and signed by the employee indicating that they read, understand, and intend to comply with the requirements of the documents. The employee must undergo documented training. Training is conducted by a senior analyst familiar with the procedure and overseen by the section Technical Director. This training is documented by any means degrated appropriate by the trainer and section Technical Director, and kept on file in the employees file located in the QA/QCO's office. The employee must perform a successful initial Demonstration of Proficiency (IDOC). See the current Document Control Logicok for the training documents and checklists utilized at HEAL to ensure that all of these requirements are met. Once all of the above requirements are met it is incumbent upon the section Technical Director to determine at which point the employee can begin to perform the test unsupervised. Certification to Complete Work Unsupervised (see the current Document Control Logbook) is then filled out by the employee and technical director.

IDOCs are required for all new analysts and methods prior to sample analysis. IDOCs are also required any time there is a change in the instrument, analyte list or method. If more than twelve months have passed since an analyst performed an IDOC and they have not performed the method and/or have not met the continuing DOC requirements, the analyst must perform an IDOC prior to resuming the test.

All IDOCs shall be documented through the use of the certification form which can be found in the current Document Control Logbook. IDOCs are performed by analyzing four Laboratory Control Spikes (LCSs). Using the results of the LCSs the mean recovery is calculated in the appropriate reporting units and the standard deviations of the population sample (n-1) (in the same units) as well as the relative percent difference for each parameter of interest. When it is not possible or pertinent to determine mean and standard deviations HEAL assesses performance against establish and documented criteria dictated in the method SOP. The mean and standard deviation are compared to the corresponding acceptance criteria for precision and accuracy in the test method (if applicable) or in laboratory-generated acceptance criteria. In the event that the HEAL SOP or test method(s) fail to establish the pass/fail criteria the default limits of +/- 20% for calculated recovery and <20% relative percent difference based on the standard deviation will be utilized. If all parameters meet the acceptance criteria, the IDOC is successfully completed. If any one of the parameters do not meet the acceptance criteria, the performance is unacceptable for that parameter and the analyst must either locate and correct the source of the problem and repeat the test for all parameters of interest or repeat the test for all parameters that failed to meet criteria. Repeat failure, however, confirms a general problem with the measurement system. If this occurs the source of the problem must be identified and the test repeated for all parameters of interest.

New employees that do not have prior analysis experience will not be allowed to perform analysis until they have demonstrated attention to detail with minimal errors in the assigned tasks. To ensure a sustained level of quality performance among staff members, continuing demonstration of capability shall be performed at least once a year. These are as an Annual Documentation of Capability shall be performed at least once a

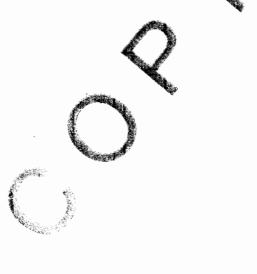
At least once per year an ADOCP must be completed. This is achieved by the acceptable performance of a blind tample (typically by using a PT sample, but can be a single blind (to the analyst) sample; by performing another IDOC, or by summarizing the data of four consecutive laboratory control samples with acceptable levels of precision and accuracy (these limits are those currently listed in the LIMS for an LCS using the indicated test method(s).) ADOCPs are documented using a standard form and are kept on the in each analyst's employee folder.

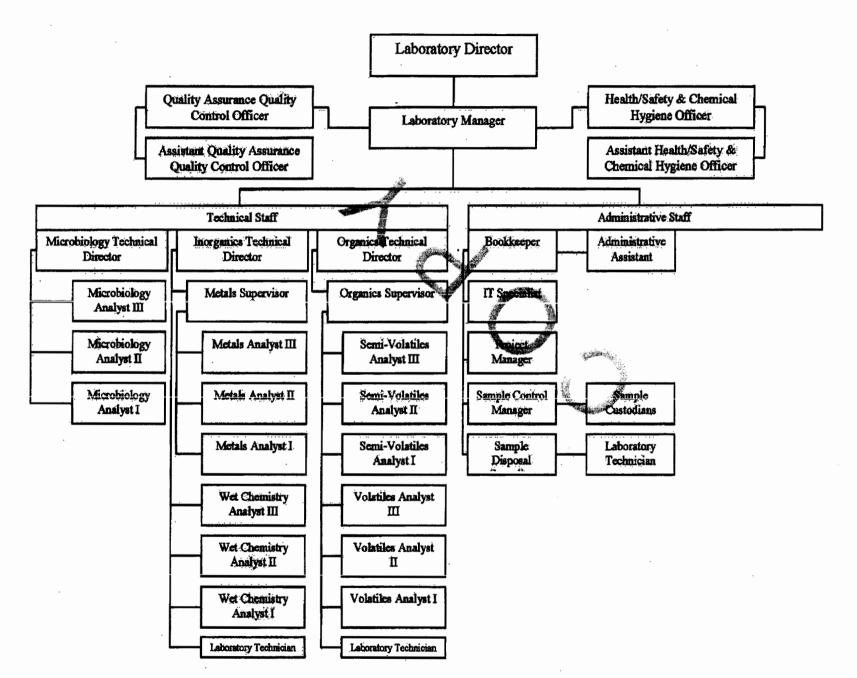
Each new employee shall be provided with data integrity training as a formal part of their new employee orientation. Each new employee will sign an ethics and data integrity agreement to ensure that they understand that data quality is our main objective. Every HEAL employee recognizes that although turn around time is important, quality is put above any pressure to complete the task expediently. Analysts are not compensated for passing QC parameters nor are incentives given for the quantity of work produced. Data Integrity and Ethics training are performed on an annual basis in order to remind all employees of HEAL's policy on data quality. Employees are required to understand that any infractions of the laboratory data integrity procedures will result in a detailed investigation that could lead to very serious

consequences including immediate termination, debarment, or civil/criminal prosecution.

Training for each member of HEAL's technical staff is further established and maintained through documentation that each employee has read, understood, and is using the latest version of this Quality Assurance Manual. Training courses or workshops on specific equipment, analytical techniques, or laboratory procedures are documented through attendance sheets, certificates of attendance, training forms, or quizzes. This training documentation is located in analyst specific employee folders in the QA/QCO Office. On the front of all methods, SOPs, and procedures for HEAL, there is a signoff sheet that is signed by all pertinent employees, indicating that they have read, understand, and agree to perform the most recent version of the document.

The effectiveness of training will be evaluated during routine data review, annual employee reviews, and internal and external audits. Repetitive errors, complaints and audit findings serve as indicators that training has been ineffective. When training is deemed to have been ineffective a brief review of the training process will be completed and a re-training conducted as soon as possible.





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## 5.0 Receipt and Handling of Samples

## **Reviewing Requests, Tenders and Contracts**

All contracts and written requests by clients are closely reviewed to ensure that the client's data quality objectives can be met to their specifications. This review includes making sure that HEAL has the resources necessary to perform the tests to the clients specifications.

When HEAL is unable to meet the clients specifications their samples will be subcontracted to an approved laboratory capable of meeting the client's data quality objectives.

## Sampling

#### **Procedures**

HEAL does not provide field sampling for any projects. Sample kits are prepared and provided for clients upon request. The sample kits contain the appropriate sampling containers (with a preservative when necessary), lately, blue ice (The use of "blue ice" by anyone except HEAL personnel is discouraged because it generally doe not maintain the appropriate temperature of the sample. If blue ice is used, it should be completely frozen at the time of use, the sample should be chilled before packing, and special notice taken at sample receipt to be certain the guired temperature has been maintained.), a cooler, chain-of-custody forms, plastic bags, bubble wrap, and any special sampling instructions. Sample kits are reviewed prior to chipment for accuracy and completeness.

#### Containers

Containers which are sent out for sampling are purchased by HEAL from a commercial source. Glass containers are certified "EPA Cleaned" QA level 1. Plastic containers are certified clean when required. These containers are received with a Certificate of Analysis verifying that the containers have been cleaned according to the EPA wash procedure. Containers are used once and discarded. If the samples are collected and stored in inappropriate containers the laboratory may not be able to accurately quantify the amount of the desired components. In this case, re-sampling may be required.

### **Preservation**

If sampling for analyte(s) requires preservation, the sample custodians fortify the containers prior to shipment to the field, or provide the preservative for the sampler to add in the field. The required preservative is introduced into the vials in uniform amounts and done so rapidly to minimize the risk of contamination. Vials that contain a

preservative are labeled appropriately. If the samples are stored with inappropriate preservatives, the laboratory may not be able to accurately quantify the amount of the desired components. In this case re-sampling may be required.

Refer to the current Login SOP and/or the current price book for detailed sample receipt and handling procedures, appropriate preservation and holding time requirements.

## Sample Custody

## Chain-of-Custody Form

A Chain-of-Custody (COC) form is used to provide a record of sample chronology from the field to receipt at the laboratory. HEAL's COC contains the client's name, address, phone and fax numbers, the project name and number, the project manager's name, and the field sampler's name. It also identifies the date and time of sample collection, sample matrix, field sample ID number, number/volume of sample containers, sample temperature upon receipt, and any sample preservative information.

There is also a space to record the HEAL ID number assigned to samples after they are received. Next to the sample information is a space for the dient to indicate the desired analyses to be performed. There is a section for the client to indicate the data package level as well as any accreditation requirements. Finally, there is a section to track the actual custody of the samples. The custody section contains lines for signatures, dates and tirnes when samples are relinquished and received. The COC form also includes a space to record special sample related instructions, sampling anomalies, time constraints, and any sample disposal considerations.

It is paramount that all COCs arrive at HEAL complete and accurate so that the samples can be processed and allocated for testing in a timely and efficient manner. A sample chain-of-custody form can be found in the current Document Control Logbook or on line at <a href="https://www.hallenvironmental.com">www.hallenvironmental.com</a>.

Should a specific project or client require the use of an internal COC, advanced notification and approval must be obtained. The use of internal COCs are not part of our standard operating procedure.

### **Receiving Samples**

Samples are received by authorized HEAL personnel. Upon arrival, the COC is compared to the respective samples. After the samples and COC have been determined to be complete and accurate, the sampler signs over the COC. The HEAL staff member in turn signs the chain-of-custody, also noting the current date, time, and sample temperature. This relinquishes custody of the samples from the sampler and delegates sample custody to HEAL. The first (white) copy of the COC form is filed in the appropriate sample folder. The second (yellow) copy of the COC form is filed in the

COC file in the sample control manager's office. The third (pink) copy of the COC form is given to the person who has relinquished custody of the samples.

## Logging in Samples and Storage

Standard Operating Procedures have been established for the receiving and tracking of all samples (refer to the current HEAL Login SOP). These procedures ensure that samples are received and properly logged into the laboratory and that all associated documentation, including chain of custody forms, is complete and consistent with the samples received. Each sample set is given a unique HEAL tracking ID number. Individual sample locations within a defined sample set are given a unique sample ID suffix-number. Labels with the HEAL numbers, and tests requested, are generated and placed on their respective containers. The pH of preserved, non-volatile samples is checked and noted if out of compliance. Due to the nature of the samples, the pHs of volatiles samples are checked after analysis. Samples are reviewed prior to being distributed for analysis.

All samples received that are requested for compliance, whether on the COC or by contract, will be identified as compliance samples in the LIMS so as to properly notify the analytical staff that they are to be analyzed in accordance with the test method(s) as well as the compliance requirements.

Samples are distributed for analysis based upon the requested tests. In the event that sample volume is limited and different departments at HEAL are required to share the sample, volatile work takes precedence and will always be analyzed first before the sample is sent to any other department for analysis.

Care will be taken to store samples is lated from laboratory contaminants, standards and highly contaminated samples.

All samples that require thermal preservation shall be acceptably stored at a temperature range just above freezing to 6 °C unless specified at another range by the SOP and Method.

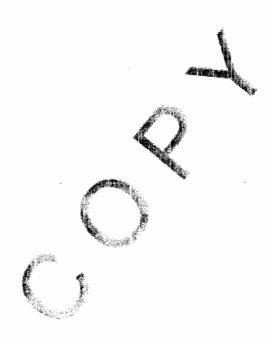
Each project (sample set) is entered into the Laboratory Information Management System (LIMS) with a unique ID that will be identified on every container. The ID tag includes the Lab ID, Client ID, date and time of collection, and the analysis/analyses to be performed. The LIMS continually updates throughout the lab. Therefore, at any time, an analyst or manager may inquire about a project and/or samples status. For more information about the login procedures, refer to the Sample Login SOP.

## **Disposal of Samples**

Samples are held at HEAL for a minimum of thirty days and then transferred to the HEAL warehouse for disposal. Analytical results are used to characterize their respective sample contamination level(s) so that the proper disposal can be performed. These wastes will be disposed of according to their hazard as well as their type and level of contamination. Refer to the Hall Environmental Analysis Laboratory Chemical Hygiene Plan and current Sample Disposal SOP for details regarding waste disposal.

Waste drums are provided by an outside agency. These drums are removed by the outside agency and disposed of in a proper manner.

The wastes that are determined to be non-hazardous are disposed of as non-hazardous waste in accordance with the Chemical Hygiene Plan and Sample Disposal SOP.



## 6.0 Analytical Procedures

All analytical methods used at HEAL incorporate necessary and sufficient Quality Assurance and Quality Control practices. A Standard Operating Procedure (SOP) is used to provide the necessary criteria to yield acceptable results. These procedures are reviewed at least annually and revised as necessary and are attached as a pdf file in the Laboratory Information Management System (LIMS) for easy access by each analyst. The sample is often consumed or altered during the analytical process. Therefore, it is important that each step in the analytical process be correctly followed in order to yield valid data.

When unforeseen problems arise, the analyst, technical director, and, when necessary, laboratory manager meet to discuss the factors involved. The analytical requirements are evaluated and a suitable corrective action or resolution is established. The client is notified in the case narrative with the final report or before, if the validity of their result is in question.

#### List of Procedures Used

Typically, the procedures used by HEAL are EPA approved methodologies or 20th edition Standard Methods. However, proprietary methods for client specific samples are sometimes used. On occasion, multiple methods or multiple method revisions are used, in this event the SOP is written to include the requirements of all referenced methods. The following tables list EPA and Standard Methods Methods methods with their corresponding analytes and/or instrument classification.

## Methods Utilized at HEAL

Drinking Water(DW) Non-Potable Water (NPW) Solids (S)

Methodology	Matrix	Title of Method		
180.1	DW	"Turbidity (Nephelometric)"		
	NPW			
200.2	DW	"Sample Preparation Procedure For Spectrochemical		
	NPW	Determination of Total Recoverable Elements"		
200 7	DW	"Determination of Metals and Trace Elements in Water and		
200.7	NPW	Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry"		
200.8	DW	"Determination of Trace Elements in Waters and Wastes by		
200.0	NPW	Inductively Coupled Plasma-Mass Spectrometry."		
245.1	DW	"Marouny (Manual Cold Vanor Tachnique)"		
	NPW	"Mercury (Manual Cold Vapor Technique)"		

300.0	DW NPW S	"Determination of Inorganic Anions by Ion Chromatography"
413.2	NPW S	"Oil and Grease"
418.1	NPW S	"Petroleum Hydrocarbons (Spectrophotometric, Infrared)"
504.1	DW	"EDB, DBCP and 123TCP in Water by Microextraction and Gas Chromatography"
524.2	DW	"Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry"
552.3	DW	"Determination of Haloacetic Acids and Dalapon in Drinking Water by Ion-Exchange Liquid-Solid Extraction and Gas Chromatography with an Electron Capture Detector"
624	NPW	Appendix A to Part 136 Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater Method 624-Purgeables"
1311	s	"Toxicity Characteristic Leaching Proceedire"
1311ZHE	S	"Toxicity Characteristic Leaching Procedure"
1664A	NPW	"N-Hexane Extractable Material HEM; Oil and Grease) and Silica Gel Treated N-Hexana Extractable Material) by Extraction and Gravimetry"
3005A	NPW	"Acid Digestion of Water, for Total Recoverable or Dissolved Metals for Analysis by FLAA or ICP Spectroscopy"
3010A	NPW	"Acid Digestion of Agueous Samples and Extracts for Total Metals for Analysis by TLAA or ICP Spectroscopy"
3050B	S	"Acid Digestion of Sediment, Sludge, and Soils"
3510C	DW NPW	"Separatory Funnel Liquid-Liquid Extraction"
3540	S	"Soxhlet Extraction"
3545	s	"Pressurized Fluid Extraction(PFE)"
3665	NPW S	"Sulfuric Acid/Permanganate Cleanup"
5030B	NPW	"Purge-and-Trap for Aqueous Samples"
5035	s	"Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples"
6010B	NPW S	"Inductively Coupled Plasma-Atomic Emission Spectrometry"
7470A	NPW	"Mercury in Liquid Waste (Manual Cold-Vapor Technique)"
	····	

7471A	s	"Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)"
8021B	NPW S	"Aromatic and Halogenated Volatiles By Gas Chromatography Using Photoionization and/or Electrolytic Conductivity Detectors"
0045D	NPW	"Nonhalogenated Volatile Organics by Gas Chromatography"
8015D	s	(Gasoline Range and Diesel Range Organics)
8081A	NPW S	"Organochlorine Pesticides by Gas Chromatography"
8082	NPW S	"Polychlorinated Biphenyls (PCBs) by Gas Chromatography"
8260B	NPW S	"Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)"
8270C	NPW S	"Semivolatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)"
8310	NPW S	"Polynuclear Aromatic Hydrocarbons"
9060	NPW	"Total Organic Carbon"
9067	NPW S	"Phenolics (Spectrophotometric, MBTH With Distillation)"
9095A	S	"Paint Filter Liquids Test"
H-8167	DW NPW	"Method 8167 Chlorine, Total
Walkley/Black	S	FOC/TOC WB
SM2320 B	DW NPW	"Alkalinity"
SM2340B	NPW	"2340 Hayaness"
SM2510B	DW NPW	"2510 Conductivity"
SM2540 B	NPW	"Total Solids Dried at 103-105° C"
SM2540 C	DW NPW	"Total Dissolved Solids Dried at 180° C"
SM2540 D	NPW	"Total Suspended Solids Dried at 103-105° C"
SM4500-H+B	DW NPW	"pH Value"
SM4500-NH3 C	NPW S	"4500-NH3" Ammonia
SM4500-Norg C	NPW S	"4500-Norg" Total Kjeldahl Nitrogen (TKN)

SM5210 B	NPW	"5210 B. 5-day BOD Test"
SM5310 B	DW	"5310" Total Organic Carbon (TOC)
SM9223B	NPW DW	"9223 Enzyme Substrate Coliform Test"
8000B	NPW S	"Determinative Chromatographic Separations"
8000C	NPW S	"Determinative Chromatographic Separations"

## Criteria for Standard Operating Procedures

HEAL has Standard Operating Procedures (SOPs) for each of the test methods listed above. These SOPs are based upon the listed methods and detail the specific procedure and equipment utilized as well as the quality requirements necessary to prove the integrity of the data. SOPs are reviewed or revised every twelve months or sooner if necessary. The review/revision is documented in the Master SOP Logbook filed in the QA/QC Office. All SOPs are available in the LIMS under the Documents and SOPs menu.

Hand written corrections or alterations to SOPs are not permitted. In the event that a correction is needed and a revision is not immediately possible, a corrective action report will be generated documenting the correction or alteration, signed by the section Technical Director and the QA/QC Officer and will be scanned into the current SOP and will document the change until a new revision is possible.

Controlled documents such as calibration summary forms, analysis bench sheets, etc. are tracked as appendices in SOPs, through the Controlled Document Logbook with copies available through the LIMS or through the MOAL so bound logbooks.

Each HEAL test method SOP shall include or reference the following topics where applicable:

Identification of the test method:

Applicable matrix or matrices;

Limits of detection and quantitation;

Scope and application, including parameters to be analyzed;

Surnmary of the test method:

Definitions:

Interferences:

Safety:

Equipment and supplies;

Reagents and standards:

Sample collection, preservation, shipment and storage;

Quality control parameters:

Page 28 of 57 Quality Assurance Plan 9.7 Effective July 29th, 2013 Calibration and standardization;

Procedure:

Data analysis and calculations;

Method performance;

Pollution prevention;

Data assessment and acceptance criteria for quality control measures;

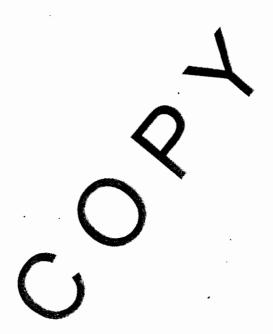
Corrective actions for out-of-control data;

Contingencies for handling out-of-control or unacceptable data;

Waste management;

References; and

Any tables, diagrams, flowcharts and validation data.



#### 7.0 Calibration

All equipment and instrumentation used at HEAL are operated, maintained and calibrated according to manufacturers' guidelines, as well as criteria set forth in applicable analytical methodology. Personnel who have been properly trained in their procedures perform the operation and calibration. Brief descriptions of the calibration processes for our major laboratory equipment and instruments are found below.

#### **Thermometers**

The thermometers in the laboratory are used to measure the temperatures of the refrigerators, freezers, ovens, water baths, incubators, hot blocks, ambient laboratory conditions, TCLP Extractions, digestion blocks, and samples at the time of log-in. All NIST traceable thermometers are either removed from use upon their documented expiration date or they are checked annually with a NIST-certified thermometer and a correction factor is noted on each thermometer log. See the most current Login SOP for detailed procedures on this calibration procedure.

Data Loggers are used to record refrigerator temperatures. These data loggers are calibrated quarterly with NIST-certified thermometers.

The NIST thermometer should be recalibrated at least every five years or whenever the thermometer has been exposed to temperature extremes.

#### Refrigerators/Freezers

Each laboratory refrigerator or freezer contains a mermometer capable of measuring to a minimum precision of 0.1°C. The thermometers are kept with the bulb immersed in liquid. Each day of use, the temperatures of the refrigerators are recorded to insure that the refrigerators are within the required designated range. Samples are stored separately from the standards to reduce the risk of contamination.

See the current Catastrophic Failure SOP for the procedure regarding how to handle failed refrigerators or freezers.

#### **Ovens**

The ovens contain thermometers graduated by 1° C. The ovens are calibrated quarterly against NIST thermometers and checked each day of use as required and in whatever way is dictated by or appropriate for the method in use.

# **Analytical and Table Top Balances**

The table top balances are capable of weighing to a minimum precision of 0.01 grams. The analytical balances are capable of weighing to a minimum precision of 0.0001 grams. Records are kept of daily calibration checks for the balances in use. Working weights are used in these checks. The balances are annually certified by an outside source and the certifications are on file with the QA/QCO.

Balances, unless otherwise indicated by method specific SOPs, will be checked each day of use with at least two weights that will bracket the working range of the balance for the day. Daily balance checks will be done using working weights that are calibrated annually against Class S weights. Class S weights are calibrated by an external provider as required. The Class S weights are used once a year, or more frequently if required, to assign values to the Working Weights. During the daily balance checks, the working weights are compared to their assigned values and must pass in order to validate the calibration of the balance. The assigned values, as well as the taily checks, for the working weights are recorded in the balance logbook for each balance.

#### Instrument Calibration

An instrument calibration is the relationship between the known concentrations of a set of calibration standards introduced into an analytical instrument and the measured response they produce. Calibration curve standards are a prepared series of aliquots at various known concentration levels from a primary source reference standard. Specific mathematical types of calibration techniques are outlined in SW-846 8000B and/or 8000C. The entire initial calibration must be performed prior to sample analyses.

The lowest standard in the calibration curve must be at or below the required reporting limit.

Refer to the current SOP to determine the minimum requirement for calibration points.

Most compounds tend to be linear and a linear approach should be favored when linearity is suggested by the calibration data. Non-linear calibration should be considered only when a linear approach cannot be applied. It is not acceptable to use an alternate calibration procedure when a compound fails to perform in the usual manner. When this occurs, it is indicative of instrument issues or operator error.

If a non-linear calibration curve fit is employed, a minimum of six calibration levels must be used for second-order (quadratic) curves.

When more than 5 levels of standards are analyzed in anticipation of using second-order calibration curves, all calibration points MUST be used regardless of the calibration option

employed. The highest or lowest calibration point may be excluded for the purpose of narrowing the calibration range and meeting the requirements for a specific calibration option. Otherwise, unjustified exclusion of calibration data is expressly forbidden.

Analytical methods vary in QC acceptance criteria. HEAL follows the method specific guidelines for QC acceptance. The specific acceptance criteria are outlined in the analytical methods and their corresponding SOPs.

#### pH Meter

The pH meter measures to a precision of 0.01 pH units. The pH calibration logbook contains the calibration before each use, or each day of use, if used more than once per day. It is calibrated using a minimum of 3 certified buffers. Also available with the pH meter is a magnetic stirrer with a temperature sensor. See the current pH SOP (SM4500 H+ B) for specific details regarding calibration of the pH probe.

# Other Analytical Instrumentation and Equipment

The conductivity probe is calibrated as needed and checked daily when in use.

Eppendorf (or equivalent brands) pipettes are checked an avimetrically prior to use.

#### **Standards**

All of the source reference standards used are ontered from a reliable commercial vendor. A Certificate of Analysis (CoA), which verifies the duality of the standard, accompanies the standards from the vendor. The Certificates of Analysis are dated and stored on file by the Technical Directors or their designee. These standards are traceable to the National Institute of Standards (NIST). When salts are purchased and used as standards the certificate of purity must be obtained from the vendor and filed with the CoAs.

All standard solutions, calibration curve preparations, and all other quality control solutions are labeled in a manner that can be traced back to the original source reference standard. All source reference standards are entered into the LIMS with an appropriate description of the standard. Dilutions of the source reference standard (or any mixes of the source standards) are fully tracked in the LIMS. Standards are labeled with the date opened for use and with an expiration date.

As part of the quality assurance procedures at HEAL, analysts strictly adhere to manufacturer recommendations for storage times/expiration dates and policies of analytical standards and quality control solutions.

#### Reagents

HEAL ensures that the reagents used are of acceptable quality for their intended purpose. This is accomplished by ordering high quality reagents and adhering to good laboratory practices so as to minimize contamination or chemical degradation. All reagents must meet any specifications noted in the analytical method. Refer to the current Purchase of Consumables SOP for details on how this is accomplished and documented.

Upon receipt, all reagents are assigned a separate ID number, and logged into the LIMS. All reagents shall be labeled with the date received into the laboratory and again with the date opened for use. Recommended shelf life, as defined by the manufacturer, shall be documented and controlled. Dilutions or solutions prepared shall be clearly labeled, dated, and initialed. These solutions are traceable back to their primary reagents and do not extend beyond the expiration date listed for the primary reagent.

All gases used with an instrument shall meet specifications of the manufacturer. All safety requirements that relate to maximum and/or minimum allowed pressure, fitting types, and leak test frequency, shall be followed. When a new tank of gas is placed in use, it shall be checked for leaks and the date put in use will be written in the instrument maintenance logbook.

HEAL continuously monitors the quality of the reagent water and provides the necessary indicators for maintenance of the purification systems in order to assure that the quality of laboratory reagent water meets established criteria or all analytical methods. The majority of HEAL methods utilize medium quality deionized magent water maintained at a resistivity greater than  $1M\Omega$  in accordance with SM1080.

Reagent blank samples are also analyzed to ensure that no contamination is present at detectable levels. The frequency of reagent blank analysis is typically the same as calibration verification samples. Refrigerator storage blanks are stored in the volatiles refrigerator for a period of one week and analyzed and replaced once a week.

#### 8.0 Maintenance

Maintenance logbooks are kept for each major instrument and all support equipment in order to document all repair and maintenance. In the front of the logbook, the following information is included:

Unique Name of the Item or Equipment
Manufacturer
Type of Instrument
Model Number
Serial Number
Date Received and Date Placed into Service
Location of Instrument
Condition of Instrument Upon Receipt

For routine maintenance, the following information shall be included in the log:

Maintenance Date
Maintenance Description
Maintenance Performed by Initials

A manufacturer service agreement (or equivalent) covers most major instrumentation to assure prompt and reliable response to maintenant needs beyond HEAL instrument operator capabilities.

Refer to the current Maintenance and Troubleshooting SOP for each section in the laboratory for further information.

# 9.0 Data integrity

For HEAL's policy on ethics and data integrity, see section 3.0 of this document. Upon being hired, and annually thereafter, all employees at HEAL undergo documented data integrity training. All new employees sign an Ethics and Data Integrity Agreement, documenting their understanding of the high standards of integrity required at HEAL and outlining their responsibilities in regards to ethics and data integrity. See the current Document Control Logbook for a copy of this agreement.

In instances of ethical concern, analysts are required to report the known or suspected concern to their Technical Director, the Laboratory Manager, or the QA/QCO. This will be done in a confidential and receptive environment, allowing all employees to privately discuss ethical issues or report items of ethical concern.

Once reported and documented, the ethical concern will be immediately elevated to the Laboratory Manager and the need for an investigation, analyst remediation, or termination will be determined on a case-by-case basis.

All reported instances of ethical concern will be thoroughly documented and handled in a manner sufficient to rectify any breaches in data integrity with the emphasis on preventing similar incidences from happening in the future.



# 10.0 Quality Control

# **Internal Quality Control Checks**

HEAL utilizes various internal quality control checks, including duplicates, matrix spikes, matrix spike duplicates, method blanks, laboratory control spikes, laboratory control spike duplicates, surrogates, internal standards, calibration standards, quality control charts, proficiency tests and calculated measurement uncertainty.

Refer to the current method SOP to determine the frequency and requirements of all quality controls. In the event that the frequency of analysis is not indicated in the method specific SOP, duplicate samples, laboratory control spikes (LCS), Method Blanks (MB), and matrix spikes and matrix spike duplicates (MS/MSD) are analyzed for every batch of twenty samples.

When sample volume is limited on a test that requires an MS/MSD an LCSD shall be analyzed to demonstrate precision and accuracy and when possible a sample duplicate will be analyzed.

Duplicates are identical tests repeated for the same sample of matrix spike in order to determine the precision of the test method. A Relative Percent Difference (RPD) is calculated as a measure of this precision. Unless indicated in the SOP, the default acceptance limit is </= 20%.

Matrix Spikes and Matrix Spike Duplicates are spiked samples (MS/MSD) that are evaluated with a known added quantity of a target compound. This is to help determine the accuracy of the analyses and to determine the matrix effects on analyte recovery. A percent recovery is calculated to assess the quality of the accuracy. In the event that the acceptance criteria is not outlined in the SOP, a default limits of 70 430% will be utilized. When an MSD is employed an RPD is calculated and when not indicated in the SOP shall be acceptable at

When appropriate for the method, is Method Blank should be analyzed with each batch of samples processed to assess contamination levels in the laboratory. MBs consist of all the reagents measured and treated as they are with samples, except without the samples. This enables the laboratory to ensure clean reagents and procedures. Guidelines should be in place for accepting or rejecting data based on the level of contamination in the blank. In the event that these guidelines are not dictated by the SOP or in client specific work plans, the MB should be less than the MDL reported for the analyte being reported.

A Laboratory Control Spike and Laboratory Control Spike Duplicate (LCS/LCSD) are reagent blanks, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. It is generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system. Guidelines are outlined in each

SOP for the frequency and pass fail requirements for LCS and LCSDs. These limits can be set utilizing control charts as discussed below.

Surrogates are utilized when dictated by method and are substances with properties that mimic the analytes of interest. The surrogate is an analyte that is unlikely to be found in environmental samples. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for surrogates.

Internal Standards are utilized when dictated by the method and are known amounts of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for Internal Standards.

Proficiency Test (PT) Samples are samples provided by an unbiased third party. They are typically analyzed twice a year, between five and seven months apart, or at any other interval as defined in the method SOP. They contain a pre-determined concentration of the target compound, which is unknown to HEAL. HEAL's management and all analysts shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance untilia, sequence of analytical steps, number of replicates and other procedures as used when analyzing routine samples. PT results are reported as normal samples, within the working range of the associated calibration curve. In the event an analyte concentration is less than the PQL, the result shall be reported as less than the PQL.

With regards to analyzing PT Samples HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seek accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall not attempt to obtain the assigned value of any PT sample from the PT Provider.

Upon receiving a Not Acceptable PT result for any analyte, a root cause analysis is conducted and the cause of the failure determined and corrected. As defined by TNI, two out of the past three PTs must be acceptable to maintain accreditation for any given analyte. If this requirement is not met, a successful history will be reestablished by the analysis of an additional PT sample. For accredited tests, the PT provider will be notified, when the PT is for corrective action purposes. The analysis dates of successive PT samples for the same TNI accredited analyte shall be at least fifteen days apart.

Calibration standards are standards run to calibrate. Once the calibration is established the same standards can be analyzed as Continuing Calibration Verifications (CCV), used to confirm the consistency of the instrumentation. Calibration standards can be utilized at the beginning and end of each batch, or more frequently as required. Typically Continuing

Calibration Blanks (CCB) are run in conjunction with CCVs. Refer to the current method SOP for frequency and pass/fail requirements of CCVs and CCBs.

Control Limits are limits of acceptable ranges of the values of quality control checks. The control limits approximate a 99% confidence interval around the mean recovery. Any matrix spike, surrogate, or LCS results outside of the control limits require further evaluation and assessment. This should begin with the comparison of the results from the samples or matrix spike with the LCS results. If the recoveries of the analytes in the LCS are outside of the control limits, then the problem may lie with the application of the extraction, with cleanup procedures, or with the chromatographic procedure. Once the problem has been identified and addressed, corrective action may include reanalysis of samples or reextraction followed by reanalysis. When the LCS results are within the control limits, the issue may be related to the sample matrix or to the use of an inappropriate extraction. cleanup, and/or determinative method for the matrix. If the results are to be used for regulatory compliance monitoring, then steps must be taken to demonstrate that the analytes of concern can be determined in the sample matrix at the levels of interest. Data generated with laboratory control samples that fall outside of the established control limits are judged to be generated during an "out-of-control" situation. These data are considered suspect and shall be repeated or reported with qualifiers.

Control limits are to be updated only by Technical Directors, action Supervisors or the Quality Assurance Officer. Control limits should be established and updated according to the requirements of the method being utilized. When the method does not specify, and control limits are to be generated or updated for test the following guidelines shall be utilized.

Limits should typically be generated utilizing the most recent 20-40 data values. In order to obtain an even distribution across multiple instruments and to include more than a single day's worth of data, surrogate limits should be generated using around 100 data values. The data values used shall not reuse values that there included in the previous Control Limit update. The data values shall also be reviewed by the LIMS for any Grubbs Outliers, and if identified, the outliers must be removed prior to generating new limits. The results used to update control limits should meet all other QC criteria associated with the determinative method. For example, MS/MSD resoveries from a GC/MS procedure should be generated from samples analyzed after a valid tune and a valid initial calibration that includes all analytes of interest. Additionally, no analyte should be reported when it is beyond the working range of the calibration currently in use. MS/MSD and surrogate limits should be generated using the same set of extraction, cleanup, and analysis procedures.

All generated limits should be evaluated for appropriateness. Where limits have been established for MS/MSD samples, the LCS/LCSD limits should fall within those limits, as the LCS/LCSD are prepared in a clean matrix. Surrogate limits should be updated using all sample types and should be evaluated to ensure that all instruments as well as a reasonable dispersion across days are represented by the data. LCS/LCSD recovery limits should be evaluated to verify that they are neither inappropriately wide nor unreasonably tight. The default LCS/LCSD acceptance limits of 70-130% and RPD of 20% (or those limits

specified by the method for LCS/LCSD and/or CCV acceptability), should be used to help make this evaluation. Technical directors may choose to use warning limits when they feel their generated limits are too wide, or default LCS limits when they feel their limits have become arbitrarily tight.

Once new Control Limits have been established and updated in the LIMS, the Control Charts shall be printed and reviewed by the appropriate section supervisor and primary analyst performing the analysis for possible trends and compared to the previous Control Charts. The technical director initials the control charts, indicating that they have been reviewed and that the updated Limits have been determined to be accurate and appropriate. Any manual alterations to the limits will be documented and justified on the printed control chart. These initialed charts are then filed in the QA/QCO office.

Once established, control limits should be reviewed after every 20-30 data values and updated at least every six months, provided that there are sufficient points to do so. The limits used to evaluate results shall be those in place at the time that the sample was analyzed. Once limits are updated, those limits apply to all subsequent analyses.

When updating surrogate control limits, all data, regardless de sample/QC type, shall be updated together and assigned one set of limits for the same method/matrix.

In the event that there are insufficient data points to update limits that are over a year old, the default limits, as established in the method or SOB shall be re-instated. Refer to the requirements in SW-846 method 8000B and 8000C for further guidance on generating control limits.

Calculated Measurement Uncertainty is calculated annually using LCSs in order to determine the laboratory specific uncertainty associated with each test method. These uncertainty values are available to our clients upon request and are utilized as a trending tool internally to determine the effectiveness of new variables introduced into the procedure over time.

# **Client Requested QC**

Occasionally certain clients will require QC that is not defined by or covered in the SOPs. These special requests will be issued to all analysts and data reviewers in writing and the analysts and data reviewers will be provided with guidance on how to properly document the client requested deviation/QC in their preparation and analytical batches.

# Precision, Accuracy, Detection Levels

#### Precision

The laboratory uses sample duplicates, laboratory control spike duplicates, and matrix spike duplicates to assess precision in terms of relative percent difference

(RPD). HEAL requires the RPD to fall within the 99% confidence interval of established control charts or an RPD of less than 20% if control charts are not available. RPD's greater than these limits are considered out-of-control and require an appropriate response.

RPD = 2 x (Sample Result - Duplicate Result) X 100 (Sample Result + Duplicate Result)

# **Accuracy**

The accuracy of an analysis refers to the difference between the calculated value and the actual value of a measurement. The accuracy of a laboratory result is evaluated by comparing the measured amount of QC reference material recovered from a sample and the known amount added. Control limits can be established for each analytical method and sample matrix. Recoveries are assessed to determine the method efficiency and/or the matrix effect.

Analytical accuracy is expressed as the Percent Recovery (%R) of an analyte or parameter. A known amount of analyte is added to an environmental sample before the sample is prepared and subsequently analyzed. This equation used to calculate percent recovery is:

%Recovery = {(concentration* recovered)/(concentration* added)} X 100

*or amount

HEAL requires that the Percent Recovery to fall within the 99 % confidence interval of established control limits. A value that falls of tside of the confidence interval requires a warning and process evaluation. The confidence intervals are calculated by determining the mean and cample standard deviation. If control limits are not available, the range of 80 to 120% is used unless the specific method dictates otherwise. Percent Recoveries outside of this range mandate additional action such as analyses by Method of Standard Additions, additional sample preparation(s) where applicable, method changes, and out-of-control action or data qualification.

#### **Detection Limit**

Current practices at HEAL define the Detection Limit (DL) as the smallest amount that can be detected above the baseline noise in a procedure within a stated confidence level.

HEAL presently utilizes an Instrument Detection Limit (IDL), a Method Detection Limit (MDL), and a Practical Quantitation Limit (PQL). The relationship between these levels is approximately

IDL: MDL: PQL = 1:5:5.

The IDL is a measure of the sensitivity of an analytical instrument. The IDL is the amount which, when injected, produces a detectable signal in 99% of the analyses at that concentration. An IDL can be considered the minimum level of analyte concentration that is detectable above random baseline noise.

The MDL is a measure of the sensitivity of an analytical method. MDL studies are required annually for each quality system matrix, technology and analyte, unless indicated otherwise in the referenced method. An MDL determination (as required in 40CFR part 136 Appendix B) consists of replicate spiked samples carried through all necessary preparation steps. The spike concentration is three times the standard deviation of three replicates of spikes. At least seven replicates are spiked and analyzed and their standard deviation(s) calculated. Routine variability is critical in passing the 10 times rule and is best achieved by running the MDLs over different days and when possible over several calibration events. Standard Methods and those methods used for drinking water analysis must have MDL studies that are performed over a period of at least three days in order to include day to day variations. The method detection limit (MDL) can be calculated using the standard deviation according to the formula: Service Control

$$MDL = s * t (99%),$$

where t (99%) is the Student's t-value for the 99% confidence interval. The t-value depends on the number of trials used in calculating the sample standard deviation, so choose the appropriate value according to the number of trials.

Number of Trial	t(92%)
6	3 6
7	6.14
8	3.00
9	2.90
2000	

The calculated MDL must not be less than 10 times the spiked amount or the study must be performed again with a lower concentration.

Where there are multiple MDL values for the same test method in the LIMS the highest MDL value is utilized.

The PQL is significant because different laboratories can produce different MDLs although they may employ the same analytical procedures, instruments and sample matrices. The PQL is about two to five times the MDL and represents a practical, and routinely achievable, reporting level with a good certainty that the reported value is reliable. It is often determined by regulatory limits. The reported PQL for a sample is dependent on the dilution factor utilized during sample analysis.

In the event that an analyte will not be reported less than the PQL, an MDL study is not required and a PQL check shall be done, at least annually, in place of the MDL study. The PQL check shall consist of a QC sample spiked at or below the PQL. All sample-processing and analysis steps of the analytical method shall be included in the PQL check and shall be done for each quality system matrix, technology, and analyte. A successful check is one where the recovery of each analyte is within the established method acceptance criteria. When this criterion is not defined by the method or SOP, a default limit of +/-50% shall be utilized.

# **Quality Control Parameter Calculations**

#### Mean

The sample mean is also known as the arithmetic average. It can be calculated by adding all of the appropriate values together, and dividing this sum by the number of values.

Average =  $(\Sigma x_i) / n$ 

 $x_i$  = the value x in the  $i^{th}$  trial n = the number of trials

#### Standard Deviation

The sample standard deviation, represented by s, is a measure of dispersion. The dispersion is considered to be the difference between the average and each of the values x_i. The variance, s_i can be calculated by summing the squares of the differences and dividing by the number of differences. The sample standard deviation, s, can be found by the pumper root of the variance.

Standard deviation =  $s = \left[\sum (x_i - average)^2 / (n-1)\right]^{\frac{1}{2}}$ 

Percent Recovery (LCS and LCSD)

Percent Recovery = (Spike Sample Result) X100 (Spike Added)

Percent Recovery (MS, MSD)

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# Percent Recovery = (Spike Sample Result – Sample Result) X100 (Spike Added)

#### **Control Limits**

Control Limits are calculated by the LIMS using the average percent recovery (x), and the standard deviation (s).

Upper Control Limit = x + 3sLower Control Limit = x - 3s

These control limits approximate a 99% confidence interval around the mean recovery.

# **RPD (Relative Percent Difference)**

Analytical precision is expressed as a percentage of the difference between the results of duplicate samples for a given analyst. Relative percent difference (RPD) is calculated as follows:

RPD = 2 x (Sample Result – Duplicate Result) (Sample Result + Duplicate Result)

# **Uncertainty Measurements**

Uncertainty, as defined by ISO, is the parameter associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurement. Ultimately, uncertainty measurements are used to state how good a test result is and to allow the end user of the data to properly interpret their reported data. All procedures allow for some uncertainty. For most analyses, the components and estimates of uncertainty are reduced by following well-established test methods. To further reduce uncertainty, results generally are not reported below the lowest calibration point (PQL) or above the highest calibration point (UQL). Understanding that there are many influential quantities affecting a measurement result, so many in fact that it is impossible to identify all of them, HEAL calculates measurement uncertainty at least annually using LCSs. These estimations of measurement uncertainty are kept on file in the method folders in the QA/QC office.

Measurement Uncertainty contributors are those that may be determined statistically. These shall be generated by estimating the overall uncertainty in the entire analytical

process by measuring the dispersion of values obtained from laboratory control samples over time. At least 20 of the most recent LCS data points are gathered. The standard deviation(s) is calculated using these LCS data points. Since it can be assumed that the possible estimated values of the spikes are approximately normally distributed with approximate standard deviation(s), the unknown value of the spike is believed to lie in 95% confidence interval, corresponding to an uncertainty range of +/- 2(s).

Calculate standard deviation (s) and 95% confidence interval according to the following formulae:

$$s = \sqrt{\frac{\sum (x - \overline{x})^2}{(n-1)}}$$

Where: s = standard deviation

x = number in series

 $\bar{x}$  = calculated mean of series

n = number of samples taken

95% confidence =  $2 \times s$ 

Example: Assuming that after gathering 20 of the most recent LCS results for Bromide, we have calculated the standard deviations of the values and achieved a result of 0.0326, our measurement of uncertainty for Bromide (at 95% confidence =  $2 \times s$ ) is 10652

# **Total Nitrogen**

Total nitrogen is calculated as follows

# **Langelier Saturation Index**

The Langelier Saturation Index (LSI) is calculated as follows:

Solids Factor (SF) =(Log10[TDS] - 1) / 10 Ca Hardness Factor (HF) = Log10([Ca] x 2.497) - 0.4 Alkalinity Factor (AF) = Log10[Alkalinity] Temp. Factor (TF) = -13.12 x Log10( $^{\circ}$ C + 273) + 34.55 pHs (pH @ saturation) =(9.3 + SF + TF) - (HF + AF) LSI = pH - pH_s

#### **Calibration Calculations**

1. Response Factor or Calibration Factor:

$$RF = ((A_x)(C_{is}))/((A_{is})(C_x))$$

 $CF=(A_x)/(C_x)$ 

a. Average RF or CF

$$RF_{AVE} = \Sigma RF_i / n$$

b. Standard Deviation

$$s = SQRT \{ [\Sigma (RF_i - RF_{AVE})^2] / (n-1) \}$$

c. Relative Standard Deviation

#### Where:

 $A_x$  = Area of the compound

 $C_x$  = Concentration of the compound

A_{is} = Area of the internal standard

C_{is} = Concentration of the internal standard

n = number of pairs of data

RF_i = Response Factor (or other determined value)

RF_{AVE} = Average of all the response factors

 $\Sigma$  = the sum of all the individual values

# 2. Linear Regression

a. Slope (m)

$$\mathbf{m} = (\mathbf{n} \Sigma \mathbf{x_i} \mathbf{y_i} - (\mathbf{n} \Sigma \mathbf{x_i})^* (\mathbf{n} \Sigma \mathbf{y_i})) / (\mathbf{n} \Sigma \mathbf{x_i}^2 - (\Sigma \mathbf{x_i})^2)$$

b. Intercept (b)

$$b = y_{AVE} - m^*(x_{AVE})$$

c. Correlation Coefficient (cc)

CC (r) ={ 
$$\Sigma((x_i-x_{ave})^*(y_i-y_{ave}))$$
 } / {  $SQRT((\Sigma(x_i-x_{ave})^2)^*(\Sigma(y_i-y_{ave})^2))$  }

Page 45 of 57 Quality Assurance Plan 9.7 Effective July 29th, 2013 Or

CC (r) =[
$$(\Sigma w * \Sigma wxy) - (\Sigma wx * \Sigma wy)] / (sqrt( ( [( $\Sigma w * \Sigma wx^2) - (\Sigma wx * \Sigma wx)]) * [( $\Sigma w * \Sigma wy^2$ ) -  $(\Sigma wy * \Sigma wy)])))]$$$$

d. Coefficient of Determination

$$COD(r^2) = CC*CC$$

#### Where:

y = Response (Area) Ratio A_{id}/A_{is}

x = Concentration Ratio C_x/C_{is}

m ≔ slope

b = intercept

n = number of replicate x,y pairs

 $x_i = individual values for independent variable$ 

y_i = individual values for dependent variable

 $\Sigma$  = the sum of all the individual values

 $x_{avis}$  = average of the x values

yave = average of the y values

w = weighting factor, for equal weighting w=1



$$y = ax^2 + bx + c$$

a. Coefficient of Determination

COD 
$$(r^2) = (\Sigma(y_i - y_{aye})^2 + \{[(n-1)/(n-p)] + [\Sigma(y_i - Y_i)^2]\}) / \Sigma(y_i - y_{ave})^2$$

#### Where

y = Response (Area) Ratio A

 $x = C_{oncentration} Ratio C_{x}/C_{is}$ 

 $a = x^2$  coefficient

b = x coefficient

c = intercept

y_i = individual values for each dependent variable

x_i = individual values for each independent variable

 $y_{ave}$  = average of the y values

n = number of pairs of data

p = number of parameters in the polynomial equation (I.e., 3 for third order, 2 for second order)

 $Yi = ((2*a*(C_x/C_{is})^2)-b^2+b+(4*a*c))/(4a)$ 

# b. Coefficients (a,b,c) of a Quadratic Regression

 $a = S_{(x2y)}S_{(xx)} - S_{(xy)}S_{(xx2)} / S_{(xx)}S_{(x2x2)} - [S_{(xx2)}]^2$ 

 $b = S_{(xy)}S_{(x2x2)} - S_{(x2y)}S_{(xx2)} / S_{(xx2)}S_{(x2x2)} - [S_{(xx2)}]^2$ 

 $c = [(\Sigma yw)/n] - b^*[(\Sigma xw)/n] - a^*[\Sigma (x^2w)/n]$ 

#### Where:

n = number of replicate x,y pairs

x = x values

y = y values

 $w = S^{-2} / (\Sigma S^{-2}/n)$ 

 $S_{(\infty)} = (\Sigma x^2 w) - [(\Sigma x w)^2 / n]$ 

 $S_{(xy)} = (\Sigma xyw) - [(\Sigma xw)^*(\Sigma yw) / n]$ 

 $S_{(xx^2)} = (\Sigma x^3 w) - [(\Sigma x w)^* (\Sigma x^2 w) / n]$ 

 $S_{(x2y)} = (\Sigma x^2 yw) - [(\Sigma x^2 w)^* (\Sigma yw) / n]$ 

 $S_{(x2x2)} = (\Sigma x^4 w) - [(\Sigma x^2 w)^2 / n]$ 

Or If unweighted calibration, w=1

S(xx) = (Sx2) - [(Sx)2 / n]

S(xy) = (Sxy) - [(Sx)*(Sy) / n]

S(xx2) = (Sx3) - [(Sx)*(Sx2) / n]

S(x2y) = (Sx2y) - [(Sx2)*(Sy) / n]

S(x2x2) = (Sx4) - [(Sx2)2 / n]

# Weighting

Weighting of 1/x or  $1/x^2$  is permissible for linear calibrations. Weighting shall not be employed for quadratic calibrations. When weighting, use the above equations by substituting x for  $1/x^2$ .

#### **Concentration Calculations**

On-Column Concentration for Average RRF Calibration using Internal Standard

On-Column Concentration  $C_x = ((A_x)(C_{ls}))/((A_{ls})(RF_{AVE}))$ 

On-Column Concentration for Average CF Calibration using External Standard

On-Column Concentration  $C_x = (A_x)/(CF_{AVE})$ 

#### On-Column Concentration for Linear Calibration

If determining an external standard, then exclude the  $A_{is}$  and  $C_{is}$  for internal standards On-Column Concentration  $C_x = ((Absolute\{[(A_x)/(A_{is})] - b\})/m) * C_{is}$ 

Page 47 of 57 Quality Assurance Plan 9.7 Effective July 29th, 2013 Where: m = slope

b = intercept

 $A_x$  = Area of the Sample

C_{is} = Concentration of the Internal Standard

A_{la} = Area of the Internal Standard

#### On-Column Concentration for Quadratic Calibration

If determining an external standard, then exclude the  $A_{\mbox{\tiny ls}}$  and  $C_{\mbox{\tiny ls}}$  for internal standards On-Column Concentration =[(+SQRT(b²-(4*a*(c-y)))-b)/(2*a)] * C_{is}

Where: a = x² coefficient

b = x coefficient

c = intercept

y = Area Ratio = A_x/A_{is}

C_{is} = Concentration of the Internal Standard

#### Final Concentration (Wet Weight)

Concentration for Extracted Samples = (On-Column Conc)(Dilution)(Final Volume) (Initial Amount)(Injection Volume)

Concentration for Purged Samples = (On-Column Conc)(Purged Amount)(Dilution) (Purged Argount)

### **Dry Weight Concentration**

Dry Weight Concentration = Final Concentration Wet Weight % Solids

#### **Percent Difference**

% Difference= Absolute(Continuing Calibration Average RRF) Average RIRF

#### **Percent Drift**

% Drift= Absolute(Calculated Concert ration - Theoretical Concentration) Theoretical Con

#### **Dilution Factor**

Dilution Factor = (Volume of Solvent + Solute) / Volume of Solute

#### Relative Retention Time

RRT =RT of Compound / RT of ISTD

#### Breakdown Percent

Breakdown = Area of DDD + Area of DDE Average (DDT, DDE and DDD)

Area of Endrin Ketone + Area of Endrin Aldehyde Average (Endrin, Endrin Ketone, Endrin Aldehyde)

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# 11.0 Data Reduction, Validation, Reporting, and Record Keeping

All data reported must be of the highest possible accuracy and quality. During the processes of data reduction, validation, and report generation, all work is thoroughly checked to insure that error is minimized.

#### **Data Reduction**

The analyst who generated the data usually performs the data reduction. The calculations include evaluation of surrogate recoveries (where applicable), and other miscellaneous calculations related to the sample quantitation.

If the results are computer generated, then the formulas must be confirmed by hand calculations, at minimum, one per batch.

See the current Data Validation SOP for details regarding data reduction.

#### **Validation**

A senior analyst, most often the section supervisor, validates the data. All data undergoes peer review. If an error is detected, it is brought to the enalyst's attention so that he or she can rectify the error, and perform further checks to ensure that all data for that batch is sound. Previous and/or common mistakes are stangently monitored throughout the validation process. Data is reported using appropriate significant figure criteria. In most cases, two significant digits are utilized, but three significant digits can be used in QC calculations. Significant digits are not counded until after the last step of a sample calculation. All final reports undergo a review by the laboratory manager, the project manager, or their designee, to provide a logical review of all results before they are released to the client.

If data is to be manually transferred between media, the transcribed data is checked by a peer. This includes data typing, computer data entry, chromatographic data transfer, data table inclusion to a cover letter, or when data results are combined with other data fields.

All hand-written data from run logs, analytical standard logbooks, hand-entered data logbooks, or on instrument-generated chromatograms, are systematically archived should the need for future retrieval arise.

See the current Data Validation SOP for details regarding data validation.

# Reports and Records

All records at HEAL are retained and maintained through the procedures outlined in the most recent version of the Records Control SOP.

Sample reports are compiled by the Laboratory Information Management System (LIMS). Most data is transferred directly from the instruments to the LIMS. After being processed by the analyst and reviewed by a data reviewer, final reports are approved and signed by the senior laboratory management. A comparative analysis of the data is performed at this point. For example, if TKN and NH3 are analyzed on the same sample, the NH3 result should never be greater than the TKN result. Lab results and reports are released only to appropriately designated individuals. Release of the data can be by fax, email, electronic deliverables, or mailed hard copy.

When a project is completed, the final report, chain of custody, any relevant supporting data, and the quality assurance/control worksheets are scanned as a .pdf file onto the main server. Original client folders are kept on file and are arranged by project number. Additionally, all electronic data is backed up routinely on the HEAL main server. The backup includes raw data, chromatograms, and report documents. Hard copies of chromatograms are stored separately according to the instrument and the analysis date. All records and analytical data reports are retained in a secure location as permanent records for a minimum period of five years (unless secure location as permanent archived information shall be documented with an access log. Access to archived electronic reports and data will be passward protected. In the event that HEAL transfers ownership or terminates business practices, complete records will be maintained or transferred according to the client's instructions.

After issuance, the original report shall remain un hanged. If a correction to the report is necessary, then an additional document shall be assued. This document shall have a title of "Addendum to Test Report or Correction to Original Report", or equivalent. Demonstration of original report integrity comes in two forms. First, the report date is included on each page of the first report. Second, each page is numbered in sequential order, making the addition or omission of any data page(s) readily detectable.

#### 12.0 Corrective Action

Refer to the most recent version of the Data Validation SOP for the procedure utilized in filling out a Corrective Action Report. A blank copy of the corrective action report is available in the current Document Control Logbook.

The limits that have been defined for data acceptability also form the basis for corrective action initiation. Initiation of corrective action occurs when the data generated from continuing calibration standard, sample surrogate recovery, laboratory control spike, matrix spike, or sample duplicates exceed acceptance criteria. If corrective action is necessary, the analyst or the section supervisor will coordinate to take the following guidelines into consideration in order to determine and correct the measurement system deficiency:

Check all calculations and data measurements systems (Calibrations, reagents, instrument performance checks, etc.).

Assure that proper procedures were followed.

Unforeseen problems that arise during sample preparation and/or sample analysis that lead to treating a sample differently from documented procedures shall be documented with a corrective action report. The section supervisor and laboratory manager shall be made aware of the problem at the time of the occurrence. See the appropriate SOP regarding departures from documented procedures.

Continuing calibration standards below acceptance criteria can not be used for reporting analytical data unless method specific criteria states of envise.

Continuing calibration standards above acceptance criteria can be used to report data as long as the failure is isolated to a single standard and the corresponding samples are non-detect for the failing analyte.

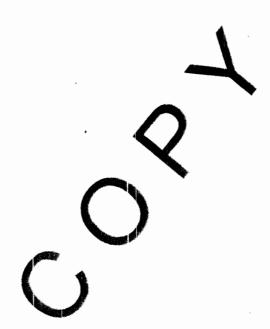
Samples with non-compliant surrogate recoveries should be reanalyzed, unless deemed unnecessary by the supervisor for matrix, historical data, or other analysis-related anomalies.

Laboratory and Matrix Spike acceptance criteria vary significantly depending on method and matrix. Analysts and supervisors meet and discuss appropriate corrective action measures as spike failures occur.

Sample duplicates with RPD values outside control limits require supervisor evaluation and possible reanalysis.

A second mechanism for initiation of corrective action is that resulting from Quality Assurance performance audits, system audits, inter- and intra-laboratory comparison studies. Corrective Actions initiated through this mechanism will be monitored and coordinated by the laboratory QA/QCO.

All corrective action forms are entered in the LIMS and included with the raw data for peer review, signed by the technical director of the section and included in the case narrative to the client whose samples were affected. All Corrective action forms in the LIMS are reviewed by the QA/QCO.



# 13.0 Quality Assurance Audits, Reports and Complaints

# Internal/External Systems' Audits, Performance Evaluations, and Complaints

Several procedures are used to assess the effectiveness of the quality control system. One of these methods includes internal performance evaluations, which are conducted by the use of control samples, replicate measurements, and control charts. External performance audits, which are conducted by the use of inter-laboratory checks, such as participation in laboratory evaluation programs and performance evaluation samples available from a NELAC-accredited Proficiency Standard Vendor, are another method.

Proficiency samples will be obtained twice per year from an appropriate vendor for all tests and matrices for which we are accredited and for which PTs are available. HEAL participates in soil, waste water, drinking water, and underground storage tank PT studies. Copies of results are available upon request. HEAL's management and all analysts shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities, and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates, and other procedures, as used when analyzing routine samples.

With regards to analyzing PT Samples, HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seek accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall not attempt to obtain the assigned value of any PT sample from the PT Provider.

Internal Audits are performed annually by the QA/QCO in accordance with the current Internal Audit SOP. The system audit confists of a qualitative inspection of the QA system in the laboratory and an assessment of the adequacy of the physical facilities for sampling, calibration, and measurement. This audit includes a careful evaluation and review of laboratory quality control procedures. Internal audits are performed using the guidelines outlined below, which include, but are not limited to:

- 1. Review of staff qualifications, demonstration of capability, and personnel training programs
- 2. Storage and handling of reagents, standards, and samples
- 3. Standard preparation logbook and LIMS procedures
- 4. Extraction logbooks
- 5. Raw data logbooks
- 6. Analytical logbooks or batch printouts and instrument maintenance logbooks
- 7. Data review procedures

- 8. Corrective action procedures
- Review of data packages, which is performed regularly by the lab manager/QA Officer.

The QA/QCO will conduct these audits on an annual basis.

# Management Reviews

HEAL management shall periodically, and at least annually, conduct a review of the laboratory's quality system and environmental testing activities to ensure their continuing suitability and effectiveness, and to introduce necessary changes or improvements. The review shall take account of:

- 1. the suitability and implementation of policies and procedures
- 2. reports from managerial and supervisory personnel
- 3. the outcome of recent internal audits
- 4. corrective and preventive actions
- 5. assessments by external bodies
- 6. the results of inter-laboratory comparisons or proficiency tests
- 7. changes in volume and type of work
- 8. client feed back
- 9. complaints
- 10. other relevant factors, such as laboratory health and safety, QC activities, resources, and staff training.

Findings from management reviews and the actions that arise from them shall be recorded and any corrective actions that arise shall be completed in an appropriate and agreed upon timescale.

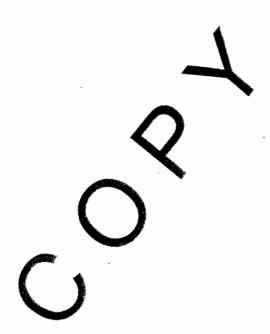
# Complaints

Complaints from clients are docuntented and given to the laboratory manager. The lab manager shall review the information and contact the client. If doubt is raised concerning the laboratory's policies or procedures, then an audit of the section or sections may be performed. All records of complaints and subsequent actions shall be maintained in the client compliant logbook for five years unless otherwise stated.

#### Internal and External Reports

The QA/QCO is responsible for preparation and submission of quality assurance reports to the appropriate management personnel as problems and issues arise. These reports include the assessment of measurement systems, data precision and accuracy, and the results of performance and system audits. Additionally, they include significant QA

problems, corrective actions, and recommended resolution measures. Reports of these Quality Assurance Audits describe the particular activities audited, procedures utilized in the examination and evaluation of laboratory records, and data validation procedures. Finally, there are procedures for evaluating the performance of Quality Control and Quality Assurance activities, and laboratory deficiencies and the implementation of corrective actions with the review requirements.

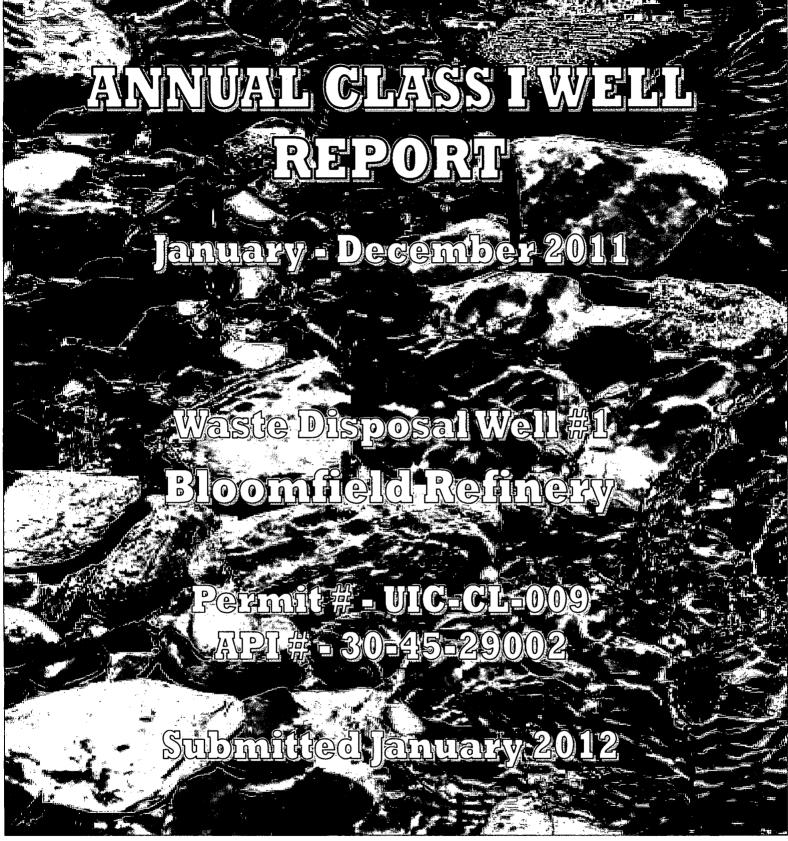


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Western Refining Southwest, Inc.





January 30, 2012

Carl Chavez
New Mexico Oil Conservation Division
Environmental Bureau
1220 South St. Francis Dr
Santa Fe, NM 87505

UPS Tracking #: 1ZF9F6470192579738

RE: Western Refining Southwest, Inc. - Bloomfield Refinery 2011 Annual Class I Well Report Non-Hazardous Injection Well Permit # - UIC-CL-009 API # - 30- 45-29002

Mr. Chavez,

Bloomfield Refinery submits the *Annual Class I Well Report January – December 2011* The well is located in the NE/4, SE/4 of Section 27, Township 29 North, Range 11West, NMPM, San Juan County, New Mexico and is operated by Western Refining Southwest Inc.

If you need more information, please contact me at (505) 632-417/1.

Sincerely,

James R: Schmaltz

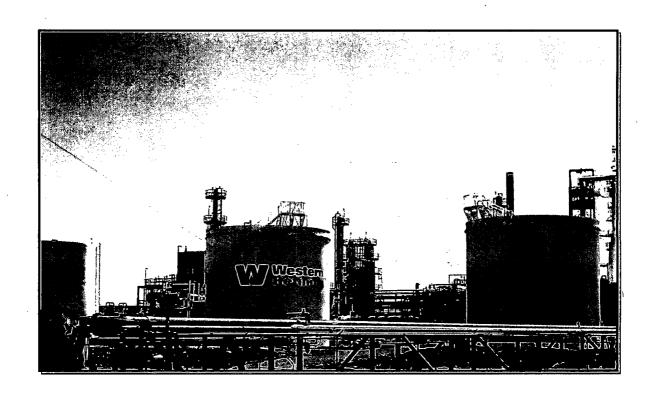
Health, Safety, Environmental, and Regulatory Director Western Refining Southwest, Inc. - Bloomfield Refinery

Cc: Kelly G. Roberts – NMOCD Aztec District Office V.R. McDaniel – Bloomfield Refinery Site Manager Allen Hains – Western Refining – El Paso

# ANNUAL CLASS I WELL REPORT Waste Disposal Well #1 January – December 2011

Western Refining Southwest, Inc.
Bloomfield Refinery
Bloomfield, New Mexico
Permit # - UIC-CL1-009
API # - 30-45-29002

# January 2012



# **ANNUAL CLASS I WELL REPORT**

# Waste Disposal Well #1 January – December 2011

Western Refining Southwest, Inc. Bloomfield Refinery Bloomfield, New Mexico Permit # - UIC-CL1-009 API # - 30-45-29002

January 30, 2012

Prepared by:

Kelly Robinson

**Environmental Supervisor** 

Reviewed by:

James R. Schmaltz

**HSER Director** 

# Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Vic R. McDaniel

Site Manager

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Figure 2 Well Schematic

Figure 3 Disposal Well and Area Wells

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# **EXECUTIVE SUMMARY**

This report provides a summary of activities conducted in 2011 on Waste Disposal Well #1 (WDW-#1) at the Bloomfield Refinery. The following is a summary of well operations and well testing activities performed in 2011.

#### **Operational Summary**

**Injection Volume -** The volume injected into the disposal well during 2011 was 20,411,654 gallons. Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation.

**Sampling and Chemical Analyses -** Injection fluids samples were collected on a quarterly basis for chemical analysis. Analytical results did not exhibit characteristics of hazardous waste.

**Maintenance Operations -** During 2011, down-hole maintenance activities included well clean-out via a coil-tubing rig and acidization. The completion of both activities resulted in a significant increase in well operation efficiency.

Mechanical Integrity Tests - The 2011 well testing program witnessed by a representative of the New Mexico Oil Conservation Division (NMOCD) included a High-Pressure Shutdown Test, Bradenhead Test, Mechanical Integrity Test, Bottomhole Pressure Survey and Pressure Fall-Off Test. Results of these tests prove that the operational integrity of the well is sound.

**Well Evaluation** – In 2011, operational data of the Bloomfield Refinery injection well identified a decreasing trend in injection flow rate over a constant pressure. The decrease in well operation efficiency was caused by a restriction in flow through the

lower well casing perforations. Well clean-out activities conducted in 2011 were successful in removing the flow restriction and thus returning the well to normal operation efficiency.

Area of Review (AOR) - No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

# **Recommendations**

Western will continue the routine monitoring, maintenance, and testing programs which include quarterly chemical analysis of injection fluids, mechanical integrity testing, Bradenhead testing, and the pressure Fall-Off Test in 2012. Western will continue to utilize the maximum operating injection pressure at the wellhead as permitted by Discharge Permit GW-130.

# INTRODUCTION

This report provides a summary of activities conducted during 2011 on Waste Disposal Well #1 (WDW #1). The disposal well is part of the Bloomfield Refinery operations. The refinery is located immediately south of Bloomfield, New Mexico in San Juan County. The well location is depicted in Figure 1. The physical address of the facility is as follows:

# **Bloomfield Refinery**

#50 County Road 4990 Bloomfield, NM 87413

The Bloomfield Refinery is located on approximately 263 acres. Bordering the facility is a combination of federal and private properties. Public property managed by the Bureau of Land Management lies to the south. The majority of undeveloped land in the vicinity of the facility is used extensively for oil and gas production and, in some instances, grazing. U.S. Highway 550 is located approximately one-half mile west of the facility. The topography of the main portion of the site is generally flat with steep bluffs to the north.

WDW #1 is owned by San Juan Refining Company, a New Mexico corporation. It is operated by Western Refining Southwest, Inc. formerly known as Giant Industries Arizona, Inc. an Arizona corporation.

#### Well Information 1.1

Well Name & Number:

OCD UIC:

Well Classification:

API Number:

Legal Location: **Physical Address:** 

OCD Discharge Plan Permit Number:

Class I Non-hazardous

Waste Disposal Well #1

30-045-29002

UIC-CL1-009 GW-130

1250 FEL, 2442FSL, I Sec 27 T29S R11E

#50 Road 4990, Bloomfield, NM 87413

# 2.0 SUMMARY OF ACTIVITIES

The following list of activities was conducted in 2011 on WDW #1 located at the Bloomfield Refinery:

<ul><li>01/19/11</li></ul>	1st Quarter 2011 Sampling Event
• 04/04/11	2nd Quarter 2011 Sampling Event
• 06/15/11	Bradenhead Test
• 06/15/11	High-Pressure Shut-Down Test
• 06/15/11	Mechanical Integrity Test
• 07/14/11	3rd Quarter 2011 Sampling Event
• 10/04/11	Down-hole Coil Tubing Clean-Out
• 10/10/11	Well Acidization Treatment Event
• 10/11/11	4th Quarter 2011 Sampling Event
<ul><li>10/19/11</li></ul>	Commencement of the Annual Pressure Fall-Off Test
• 11/1/2011	Completion of the Annual Pressure Fall-Off Test

Quarterly samples collected for laboratory analysis were submitted to Hall Environmental Laboratories located in Albuquerque, New Mexico. Copies of the analytical reports are provided in Appendix B.

A representative of New Mexico Oil Conservation Division (NMOCD) was on-site to witness the Bradenhead Test, High-Pressure Shut-Down Test, and Mechanical Integrity Test on June 15, 2011. A copy of the test reports is provided in Appendix A.

On September 9, 2011, NMOCD reviewed and approved Western's request to acidize WDW #1 prior to conducting the annual Fall-Off Test. On September 16th, 2011 in preparation for the up-coming scheduled acidization field work, Western identified scaling inside the well casing that restricting flow to the bottom perforations of the well casing. Due to the restricted flow into the lower formation, Western received verbal approval from NMOCD to post-pone the acidization work until arrangements could be made to have the well cleaned-out via a coil-tubing unit. NMOCD approval was followed-up via an e-mail dated Friday, September 16, 2011 (see Appendix A). A revised

acidization and well clean-out procedure was submitted on September 21, 2011 and approved by NMOCD on September 22, 2011.

The well clean-out and acidization activities were performed on October 4th and October 10th, 2011, respectively. Clean-out of the well was found to be effective in removing the blockage that prevented flow from accessing the lower perforations of the well casing. Correspondence between OCD and Western pertaining to the scheduling of these activities is provided in Appendix A.

The Annual Pressure Fall-Off Test was conducted between October 19, 2011 and November 1, 2011. The approved testing procedures were submitted to NMOCD along with the respective C-103 notification form dated September 16, 2011. A copy of the testing procedures and correspondence between OCD and Western pertaining to the scheduling of these activities is provided in Appendix A.

# 3.0 INJECTION VOLUME

The Monthly Injection Well Report summarizing injection volumes and well performance parameters is presented as Table 1.

# 3.1 Injection Volume

The volume injected into the disposal well during 2011 was 20,411,654 gallons.

Throughout 2011 the Bloomfield Refinery injection well operated within the operational limits of less than 1,150 psi.

# 3.2 Injection Well Down-Time

The Injection Well was down approximately 1,131 hours in 2011. Plant operational issues resulted in the injection well to be off-line for a period of time in June 2011. Well performance tests and clean-out activities conducted in 2011 resulting in the well to be off-line for an extended period in October 2011. Decreased volume of plant produced water in December 2011 resulting in decreased operational time of the injection well. All other additional down-times in 2011 correlated with regular equipment maintenance activities.

# 4.0 SAMPLING AND CHEMICAL ANALYSIS

Injection fluid samples were collected on a quarterly basis and analyzed for the constituents listed per Item #9 of the Bloomfield Refinery Class I (Non-Hazardous)

Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal dated March 23, 2004.

First quarter samples were collected on January 19, 2011. Second quarter samples were collected April 4, 2011. Third quarter samples were obtained July 14, 2011. Fourth quarter samples were taken October 11, 2011.

All quarterly samples collected for laboratory analysis were submitted to Hall Environmental Analysis Laboratory located in Albuquerque, NM. The analytical results conclude that the injected water did not exhibit characteristics of hazardous waste. The respective quarterly analytical reports and Laboratory Quality Assurance Plan are provided in Appendices B and C, respectively.

# 5.0 TESTING AND MAINTENANCE ACTIVITIES

In addition to the conducting general preventative maintenance activities on the injection well equipment, the following testing and well maintenance activities were conducted during 2011:

- Well Clean-Out Activities
- Well Acidization Activities
- Mechanical Integrity Testing (includes high-pressure shutdown and Bradenhead Testing)
- Annual Pressure Fall-Off Testing

All activities were conducted following NMOCD approval, and such documentation is provided in Appendix A. The following is a brief summary of the testing and well maintenance activities conducted in 2011.

## 5.1 Well Clean-Out Activities

In preparation for the up-coming well acidization activities that was originally scheduled for September 19, 2011, Western contracted with Tefteller, Inc. to tag the bottom of the well to ensure there was no tubing or well obstruction. The total well depth was measured to be 3,394 ft deep, which indicated that down-hole flow was being prevented from flowing though the lower perforations of the wall that accessed the Menefee Formation. Based on these finding, Western requested and received approval from OCD to perform well clean-out activities that included coiling the well for the purpose of removing the scale and/or blockage within the well casing.

On October 4th, 2011, Western contracted with Basic Energy Services to clean-out the Bloomfield Refinery injection well. A 1 ¼-inch coil tube was lowered down the well to a total depth of 3,520 ft. At approximately 3,300 ft. circulation pressure decreased significantly indicating a restriction or blockage in the casing. After attempting to re-tag the well, the coil line broke-through the restriction and was then able to be lowered to the bottom of the well (3,520 ft) with ease.

The success of the coil-tubing activities resulted in a significant increase in well operation efficiency.

## 5.2 Well Acidization Activities

Following completion of the well clean-out activities, Western contracted with Halliburton to acidize the well to further enhance the well's performance. Acidization activities included pumping 4,200 gallons of 15% HCl acid with inhibitor along with 300 bio-degradable ball sealers down into the well. The acid solution was allowed to displace to the bottom perforations. The well was then shut-in for approximately 1 hr to let the acid treatment "soak." After sufficient time had elapsed, the well was allowed to flow back into on-site frac tanks. Approximately 400 barrels of fluid was allowed to flow back before returning the well to normal operation.

# 5.3 Mechanical Integrity Testing

A representative of New Mexico Oil Conservation Division (NMOCD) was on-site to witness a High Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test (MIT) on June 15, 2011. All tests were witnessed by Monica Kuehling of NMOCD-Aztec. The MIT held at 515 psi for 30 minutes, therefore confirming the integrity of the well. A copy of the Test Reports is provided in Appendix A.

## 5.4 Annual Pressure Fall-Off Test

Bloomfield Refinery retained William M. Cobb & Associates, Inc. to perform the annual Bottomhole Pressure Survey and Pressure Fall-Off Test on Waste Disposal Well #1 located at the Bloomfield Refinery. The Annual Pressure Fall-Off Test was conducted in accordance with United States Environmental Protection Agency (USEPA) 40 CFR 146.13 and the State of New Mexico Fall-Off Test Guidelines, December 3, 2007. The 2011 pressure Fall-Off Test procedure was conducted in accordance with the USEPA's Region

6 "Pressure Fall-Off Testing Guidelines, Third Revision", dated August 8, 2002, and required by the State of New Mexico as of December 3, 2007. The Pressure Fall-Off test and Bottomhole Pressure survey performed on Waste Disposal Well No. 1 also met the NMOCD requirements for such testing.

The chronological order of events performed during the Fall-Off Test is as follows:

- October 19, 2011 9:06 am Tefteller, Inc. runs tandem bottomhole pressure gauges in the well to monitor the falloff portion of the test.
- October 19, 2011 10:19 am Pre-flow period begins.
- October 21, 2011 11:04 am Well is flowing at 82.6 gallons per minute (gpm)
   with an average rate of 82.6 gpm for the 49-hour period. The well is shut-in for the falloff test.
- November 1, 2011 10:26am Falloff test ends after 263 hours. A pressure gradient survey is conducted as pressure gauges are retrieved from the well.

Fluids from WDW-1 are injected into the Menefee and Cliff House formations. Geologic assessment indicates the WDW #1 is in a confined low permeability sand interval and historically is not capable of producing a bottomhole 100 psi pressure drop. Records show that WDW #1 was hydraulically fractured after it was initially drilled. The 2006, 2008, 2009, and 2010 Fall-Off Test data confirm this with a linear flow regime observed after the end of storage effects.

The 2011 Fall-Off Test data showed no unexpected pressure changes. The pressure dropped quickly during the first few minutes of the test due to wellbore storage effects and then continued to decline as the pressure in the reservoir adjusted to the no-flow period. The Fall-Off Test data show linear flow for the duration of the test with no indication of end of linear flow or reservoir boundary effects. There does not appear to

be any reservoir response to injection other than that which would be expected from normal growth of the injected volume.

All test data and conclusions are presented in the 2011 Annual Bottomhole Pressure Surveys and Pressure Fall-Off Tests for Waste Disposal Well #1Report (Cobb and Associates, 2011) that was submitted to NMOCD – Santa Fe on December 21, 2011.

# 6.0 WELL EVALUATION

## 6.1 Well Evaluation

In 2011, operational data of the Bloomfield Refinery injection identified a decreasing trend in injection flow rate at a constant pressure. The well clean-out activities resulted in a significant increase in the well's operating efficiency.

# 6.2 Area of Review (AOR)

The Area of Review data from the 2008 Fall-Off test report was reviewed and updated in 2011 Annual Bottomhole Pressure Surveys and Pressure Fall-Off Tests for Waste Disposal Well #1Report (Cobb & Associates, 2011). No new wells were found in the one-mile radius.

Fifty-eight wells were found within a one-mile radius of WDW #1, which injects water into the Mesaverde formation. The wells and status are spotted on an area map, Figure 3, with a well number listed with the well data in Table 2. Of these wells, 15 have been plugged and abandoned. Four wells are classified as dry holes and are believed to be plugged and abandoned. Twenty-four wells produce petroleum from shallow zones. One well is an Entrada injection well. Fourteen wells produce petroleum from the Dakota and Gallup zones, which are deeper than the Mesaverde interval used for injection purposes. No wells are producing from the injection interval within a one-mile radius of WDW #1.

Twenty-four of the 59 wells have penetrated the injection zone. Of these, three have been plugged. Five wells are currently producing from shallow zones and 14 wells produce from deep zones. There are two injection wells including WDW #1 and Ashcroft SWD #1 well.

No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

# 7.0 CONCLUSIONS AND RECOMMENDATIONS

The following is a summary of well operations and well testing activities performed in 2011.

# 7.1 Conclusions

**Injection Volume -** The volume injected into the disposal well during 2011 was 20,411,654 gallons. Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation.

**Sampling and Chemical Analyses -** Injection fluids samples were collected on a quarterly basis for chemical analysis. Analytical results did not exhibit characteristics of hazardous waste.

**Maintenance Operations -** During 2011, down-hole maintenance activities included well clean-out via a coil-tubing rig and acidization. The completion of both activities resulted in a significant increase in well operation efficiency.

Mechanical Integrity Tests - The 2011 well testing program witnessed by a representative of OCD included a High-Pressure Shutdown Test, Bradenhead Test, Mechanical Integrity Test, Bottomhole Pressure Survey and Pressure Fall-Off Test. Results of these tests prove that the operational integrity of the well is sound.

**Well Evaluation** – In 2011, operational data of the Bloomfield Refinery injection well identified a decreasing trend in injection flow rate over a constant pressure. The decrease in well operation efficiency was caused by a restriction in flow through the lower well casing perforations. Well clean-out activities conducted in 2011 were successful in removing the flow restriction and thus returning the well to normal operation efficiency.

**Area of Review (AOR) -** No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

# 7.2 Recommendations

Western will continue the routine monitoring, maintenance, and testing programs which include quarterly chemical analysis of injection fluids, mechanical integrity testing, Bradenhead testing, and the pressure Fall-Off Test in 2012. Western will continue to utilize the maximum operating injection pressure at the wellhead as permitted by Discharge Permit GW-130.

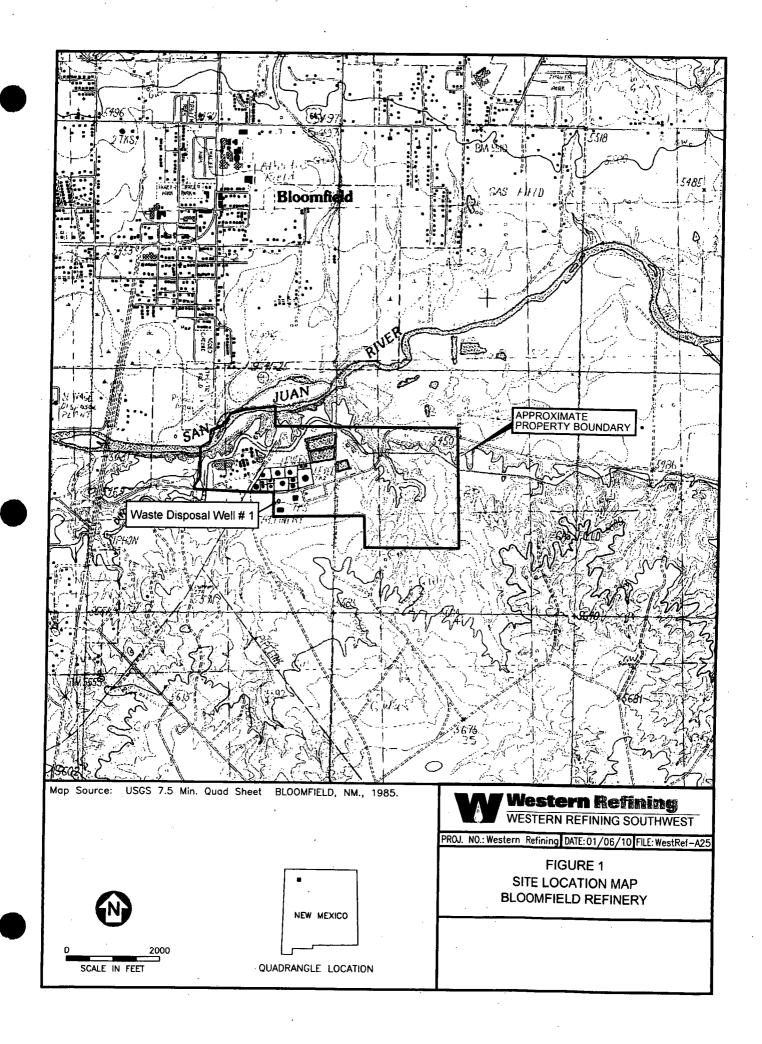
# 8.0 REFERENCES

Cobb & Associates, 2009a, Evaluation of Disposal Well #1 Bloomfield Refinery, August 26, 2009.

Cobb & Associates, 2011, 2011 Annual Bottomhole Pressure Surveys and Pressure Fall-Off Tests for Waste Disposal Well #1Report December 21, 2011.

Bloomfield Refinery Class I (Non-Hazardous) Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal dated March 23, 2004.

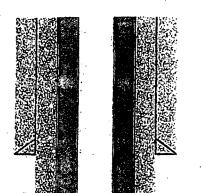
# **FIGURES**



# **WESTERN REFINING DISPOSAL WELL #1**

SW SECTION 26, T29N, R11W

NO.: 30-045-29002





# FIGURE 2 DISPOSAL WELL #1 WELL SCHEMATIC Western Refining Inc. Bloomfield, NM

				_	
Date:	4/26/2006	Approved By:	ds	Job No.:	70F5830
Orawn By:	rie	Checked By:		Scale:	N/A

8-5/8", 48#/ft, Surface Casing @ 830'

TOC: Surface Hole Size: 11.0"

Tubing: 2-7/8", Acid Resistant Fluorotine Cement Lined

Wt of Tubing: 6.5 #/ft

Wt of Tubing Lined: 7,55 #/ft

Tubing ID: 2.128"
Tubing Drift ID: 2.000"

Minimum ID @ Packer: ~1.87" estimated

Packer: Unknown Packer Type @ 3221'
Could be a Guiberson or similar model Uni-6

Perforations: 3276' - 3408' 4JSPF 0.5 EHD Top of the Cliff House Formation: 3276'

Fill was cleaned out of well on 4/20/06 Fill was orginally tagged at 3325'

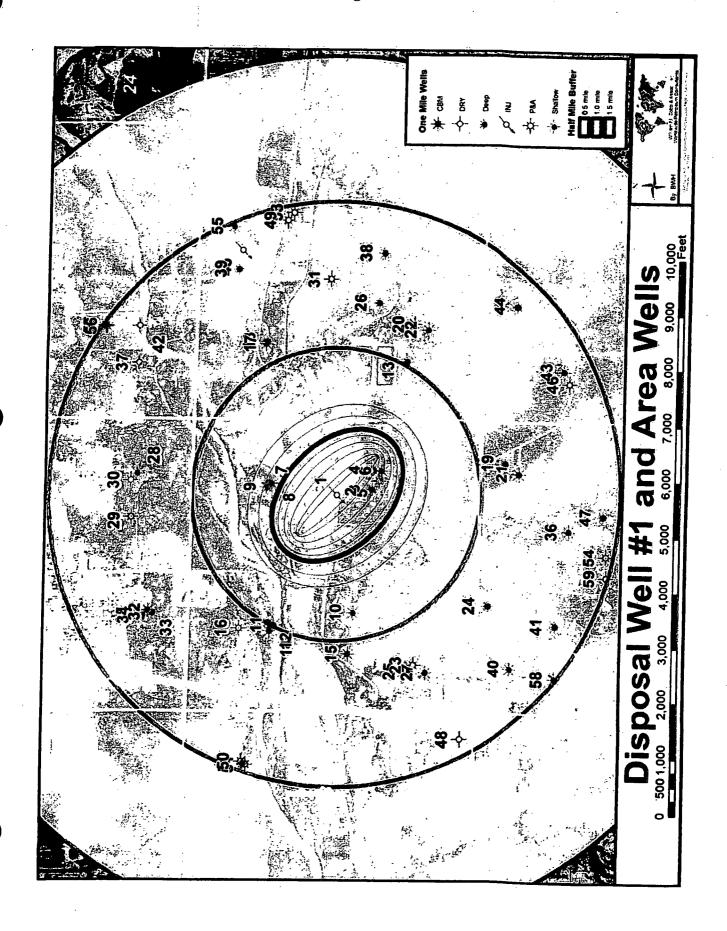
Perforations: 3435' - 3460' 4JSPF 0.5 EHD Top of the Menefee Formation: 3400'

RBP: 3520'

5-1/2", 15.5#/ft, Production Casing @3600'

TOC: Surface Hole Size: 7-7/8"

Figure 3



# **TABLES**

# WESTERN REFINING SOUTHWEST, INC. - BLOOMFIELD REFINERY P.O. BOX 159

# **BLOOMFIELD, NEW MEXICO 87413**

# MONTHLY INJECTION WELL REPORT DISCHARGE PLAN GW-130 NE1/4 SE1/4 SECTION 27, T29N, R11W NMPM, SAN JUAN COUNTY, NEW MEXICO

		AMOUNT	TOTALIZER		,							ON-LINE	Ш
TO SOLAR	TO SOLAR	AMOUNT		DOWN-	INJE	INJECTION PRESSURE	SURE	ANN	ANNULAR PRESSURE	SURE		FLOW RATES	ES
FROM RIVER   EVAP PONDS   INJECTED	EVAP PONDS	INJECTE	_	TIME	MAX	Z	AVG	MAX	NIM	AVG	MAX	NIM	AVG
(GALLONS) (GALLONS) (GALLONS)		(GALLONS)		(HRS)	(PSIA)	(PSIA)	· (PSIA)	(PSIA)	(PSIA)	· (PSIA)	(GPM)	(GPM)	(GPM)
		-											
3,038,000 0 1,344,152		1,344,152	i l	0	1055	889	943	179	142	164	47	18	30
482,000 0 1,236,937	0 1,236,937	1,236,937		0 .	1078	891	937	188	155	170	51	18	30.2
1,578,000 0 1,127,624	0 1,127,624	1,127,624		<b>&amp;</b>	1118	889.0	992.7	. 202	116	152	45.0	18	25
1,845,000 0 1,420,829		1,420,829		0	1109	892	996	190	145	163	54	18	32
2,250,000 0 1,658,138		1,658,138		0	1120	926	1044	209	150	180	47	25	38
1,351,000 2,448,862 1,056,598		1,056,598		217.5	1115	917	1042	210	163	166	47	22	34
		,					,	٠.					
2,684,000 3,052,200 1,823,541		1,823,541		.0	1111	926	1045	236	117	165	49	30	40
1,991,000 1,745,829 1,569,856		1,569,856		45.75	1120	935	1048	153	101	125	53	22	38
1,478,000 2,823,969 2,823,969		2,823,969		13	1113	1012	1074	140	114	120	51	37	45
789,000 1,607,062 1,828,580	_	1,828,580	L	319	1062	910	1006	143	114	119.5	97	35	66.5
			L				ļ						

The total amount injected in 2011 is 20,411,654 gallons.

2,011,000

NOV DEC

80.9

52 54

97

133.5

117

200

1019

931

1057

50 44

3,260,845

84,960 803,606

CERTIFICATION:

DATE

Pen. Ini. Zone	Yes	Yes	Š	Yes	Š	8	8	8 8	Yes	Yes	8	Yes	Yes	8 S	Yes	8	Yes	Yes	Yes	8	2°	ž	Š	Yes
Status	Ž	P&A	Shallow	Deep	P&A	CBM	CBM	P&A	Shallow	Shallow	Shallow	Deep	Deep	Shallow	CBM	P&A	CBM	Deep	Deep	CBM	Shallow	Shallow	P&A	Deep
RESERVOIR	MESAVERDE	DAKOTA	CHACRA	GALLUP	PICTURED CLIFFS	FRUITLAND COAL	FRUITLAND COAL		CHACRA	PICTURED CLIFFS	FRUITLAND SAND	DAKÓTA	DAKOTA	CHACRA	FRUITLAND COAL		FRUITLAND COAL	DAKOTA	GALLUP	FRUITLAND COAL	CHACRA	CHACRA	PICTURED CLIFFS	GALLUP
OPERATOR	WESTERN REFINING MESAVERDE	BP AMERICA	XTO ENERGY, INC	XTO ENERGY, INC.	Pre-Ongard	HOLCOMB O&G	H-27-29N-11W HOLCOMB O&G	Pre-Ongard	H-27-29N-11W XTO ENERGY, INC	Burlington	MANANA GAS INC	Burlington	Burlington	F-27-29N-11W MANANA GAS INC	Burlington	Pre-Ongard	F-26-29N-11W HOLCOMB O&G	XTO ENERGY, INC	Burlington	Burlington	Burlington	ENERGEN	Pre-Ongard	ENERGEN
ULSTR	1-27-29N-11W	I-27-29N-11W	I-27-29N-11W	I-27-29N-11W	I-27-29N-11W	I-27-29N-11W	H-27-29N-11W	H-27-29N-11W Pre-Ongard	H-27-29N-11W	K-27-29N-11W	F-27-29N-11W	F-27-29N-11W	M-26-29N-11W Burlington	F-27-29N-11W	L-27-29N-11W	C-27-29N-11W	F-26-29N-11W	F-26-29N-11W	A-34-29N-11W	N-26-29N-11W	A-34-29N-11W	N-26-29N-11W	M-27-29N-11W Pre-Ongard	C-34-29N-11W
P&A Date		19-Jan-94			18-Oct-82	-		18-Aug-55								09-Nov-78							27-Jun-75	
<u>Total</u> Depth	3514	6298	2839	6177	1717	1714	1689	1800	6262	5808	1354	6160	6348	2710	6214	800	4030	6242	6148	1760	2857	2869	1747	5970
Perf Bottom	3514	6298	2839	5646		1714	1689		2810	1770	1354	6160	6348	2710	1661		1645	6242	6148	1760	2857	2869	1747	5970
Perf Top	3276	6157	2827	5314		1543	1483		2701	1680	1326	6024	6176	2578	1388		1462	6086	6086	1468	2747	2746	1664	5326
APINO	30-045-29002	30-045-07825	30-045-23554	30-045-30833	30-045-07812	30-045-34463	30-045-34409	30-045-07883	30-045-24084	30-045-25673	30-045-27361	30-045-24673	30-045-12003	30-045-27365	30-045-07835	30-045-07896	30-045-25329	30-045-24083	30-045-25657	30-045-31118	30-045-24574	30-045-24572	30-045-07903	30-045-25707
#1	-	-	-	൩	-	-	. 7	7	1	18	₹~	1	~	~	~	-	<b>-</b>	1	16	100	თ	6	~	15
WELLNAME	DISPOSAL	DAVIS GAS COM F	DAVIS GAS COM G	DAVIS GAS COM F	Davis Pooled Unit	JACQUE	JACQUE	0.23 Davis PU/FB Umbarger	DAVIS GAS COM F	CONGRESS	LAUREN KELLY	MANGUM	CALVIN	MARIAN S	MANGUM	Black Diamond	DAVIS GAS COM J	SULLIVAN GAS COM.D	CONGRESS	CALVIN	SUMMIT	CONGRESS	Garland "B"	SUMMIT
Map Miles to Seq. DW1	0.00	0.11	0.12	0.15	0.16	0.18	0.23	0.23	0.24	0.41	0.49	0.49	0.51	0.52	0.55	0.56	0.57	0.58	09.0	0.64	0.64	0.64	0.64	0.65
Map Seq.	-	7	ო	4	လ	<b>σ</b>	7	<b>∞</b>	6	10	<b>,E</b>	12	13	14	15	16	17	18	19	20	21	22	23	24

Pen. Ini. Zone	Š	Yes	Š	8 8	Š	Yes	°Z	Š	Š	Yes	ž	Š	Š	Yes	Yes	ž	Yes	Š	Yes	Yes	Yes	Š	Yes	ş
Status	Shallow	Deep	Shallow	Shallow	P&A	P&A	P&A	Shallow	CBM	Deep	Shallow	Shallow	DRY	Deep	Deep	Shallow	Deep	DRY	Shallow	Deep	<u>2</u>	P&A	Deep	DRY
RESERVOIR	CHACRA	GALLUP	PICTURED CLIFFS	CHACRA	FRUITLAND SAND	DAKOTA	(N/A)	CHACRA	FRUITLAND COAL	DAKOTA	FRUITLAND SAND	PICTURED CLIFFS	FARMINGTON	DAKOTA	DAKOTA	FARMINGTON, NORTH Shallow	DAKOTA	FARMINGTON	CHACRA	GALLUP	MORRISON BLUFF EN	PICTURED CLIFFS	DAKOTA	
OPERATOR	ENERGEN	Burlington	Burlington	MANANA GAS INC	O-22-29N-11W JOHN C PICKETT	P-22-29N-11W MANANA GAS INC	Pre-Ongard	N-22-29N-11W MANANA GAS INC	N-22-29N-11W MANANA GAS INC	N-22-29N-11W MANANA GAS INC	N-22-29N-11W MANANA GAS INC	G-34-29N-11W CHAPARRAL O&G	Pre-Ongard	Burlington	B-26-29N-11W XTO ENERGY, INC	D-34-29N-11W MCELVAIN O&G	Burlington	Pre-Ongard	Burlington	Burlington	B-26-29N-11W XTO ENERGY, INC	E-35-29N-11W CHAPARRAL O&G	Burlington	Pre-Ongard
ULSTR	M-27-29N-11W ENERGEN	K-26-29N-11W Burlington	M-27-29N-11W Burlington	P-22-29N-11W	0-22-29N-11W	P-22-29N-11W	M-26-29N-11W Pre-Ongard	N-22-29N-11W	N-22-29N-11W	N-22-29N-11W	N-22-29N-11W	G-34-29N-11W	M-23-29N-11W Pre-Ongard	J-26-29N-11W	B-26-29N-11W	D-34-29N-11W	F-34-29N-11W	O-23-29N-11W Pre-Ongard	E-35-29N-11W	C-35-29N-11W Burlington	B-26-29N-11W		G-34-29N-11W	P-28-29N-11W Pre-Ongard
P&A Date					02-Mar-00	14-Jun-99	11-Nov-58				•											18-Dec-99		
<u>Total</u> Depth	2790	5870	1678	2754	1466	6274	1917	2732	1608	6226	1410	1736	2335	6430	6160	1525	6347	2015	6328	5943	7382	1790	6340	870
Perf Bottom	2790	5870	1678	2754	1466	6274		2732	1608	6226	1410	1736		6430	6160	1064	6347		2906	5943	7070	1790	6340	
Perf	2668	5295	1648	2627	1380	6072		2622	1440	6052	1390	1726		6172	6047	1060	6202		2784	5369	6952	1776	6171	
APINO	30-045-24573	30-045-25612	30-045-21732	30-045-26721	30-045-07959	30-045-07961	30-045-07776	30-045-26731	30-045-34312	30-045-07940	30-045-13089	30-045-20755	30-545-02123	30-045-33093	30-045-07733	30-045-24834	30-045-24835	30-545-02124	30-045-24837	30-045-25675	30-045-30788	30-045-20752	30-045-07672	30-045-07751
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WELLNAME	GARLAND	CALVIN	GARLAND B	NANCY HARTMAN	GRACE PEARCE	HARTMAN	Davis	MARY JANE	ROYAL FLUSH	COOK	C00K	SHELLY	HARE	CALVIŅ	SULLIVAN GAS COM D	ELLEDGE FEDERAL 34	CONGRESS	HARE	CONGRESS	CONGRESS	ASHCROFT SWD	LEA ANN	CONGRESS	Viles EE
Miles to DW1	0.65	0.67	0.68	0.70	0.71	0.72	0.73	0.75	0.76	0.79	0.79	0.82	0.82	0.84	0.85	0.85	0.89	0.90	06.0	0.90	0.90	0.90	0.94	0.94
Map. Seq.	25	56	27	28	53	30	31	32	33	8	35	36	37	38	39	4	4	45	43	4	45	46	47	48

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Pen. Inj. Zone	ş	<u>8</u>	8 2	Yes	8 8	. °	N _o	N _o	Yes	S S	Š
Status	P&A	P&A	P&A	Deep	P&A	P&A	Shallow	CBM	P&A	Shallow	DRY
RESERVOIR	PICTURED CLIFFS	PICTURED CLIFFS		<b>DAKOTA</b>	PICTURED CLIFFS	PICTURED CLIFFS	CHACRA	FRUITLAND COAL	DAKOTA	PICTURED CLIFFS	FRUITLAND SAND
<u>OPERATOR</u>	Pre-Ongard	Pre-Ongard	Pre-Ongard	A-28-29N-11W XTO ENERGY, INC	Pre-Ongard	Pre-Ongard	B-26-29N-11W XTO ENERGY, INC	K-23-29N-11W HOLCOMB O&G	BP AMERICA	E-34-29N-11W CHAPARRAL O&G	Pre-Ongard
ULSTR	G-26-29N-11W Pre-Ongard	05-May-78 A-28-29N-11W Pre-Ongard	05-Jun-78 A-28-29N-11W Pre-Ongard	A-28-29N-11W	31-Aug-53 G-26-29N-11W Pre-Ongard	30-Oct-53 J-34-29N-11W Pre-Ongard	B-26-29N-11W	K-23-29N-11W	10-Mar-97 K-23-29N-11W	E-34-29N-11W	-34-29N-11W
P&A Date	23-Jun-55	05-May-78	05-Jun-78		31-Aug-53	30-Oct-53			10-Mar-97		
<u>Total</u> Depth	006	1600	009	6125	1420	S _C	2761	2761	6182	1731	FrtInd
Perf Bottom				6125			2761	1648	6182	1731	
Per				6023			2750	1470	6154	1712	
APINO	30-045-29107	30-045-07895	30-045-07762	30-045-07894	30-045-07870	30-045-07674	30-045-23163 2750	30-045-23550 1470	30-045-07985	30-045-20609	30-545-02151
#1	¥	7	က	-	-	-	_	-	~	-	7
WELLNAME	Sullivan	Madsen Selby Pooled Unit	Masden-Selby	MASDEN GAS COM	Sullivan	CONGRESS	EARL B SULLIVAN	STATE GAS COM BS	PEARCE GAS COM	CHAPARRAL	CONGRESS
Miles to DW1	0.95	0.97	0.97	0.97	0.97	96.0	96.0	66.0	0.99	0.99	0.99
Map Seq.	49	20	5.	25	53	54	22	26	22	58	29

Zone.	윙	12	4	0	10	4		35
Pen Inj. Zone	Yes	က	0	7	8	က	4	24
Total	Wells	15	4	2	^	17	4	69
	Status	P&A	Dry	ÎN.	CBM	Shallow	Deep	Total

# APPENDIX A

From:

Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]

Sent:

Friday, September 09, 2011 5:07 PM

To:

Robinson, Kelly

Cc: Subject: Kuehling, Monica, EMNRD; Roberts, Kelly G, EMNRD; Schmaltz, Randy RE: UICI-009 Bloomfield Refinery Well Acidization September 2011

Attachments:

C-103 Well Stimulation 9-9-2011.pdf

Ms. Robinson:

Please find attached the OCD- Environmental Bureau's approval of your C-103.

Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/

"Why not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward with the Rest of the

Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at: http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Friday, September 09, 2011 2:28 PM

To: Chavez, Carl J, EMNRD

**Cc:** Kuehling, Monica, EMNRD; Roberts, Kelly G, EMNRD; Schmaltz, Randy **Subject:** UICI-009 Bloomfield Refinery Well Acidization_September 2011

Importance: High

Good Afternoon Sir.

Western Refining Southwest, Inc. – Bloomfield Refinery is requesting OCD's approval to conduct acidization and well clean-out activities on the Refinery's injection well. Attached is the completed C-103 notification for this event and a written summary of the proposed activities. These proposed activities are intended to follow the same procedures OCD previously approved in August 2009. Following OCD's approval, Western is hoping to be able to schedule this work for the later part of next week pending contractor availability as well.

As we discussed during an earlier phone conversation, Cindy Hurtado is no longer with Western Refining. Therefore, if you have any questions or need additional information, please do not hesitate to contact me at your convenience.

Thank you for your time and have a great weekend!

Sincerely,

Kelly R. Robinson
Environmental Supervisor

Western Refining Southwest, Inc.

Bloomfield, NM87413

- (o) 505-632-4166 (c) 505-801-5616 (f) 505-632-4024

- (e) kelly.robinson@wnr.com

From:

Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]

Sent:

Tuesday, September 13, 2011 10:22 AM

To:

Robinson, Kelly, Kuehling, Monica, EMNRD; Roberts, Kelly G, EMNRD

Cc:

Schmaltz, Randy

Subject:

RE: Bloomfield Refinery Well Acidization Work - Schedule

Ok. Thanks.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/

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Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at:

http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Monday, September 12, 2011 8:53 AM

To: Kuehling, Monica, EMNRD; Roberts, Kelly G, EMNRD

Cc: Chavez, Carl J, EMNRD; Schmaltz, Randy

Subject: Bloomfield Refinery Well Acidization Work - Schedule

Good Morning Everyone,

Following Mr. Chavez's approval of the proposed acid treatment of the Bloomfield Refinery injection well, we have scheduled the approved activities to be conducted on Monday, September 19, 2011. The reason for the quick schedule is so as to be able to initiate the Fall-Off Testing prior to the OCD deadline. I will be finalizing the Fall-Off Test procedure within the next day or two, and will then be submitting it to OCD for review and approval. The final schedule of the Fall-Off Test will be pending approval and coordination with OCD on their schedule for viewing of the test.

If you would like to be on-site for the activities scheduled for Monday, September 19th, 2011, please let me know at your convenience. At this time the acid work is scheduled to be performed in the morning hours of Monday, September 19th.

Thank you again for your time, and have a great Monday!

Sincerely,

Kelly R. Robinson Environmental Supervisor

#### Western Refining Southwest, Inc.

111 County Road 4990 Bloomfield, NM87413

- (o) 505-632-4166
  - (c) 505-801-5616
  - (f) 505-632-4024
  - (e) kelly.robinson@wnr.com

From:

Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]

Sent:

Friday, September 16, 2011 8:37 AM

To:

Robinson, Kelly

Cc:

Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Roberts, Kelly G, EMNRD

Subject:

RE: UICI-009 Bloomfield Refinery Injection Well Fall Off Test 2011

Ms. Robinson:

The OCD is in receipt of your Fall-Off Test (FOT) request and OCD- EB will respond by COB today.

Please inform the OCD District (Ms. Kuehling and me) of the planned date and time for installation of the bottom hole gauges in advance of shutting off injection to the well for the FOT; and also in advance of shutting off injection after achieving a pseudo steady-state injection condition into the well to allow the OCD to witness pressure fall-off at that time.

Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/

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Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at:

http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

**From:** Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Friday, September 16, 2011 8:18 AM

To: Chavez, Carl J, EMNRD

Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Roberts, Kelly G, EMNRD

**Subject:** UICI-009 Bloomfield Refinery Injection Well Fall Off Test 2011

#### Good Morning Sir,

Western Refining Southwest Inc. - Bloomfield Refinery (Western) is requesting OCD's approval to conduct the Annual Fall-Off Test on the Refinery's injection well. Attached is the completed C-103 notification for this event, and a written summary of the proposed activities.

Pending QCD approval, Western would like to initiate the Fall-Off Test following completion of the Acidizing that is scheduled to commence on Monday, September 19th. With this said, it is anticipated that the memory gauges would be installed in the well on Friday, September 23rd, and the well would be shut-in on Monday, September 26th, 2011 (thus starting the fall-off portion of the testing).

If you have any questions or need any additional information, please do not hesitate to contact me at your convenience.

Thank you for your time!

Sincerely,

Kelly R. Robinson **Environmental Supervisor** 

# Western Refining Southwest, Inc.

111 County Road 4990 Bloomfield, NM87413

- (o) 505-632-4166
- (c) 505-801-5616
- (f) 505-632-4024
- (e) kelly.robinson@wnr.com

From: Sent: Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]

Thursday, July 21, 2011 12:31 PM

To:

Robinson, Kelly

Cc:

Varela, Monica G., EMNRD

Subject: RE: Western Re

RE: Western Refining Bloomfield Refinery - Fall-Off Test Scheduling

Ms. Robinson:

Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/index.htm

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Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at: http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Thursday, July 21, 2011 12:20 PM

**To:** Chavez, Carl J, EMNRD **Cc:** Schmaltz, Randy

**Subject:** Western Refining Bloomfield Refinery - Fall-Off Test Scheduling

Importance: High

Good Morning Mr. Chavez,

As discussed during our phone conversation yesterday, Western has not finalized the schedule for the Injection Well Fall-Off Test at the Bloomfield Refinery. It is our intention to perform a well stimulation procedure prior to conducting the Injection Well Fall-Off Test. At this time, we are hoping to be able to schedule the well stimulation event during the week of August 29th, 2011. This schedule is contingent on contractor availability. Upon completion of the well stimulation event, we anticipate to be able to conduct the Well Fall-Off Test during the week of September 12th, 2011.

Western will notify OCD once the schedules for both events are finalized. Once the schedules are finalized, Western will also submit the respective C-103 notifications that will include Scope of Work summaries for OCD's review and approval.

I appreciate your time in talking with me yesterday. If you have any questions, please don't hesitate to contact me at your convenience.

Sincerely,

Kelly R. Robinson nvironmental Supervisor

Western Refining Southwest, Inc. 111 County Road 4990

# Bloomfield, NM87413

office: (505) 632-4166 cell: (505) 801-5616 ax: (505) 632-4024 email: kelly.robinson@wnr.com

# Chavez, Carl J. EMNRD

From:

Chavez, Carl J. EMNRD

Sent:

Friday, August 20, 2010 11:58 AM

To:

'Hurtado, Cindy'; Roberts, Kelly G, EMNRD

Cc: Subject: Schmaltz, Randy; Kuehling, Monica, EMNRD

RE: Bloomfield Refinery - UiCI-009 Fall-Off Test (UICI-009)

Attachments:

C-103 Annual FOT 8-20-10.pdf

Cindy:

Approved. Please see attachment.

As a reminder, during the steady-state injection period prior to fall-off test (FOT) monitoring, please be sure to include the real-time injection flow rate with pressure and temperature data to verify that a steady-state flow condition was achieved prior to FOT monitoring. Also, an updated historical pressure-flow rate chart should be submitted with the fall-off test package for the disposal well.

Please contact me if you have questions. Thank you.

Please be advised that NMOCD approval of this plan does not relieve Western Refining Southwest, Inc.-Bloomfield Refinery of responsibility should their operations pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve Western Refining Southwest, Inc.- Bloomfield Refinery of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe. New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

From: Hurtado, Cindy [mailto:Cindy.Hurtado@wnr.com]

Sent: Friday, August 20, 2010 9:31 AM

To: Chavez, Carl J, EMNRD; Roberts, Kelly G, EMNRD Cc: Schmaltz, Randy; Kuehling, Monica, EMNRD Subject: Bloomfield Refinery - UiCI-009 Fall-Off Test

Good Morning Carl,

Please disregard the previous e-mail concerning Bloomfield Refinery's Fall-Off Test. It did not contain the signed C-103 application. This current e-mail contains the signed C-103.

Please find attached the C-103 application for Bloomfield Refinery's Class 1 Injection Well Fall-Off Test to begin on August 29, 2010. Also attached is the Fall-Off Test Plan incorporating your request to install bottom hole gauges at 48 hours before cessation of injection and the Wellbore Diagram.

Monica Kueling with Aztec OCD is available on August 30, 2010 to witness installation of the bottom hole gauges.

A hard copy of this submittal will be mailed to your office.

Thanks,

From:

Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]

ent:

Friday, September 16, 2011 10:48 AM

To:

Robinson, Kelly

Cc:

Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Roberts, Kelly G, EMNRD; Schmaltz,

Randy: McDaniel, Vic

**Subject:** 

RE: UICI-009 Bloomfield Refinery Injection Well Fall Off Test 2011

Kelly:

OCD is in receipt of the update.

Please remember to submit a C-103 for the "coiling" of the injection well if you are entering the well, etc. Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/

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Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at: http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Friday, September 16, 2011 10:24 AM

To: Chavez, Carl J, EMNRD

Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Roberts, Kelly G, EMNRD; Schmaltz, Randy; McDaniel, Vic

Subject: RE: UICI-009 Bloomfield Refinery Injection Well Fall Off Test 2011

Importance: High

Mr. Chavez,

Thank you for talking with me this morning. As we discussed, Western has identified scaling inside the injection well that has minimize the capacity of the Bloomfield Refinery injection well. The result of these findings have made it necessary to post-pone the acid work on the well, and thus the scheduling of the Fall-Off Test.

As of this morning, Western is in the process of contracting with a Coil Tubing company to be able to coil the Bloomfield Refinery injection well. Coiling the well will allow us to remove the scale in the bottom 80 ft, and thus allow us to resume injection into the Menefee Formation. At this time, the earliest the Coil Tubing Contractor could be on-site is Monday, September 26th, 2011. We will have a more firm schedule next week, and at that time we will provide OCD with an up-dated schedule.

Following the coiling activities, we would like to proceed in conducting the well stimulization/acidization to ensure any scale within the perforations of the well has been removed. We are confident that these two activities will return the well to is normal production capacity.

Once the coiling process and acidization activities are completed, we will then be able to schedule the Fall-Off Test.

We appreciate OCD's understanding on these issues. Western will send out a confirmed schedule of events once they are know next week. At that time, we will make sure that we coordinate these activity with OCD so as to provide the opportunity to witness any or all of these activities.

Thank you again for your time, and have a great weekend!

Sincerely,

Kelly R. Robinson Environmental Supervisor

#### Western Refining Southwest, Inc.

111 County Road 4990 Bloomfield, NM87413

(o) 505-632-4166

(c) 505-801-5616

(f) 505-632-4024

(e) kelly.robinson@wnr.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Friday, September 16, 2011 8:37 AM

To: Robinson, Kelly

**Cc:** Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Roberts, Kelly G, EMNRD **Subject:** RE: UICI-009 Bloomfield Refinery Injection Well Fall Off Test 2011

Ms. Robinson:

The OCD is in receipt of your Fall-Off Test (FOT) request and OCD- EB will respond by COB today.

Please inform the OCD District (Ms. Kuehling and me) of the planned date and time for installation of the bottom hole gauges in advance of shutting off injection to the well for the FOT; and also in advance of shutting off injection after achieving a pseudo steady-state injection condition into the well to allow the OCD to witness pressure fall-off at that time.

hank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/

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Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at: <a href="http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental">http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental</a>)

**From:** Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Friday, September 16, 2011 8:18 AM

To: Chavez, Carl J, EMNRD

Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Roberts, Kelly G, EMNRD

Subject: UICI-009 Bloomfield Refinery Injection Well Fall Off Test_2011

Good Morning Sir,

Western Refining Southwest Inc. – Bloomfield Refinery (Western) is requesting OCD's approval to conduct the Annual Fall-Off Test on the Refinery's injection well. Attached is the completed C-103 notification for this event, and a written immary of the proposed activities.

Pending OCD approval, Western would like to initiate the Fall-Off Test following completion of the Acidizing that is scheduled to commence on Monday, September 19th. With this said, it is anticipated that the memory gauges would be

From:

Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]

ent:

Thursday, September 22, 2011 2:47 PM

To:

Robinson, Kelly

Cc:

Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Schmaltz, Randy

Subject: Attachments: RE: UICI-009 Revised Notification_Bloomfield Refinery Injection Well Stimulation Activities C-103 Well Stimulation 9-22-2011.pdf

Kelly:

Please find OCD's approval attached.

Good luck. Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/

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From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Wednesday, September 21, 2011 4:37 PM

To: Chavez, Carl J, EMNRD

Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Schmaltz, Randy

Subject: UICI-009 Revised Notification Bloomfield Refinery Injection Well Stimulation Activities.

#### Good Afternoon Sir,

Western Refining Southwest, Inc. – Bloomfield Refinery is submitting a revised C-103 that pertains to the proposed well stimulation/acidization activities on the Refinery's injection well. As per our previous phone conversation, Western is currently working to finalize a contract with Basic Energy Services (formerly known as Maverick Coil Tubing, Inc.) to perform the coil tubing activities that is needed to evacuate the accumulation of scale within the bottom perforations of the Bloomfield Injection Well. Once this Contract with Basic Energy is finalized and OCD has approve the proposed activities, Western will notify OCD of the schedule to implement the field activities so that opportunity is provided to witness any or all of the field activities.

Thank you for your time, and please contact me at your convenience if you have any questions or need any additional information.

Sincerely,

Kelly R. Robinson
Environmental Supervisor

#### Western Refining Southwest, Inc.

11 County Road 4990 Bloomfield, NM87413

- (o) 505-632-4166
- (c) 505-801-5616

- (f) 505-632-4024 (e) <u>kelly_robinson@wnr.com</u>

Submit 1 Copy To Appropriate District	State of New Mexico		C-103
Office <u>District 1</u> (575) 393-6161	Energy, Minerals and Natural Re	sources Revised Augus	it 1, 2011
1625 N. French Dr., Hobbs, NA1 88240 District II - (575) 748-1283		WELL API NO. 30-045-29002-00	1
811 S. First St., Artesia, NM 88210	OIL CONSERVATION DIV	5 Indicate Type of Lance	
<u>District III ~ (505) 334-6178</u> 1000 Rio Brazos Rd., Aztec, NM 87410	1220 South St. Francis I	r. STATE   FEE	
District IV - (505) 476-3460	Santa Fe, NM 87505	6. State Oil & Gas Lease No.	
1220 S. St. Francis Dr., Santa Fe, NM 87505		N/A	
SUNDRY NOTICE (DO NOT USE THIS FORM FOR PROPOSA	ES AND REPORTS ON WELLS LS TO DRILL OR TO DEEPEN OR PLUG BAG TION FOR PERMIT" (FORM C-101) FOR SIJO		Name
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# 50 Road 4990, Bloomfield, NM, 87	413	Blanco/Mesa Verde	-
4. Well Location			
Unit Letter1_:2442	feet from the south lin	e and 1250 feet from the east 1	ine
Section 27	Township 29 Range	11 NMPM County San	luan
	11. Elevation (Show whether DR, RKB,	RT, GR, etc.)	
12. Check Ap	propriate Box to Indicate Nature	of Notice, Report or Other Data	
NOTICE OF INTE	•	SUBSEQUENT REPORT OF:	
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Spud Date:	Rig Release Date:		
			****
I hereby certify that the information abo	ve is true and complete to the best of n	y knowledge and belief.	
Jet V	•		
SIGNATURE of elly foli	TITLE Environm	ental Supervisor DATE 9/21/2011	
	·		Managodia - que región h
Type or print name Kelly Robinson	E-mail address: <u>kell</u>	v.robinson@wnr.com PHONE: 505-632-4166	
For State Use Only		•	
APPROVED BY:	Sim TITLE Environ	til Enginee DATE 9/22/2	2011
Conditions of Approval (if any):	A STATE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PAR		Marine State Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control

#### Western Refining Southwest, Inc. – Bloomfield Refinery

Well Clean-Out and Acid Treatment Field Procedure - September 2011

Well:

Disposal Well #1

Field:

Mesaverde

Location:

Bloomfield Refinery S27, T29N, R11W

API No. :

30-045-29002

PROJECT: Lower Injection pressure by pumping 15% HCl acid.

#### Prior to Job:

A safety meeting will be held for all contractors and facility visitors prior to the start of field activities. Equipment staged on-site for well clean-out and acidizing activities include two 400-bbl frac tanks to be used for flow-back after acid job. An additional frac tank may be used for flow-back during well clean out activities. The tanks will be hard-piped to the injection well piping for flow-back. All field piping will be pressured tested at 4,000 psi to ensure no leaks exist on field equipment prior to commencement of field work.

A water truck will be used for fluid displacement. Hydrants at the Bloomfield Refinery have too much pressure for these field activities. A summary of the activities proposed are as follows:

#### Phase 1: Clean out and Acid Spot

- 1. Rig up the coil tubing unit & Halliburton to well head and conduct pressure test on pumps and lines.
- 2. RIH with 1-1/4-inch coil tubing to PBTD at 3520 ft. Clean out if necessary.
- 3. Pull coiled tubing up to bottom perforation at 3,460 ft KB (bottom perforation) to ensure acid placement is at the perforations.
- Pump 200 gallons of 15% HCL with inhibitors into well.
- 5. Pull out coiled tubing and shut well in overnight.

#### Phase 2: Acid / Ball Off

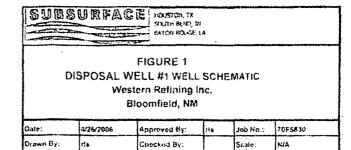
- Establish an injection rate with water. Pump 4,200 gallons of 15% HCl acid w/ inihibtors and mutual solvent with 300 ea. bio-degradable ball sealers. Pump initial 500-gallons without balls.
- Displace acid to bottom perforation with ~ 24 bbls of 2% KCl water (or disposal water if available).
- Shut well in for ~ 1 hr and let acid treatment "soak".
- Open well through 2-inch line and let well flow back to frac tank. Flow back approximately 400 bbls of fluid.
- After flowback, return well to injection status and monitor rates and pressures.

#### Materials & Vendors

Add: Halliburton Energy Services Coll Tubing: Basic Energy Services

## WESTERN REFINING DISPOSAL WELL #1 NW, SW SECTION 26, T29N, R11W

NO.: 30-045-29002



8-5/8", 48#/ft, Surface Casing @ 830"

TOC: Surface Hole Size: 11.0°

Tubing: 2-7/8", Acid Resistant Fluoroline Cement Lined

Wt of Tubing: 6.5 #/ft

Wt of Tubing Lined: 7.55 #/ft

Tubing ID: 2,128"
Tubing Drift ID: 2,000"

Minimum ID @ Packer: ~1.87" estimated

Packer: Unknown Packer Type @ 3221'
Could be a Guiberson or similar model Uni-6

Perforations: 3276' - 3408' 4JSPF 0.5 EHD Top of the Cliff House Formation: 3276'

Fill was cleaned out of well on 4/20/06 Fill was orginally tagged at 3325'

Perforations: 3435' - 3460' 4JSPF 0.5 EHD Top of the Menefee Formation: 3400'

RBP: 3520'

5-1/2", 15.5#/ft, Production Casing @3600'

TOC: Surface Hole Size: 7-7/8"

From:

Robinson, Kelly

ent:

Tuesday, October 04, 2011 7:02 AM

To:

'Powell, Brandon, EMNRD', Kuehling, Monica, EMNRD

Cc:

Schmaltz, Randy; 'Chavez, Carl J, EMNRD'

Subject:

Bloomfield Refinery Injection Well - Acidizing and Coiling Work

#### Good Morning Brandon and Monica,

I apologize for the short notice, but as of 5pm yesterday afternoon I was given Corporate approval to go forward with the Injection Well coiling and acidizing work. As you know, we have been delayed in scheduling and moving forward with these activities pending finalization of the contracts.

Basic Energy Services in Aztec, NM is being contracted to perform the well coiling activities. Halliburton will be performing the acidizing work. As of 6am this morning, we were told that the only opportunity Basic Energy has for coiling the well is today. The next opportunity would not be for several weeks. Therefore, I have asked Basic Energy to mobilize to the Bloomfield Refinery this morning. They are expected to arrive within the hour, and at that time, after safety orientations are complete, we will begin the coiling work.

Halliburton has also a similar limited schedule of opportunity. Their next available opportunity to be on-site to perform the acidizing work is Friday, October 7th.

Following completion of these two activities, we will schedule the Fall-Off Test for the Injection Well. That test will be conducted at a time that is convenient for both the contract (Teffteller) and OCD representatives.

I apologize for the late notice. If you have any questions, please do not hesitate to contact me at your convenience.

incerely,

Kelly R. Robinson Environmental Supervisor

#### Western Refining Southwest, Inc.

111 County Road 4990 Bloomfield, NM87413

- (o) 505-632-4166
- (c) 505-801-5616
- (f) 505-632-4024
- (e) kelly.robinson@wnr.com

From:

Robinson, Kelly

ent:

Thursday, October 06, 2011 10:17 AM

To: Cc: 'Powell, Brandon, EMNRD'; Kuehling, Monica, EMNRD

'Chavez, Carl J, EMNRD'; Schmaltz, Randy

Subject:

Acidization Work Scheduled for the Bloomfield Refinery Injection Well

#### Good Morning Brandon and Monica,

As of 10am this morning, Western Refining Southwest, Inc. (Western) was able to finalize the schedule for acidizing the injection well at the Bloomfield Refinery. Halliburton is scheduled to arrive on-site between 9am and 10am tomorrow, October 7th, 2011. I will be the Western representative who will oversee these activities. If you have any questions regarding these schedule activities, please feel free to contact me at your convenience.

Following the well acidization activities, the injection well will be returned to normal operation. I will be contacting you again next week to schedule a time that meets your schedule for conducting the Annual Fall-Off Test.

Thank you for your time, and have a great day!

Sincerely,

Kelly R. Robinson **Environmental Supervisor** 

#### Western Refining Southwest, Inc.

111 County Road 4990 Bloomfield, NM87413

- (o) 505-632-4166
- (c) 505-801-5616
- (f) 505-632-4024
- (e) kelly.robinson@wnr.com

From:

Robinson, Kelly

ent:

Thursday, October 06, 2011 3:48 PM

To: Subject: 'Powell, Brandon, EMNRD'; Kuehling, Monica, EMNRD

Bloomfield Refinery Injection Well Acidization Activities - Change in Schedule

#### Good Afternoon Brandon and Monica.

I received a call from Halliburton just about 10 minutes ago informing me that due to the recent rainy weather in the Four Corners Area, Halliburton was unable to complete the acid job they are working on at the Reservation. With this said, they had to postpone the work scheduled for the Bloomfield Refinery Injection Well until Monday, October 10th. They are scheduled to be on-site around 8am on Monday.

I apologize for the change in schedule.

If you have any questions, please don't hesitate to contact me at your convenience.

Thank you for your time and have a great weekend!

Kelly R. Robinson Environmental Supervisor

#### Western Refining Southwest, Inc.

111 County Road 4990 Bloomfield, NM87413

(o) 505-632-4166

(c) 505-801-5616

505-632-4024

e) kelly.robinson@wnr.com

From:

Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]

ent:

Thursday, October 13, 2011 5:16 PM

To:

Robinson, Kelly

Subject:

RE: UICI-009 Bloomfield Refinery Injection Well Fall Off Test 2011

Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/

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Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at: <a href="http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental">http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental</a>)

From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Thursday, October 13, 2011 1:53 PM

To: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD

Cc: Chavez, Carl J, EMNRD; Schmaltz, Randy

Subject: FW: UICI-009 Bloomfield Refinery Injection Well Fall Off Test_2011

#### Good Afternoon,

Over the past few weeks, Western Refining Southwest, Inc. – Bloomfield Refinery has been able to successfully complete the well stimulation and well coiling activities at the Bloomfield Refinery injection well. With this said, Western has contracted Tefteller, Inc. to assist in performing the up-coming Fall-Off Test.

At this time, Tefteller, Inc. is scheduled to arrive on-site at approximately 8am on Wednesday, October 19th to install the memory gauges down the well. By this time, the injection well will have reached and maintained a steady-state injection rate for a minimum of 24-hours prior. Once the gauges are installed, they will be allowed to stabilize for at least 48-hours before the well is shut-in and the fall-off monitoring commences. The well will remain shut-in for approximately 3 to 11 days, pending the fall-off data results collected. Attached is the OCD approved procedure that will be followed.

Western understands that OCD requests to be on-site for a part or all of these activities. If the above schedule does not meet your availability and OCD would like the testing schedule to be changed or adjusted, please let me know at your convenience so that the appropriate arrangements can be made.

Thank you for your time, and have a great weekend!

Sincerely,

Kelly R. Robinson Environmental Supervisor

#### Western Refining Southwest, Inc.

111 County Road 4990 Hoomfield, NM87413

- (o) 505-632-4166
- (c) 505-801-5616

(f) 505-632-4024

(e) kelly.robinson@wnr.com

**From:** Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Friday, September 16, 2011 4:42 PM

**To:** Robinson, Kelly

Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Roberts, Kelly G, EMNRD; Schmaltz, Randy; McDaniel, Vic

Subject: RE: UICI-009 Bloomfield Refinery Injection Well Fall Off Test 2011

Ms. Robinson:

Please find attached OCD's approval of the C-103 FOT. Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/

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Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at: http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

**From:** Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Friday, September 16, 2011 10:24 AM

To: Chavez, Carl J, EMNRD

🗲: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Roberts, Kelly G, EMNRD; Schmaltz, Randy; McDaniel, Vic

**Subject:** RE: UICI-009 Bloomfield Refinery Injection Well Fall Off Test_2011

Importance: High

Mr. Chavez,

Thank you for talking with me this morning. As we discussed, Western has identified scaling inside the injection well that has minimize the capacity of the Bloomfield Refinery injection well. The result of these findings have made it necessary to post-pone the acid work on the well, and thus the scheduling of the Fall-Off Test.

As of this morning, Western is in the process of contracting with a Coil Tubing company to be able to coil the Bloomfield Refinery injection well. Coiling the well will allow us to remove the scale in the bottom 80 ft, and thus allow us to resume injection into the Menefee Formation. At this time, the earliest the Coil Tubing Contractor could be on-site is Monday, September 26th, 2011. We will have a more firm schedule next week, and at that time we will provide OCD with an up-dated schedule.

Following the coiling activities, we would like to proceed in conducting the well stimulization/acidization to ensure any scale within the perforations of the well has been removed. We are confident that these two activities will return the well to is normal production capacity.

Once the coiling process and acidization activities are completed, we will then be able to schedule the Fall- Off Test.

We appreciate OCD's understanding on these issues. Western will send out a confirmed schedule of events once they are know next week. At that time, we will make sure that we coordinate these activity with OCD so as to provide the opportunity to witness any or all of these activities.

hank you again for your time, and have a great weekend!

Sincerely,

#### Kelly R. Robinson Environmental Supervisor

#### Jestern Refining Southwest, Inc.

111 County Road 4990 Bloomfield, NM87413

- (o) 505-632-4166
- (c) 505-801-5616
- (f) 505-632-4024
- (e) kelly.robinson@wnr.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]

Sent: Friday, September 16, 2011 8:37 AM

To: Robinson, Kelly

**Cc:** Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Roberts, Kelly G, EMNRD **Subject:** RE: UICI-009 Bloomfield Refinery Injection Well Fall Off Test 2011

Ms. Robinson:

The OCD is in receipt of your Fall-Off Test (FOT) request and OCD- EB will respond by COB today.

Please inform the OCD District (Ms. Kuehling and me) of the planned date and time for installation of the bottom hole gauges in advance of shutting off injection to the well for the FOT; and also in advance of shutting off injection after achieving a pseudo steady-state injection condition into the well to allow the OCD to witness pressure fall-off at that time.

Thank you.

arl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/

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Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at:

http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

**From:** Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Friday, September 16, 2011 8:18 AM

To: Chavez, Carl J, EMNRD

Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Roberts, Kelly G, EMNRD

Subject: UICI-009 Bloomfield Refinery Injection Well Fall Off Test 2011

Good Morning Sir,

Western Refining Southwest Inc. – Bloomfield Refinery (Western) is requesting OCD's approval to conduct the Annual Fall-Off Test on the Refinery's injection well. Attached is the completed C-103 notification for this event, and a written summary of the proposed activities.

Pending OCD approval, Western would like to initiate the Fall-Off Test following completion of the Acidizing that is cheduled to commence on Monday, September 19th. With this said, it is anticipated that the memory gauges would be installed in the well on Friday, September 23rd, and the well would be shut-in on Monday, September 26th, 2011 (thus starting the fall-off portion of the testing).

If you have any questions or need any additional information, please do not hesitate to contact me at your convenience.

Thank you for your time!

Sincerely,

Kelly R. Robinson Environmental Supervisor

#### Western Refining Southwest, Inc.

111 County Road 4990 Bloomfield, NM87413

- (o) 505-632-4166
- (c) 505-801-5616
- (f) 505-632-4024
- (e) kelly.robinson@wnr.com

From:

Chavez, Carl J. EMNRD [CarlJ.Chavez@state.nm.us]

Sent:

Friday, October 21, 2011 1:18 PM

To:

Robinson, Kelly, Powell, Brandon, EMNRD; Kuehling, Monica, EMNRD; Wiebe, Paul, EMNRD

Cc:

Schmaltz, Randy; Sanchez, Daniel J., EMNRD; VonGonten, Glenn, EMNRD

Subject:

RE: Bloomfield Refinery Injection Well - Schedule Up-Date

Kelly:

Thank you for the update.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/

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http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]

Sent: Friday, October 21, 2011 12:03 PM

To: Powell, Brandon, EMNRD; Kuehling, Monica, EMNRD; Wiebe, Paul, EMNRD

Cc: Schmaltz, Randy; Chavez, Carl J, EMNRD

Subject: Bloomfield Refinery Injection Well - Schedule Up-Date

#### Good Afternoon Everyone!

I wanted to take this opportunity to provide you with an up-dated schedule regarding the Fall-Off Test that is currently being conducted at the Bloomfield Refinery injection well. As you may know, we installed down-hole memory gauges at the injection well on Wednesday, October 19th. We maintained a steady injection flow during the three days prior and 48-hour following the installation of the gauges. As of 11am this morning, the injection well has been blocked-in and down-hole flow by the injection well pump has ceased. The well will be blocked-in for 11 days. At this time, the contractor is scheduled to return to the facility on **Tuesday, November 1^{ch} at 10:30am**, at which time the gauges will be pulled from the well with incremental interval pressure readings collected as outlined in the approved Fall-Off Test procedure.

During the time the well is blocked-in, surface casing pressures can be monitored from a field gauge that was installed by the contractor at the well head. This pressure reading will be monitored several times during each shift by Operations and Environmental personnel.

If there are any questions or concerns regarding these activities, please feel free to contact me at your convenience.

I appreciate your time, and have a great weekend!

Sincerely,

Kelly R. Robinson Environmental Supervisor

Western Refining Southwest, Inc.

111 County Road 4990

installed in the well on Friday, September 23rd, and the well would be shut-in on Monday, September 26th, 2011 (thus starting the fall-off portion of the testing).

If you have any questions or need any additional information, please do not hesitate to contact me at your convenience.

Thank you for your time!

Sincerely,

Kelly R. Robinson Environmental Supervisor

#### Western Refining Southwest, Inc.

111 County Road 4990 Bloomfield, NM87413

- (o) 505-632-4166
- (c) 505-801-5616
- (f) 505-632-4024
- (e) kelly.robinson@wnr.com



# NEW MEXICO ENERGY, MINERALS & NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
AZTEC DISTRICT OFFICE
1000 RIO BRAZOS ROAD
AZTEC NM 87410
(505) 334-6178 FAX: (505) 334-6170
http://emnrd.state.nm.us/ocd/District III/3distric.htm

# **BRADENHEAD TEST REPORT**

(submit 1 copy to above address)

Date o	of Test	6	-15-	//	Opera	ator Western API #30-0
		ne S				Location: Unit_Section Township Range //
						Tubing DIntermediate VIII Casing Bradenhead O
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TIME 5 min_						Steady Flow
10 min_						Surges
15 min_						Down to Nothing
20 min_						Nothing
25 min_		ļ				Gas
30 min_						Gas & Water
						Water
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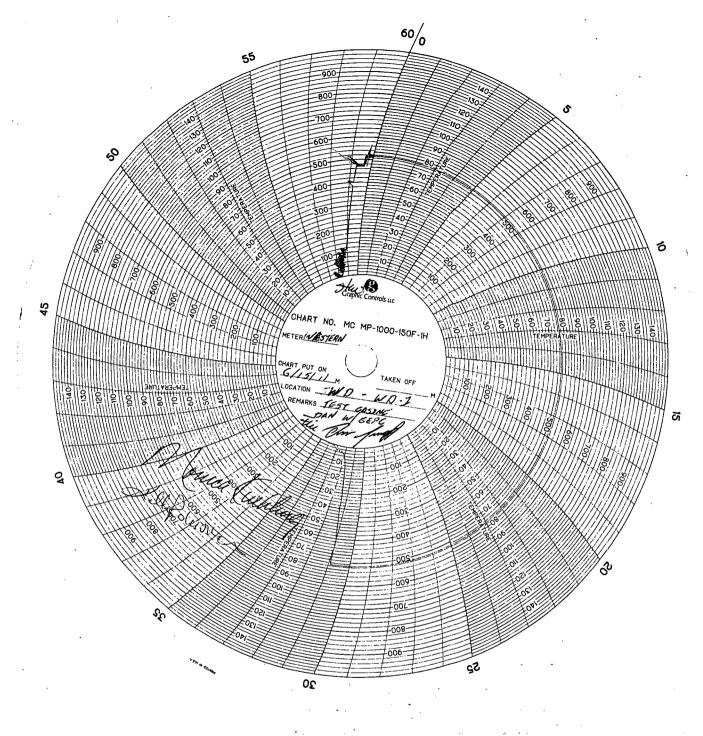


# NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

# MECHANICAL INTEGRITY TEST REPORT

(TA OR UIC)

Date of Test $6-15-11$	Operator Western	API # 30-0
Property NameSWD	Well #/	Location: Unit_SecTwn=Rge//_
Land Type:  State Federal Private Indian	Well Ty	Water Injection  Salt Water Disposal  Gas Injection  Producing Oil/Gas  Pressure obervation
Temporarily Abandoned Well (Y/N)	ТА Ехр	ires:
Sasing Pres. Padenhead Pres. Tubing Pres. Int. Casing Pres.	Tbg. SI Pres. Tbg. Inj. Pres.	Max. Inj. Pres
Pressured annulus up to	psi for 30	mins. Test passed/failed
REMARKS: C	Def. 3221 Copperf 3276	
,		
(Operator Representative)  Environmental Supervis  (Position)	Witness	NMOCD)  Revised 02-11-02



Office Office	State of New Mexico	Form C-103
District 1 - (575) 393-6161	Energy, Minerals and Natural Resources	Revised August 1, 2011 WELL API NO.
1625 N. Freech Dr., Hobbs, NM 88240 District II - (575) 748-1283	ATT CONCERNAL MEAN PROPERTY.	30-045-29002-00
811 S. Pirst St., Artesia, NM 88210 District III - (505) 334-6178	OIL CONSERVATION DIVISION	5. Indicate Type of Lease
1000 Rio Brazos Rd., Aztoc, NM 87410	1220 South St. Francis Dr. Santa Fe, NM 87505	STATE FEE S
<u>District IV</u> - (505) 476-3460 1220 S. St. Francis Dr., Santa Fe, NM 87505	Sama 1 c, 1414 67205	6. State Oil & Gas Lease No. N/A
	CES AND REPORTS ON WELLS	7. Lease Name or Unit Agreement Name
	TALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A ATTON FOR PERMIT" (FORM C-101) FOR SUCH	Disposal
1. Type of Well: Oil Well	Gas Well 🛛 Other - (Disposal Well)	8. Well Number: #001
Bloomfield Refinery	ining Co. / Western Refining Southwest, Inc	9. OGRID Number: 037218
3. Address of Operator #.50 Road 4990, Bloomfield, NM, I	37413	10. Pool name or Wildcat: Blanco/Mesa Verde
4. Well Location		
Unit Letter   1 : 244	2 feet from the <u>south</u> line and <u>12</u>	50 feet from the east line
Section 27	Township 29 Range 11	NMPM County San Juan
A CONTRACTOR OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF TH	11. Elevation (Show whether DR, RKB, RT, GR, etc.	) he ill is
12. Check A	ppropriate Box to Indicate Nature of Notice,	Report or Other Data
NOTICE OF IN		SEQUENT REPORT OF:
PERFORM REMEDIAL WORK	PLUG AND ABANDON   REMEDIAL WOR	
TEMPORARILY ABANDON	CHANGE PLANS COMMENCE DR	
	MULTIPLE COMPL   CASING/CEMEN	T JOB
DOWNHOLE COMMINGLE		
OTHER: Well Stimulation / Acidize		
13. Describe proposed or comple	ted operations. (Clearly state all pertinent details, an	d give pertinent dates, including estimated date
of starting any proposed wor proposed completion or reco	k). SEE RULE 19.15.7.14 NMAC. For Multiple Commission	mpletions: Attach wellbore diagram of
proposed completion of reco	inpeton.	
Western Refining Southwest, Inc B	loomfield Refinery requests permission to perform w	ell stimulation/acidization procedures on the
Class I Injection Well referenced above	ve. The procedures for this project are attached. The	procedure will be scheduled pending approval
from OCD.		
,		
·		-
Spud Date:	Rig Release Date:	
I hereby certify that the information al	sove is true and complete to the best of my knowledge	e and belief.
JAIDA		
SIGNATURE Kellykolu	TITLE Environmental Superv	isor DATE 9/9/2011
Type or print name Kelly Robinso	n E-mail address: kelly.robinson@	wir.com PHONE: 503-632-4166
For State Use Only	пенульними	2011-1-100
APPROVED BY: Carl J. C.	TITLE Environmental	Engline DATE 9/9/2011
Conditions of Approval (if any):	<del></del>	

#### Western Refining Southwest, Inc. - Bloomfield Refinery

Well Clean-Out and Acid Treatment Field Procedure - September 2011

Well:

Disposal Well #1

Field:

Mesaverde

Location:

Bloomfield Refinery S27, T29N, R11W

API No. :

30-045-29002

PROJECT: Lower Injection pressure by pumping 15% HCl acid.

#### Prior to Job:

A safety meeting will be held for all contractors and facility visitors prior to the start of field activities. Equipment staged on-site for well clean-out and additional activities include two 400-bbl frac tanks to be used for flow-back after acid job. An additional frac tank may be used for flow-back during well clean out activities. The tanks will be hard-piped to the injection well piping for flow-back. All field piping will be pressured tested at 4,000 psi to ensure no leaks exist on field equipment prior to commencement of field work.

A water truck will be used for fluid displacement. Hydrants at the Bloomfield Refinery have too much pressure for these field activities. A summary of the activities proposed are as follows:

#### Phase 1: Clean out and Acid Spot

- Rig up the Sanjel coll tubing unit & Halliburton to well head and conduct press test on pumps and lines.
- 2. RIH with 1-1/4-Inch coil tubing to PBTD at 3520 ft. Clean out if necessary.
- 3. Pull colled tubing up to bottom perforation at 3,460 ft KB (bottom perforation) to ensure acid placement is at the perforations.
- 4. Pump 200 gallons of 15% HCL with inhibitors into well
- 5. Pull out coiled tubing and shut well in overnight.

#### Phase 2: Acid / Ball Off

- Establish an injection rate with water. Pump 4,200 gallons of 15% HCl acid w/ inihibtors and mutual solvent with 300 ea. bio-degradable ball sealers. Pump Initial 500-gallons without balls.
- Displace acid to bottom perforation with ~ 24 bbls of 2% KCl water (or disposal water if available).
- Shut well in for ~ 1 hr and let acid treatment "soak".
- Open well through 2-inch line and let well flow back to frac tank. Flow back approximately 400 bbls of fluid.
- After flowback, return well to injection status and monitor rates and pressures.

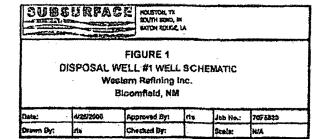
#### Materials & Vendors

Acid: Halliburton Energy Services

Coll Tubing: Sanjel

# WESTERN REFINING DISPOSAL WELL #1 NW, SW SECTION 26, T29N, R11W

NO.: 30-045-29002



8-5/8", 48#/fi, Surface Casing @ 830' TOC: Surface

Hole Size: 11.0"

Tubing: 2-7/8", Acid Resistant Fluoroline Cement Lined

Wt of Tubing: 6.5 #/ft

Wt of Tubing Lined: 7.55 #ft

Tubing ID: 2.128"
Tubing Drift ID: 2.000"

Minimum ID @ Packer: ~1.87" estimated

Packer: Unknown Packer Type @ 3221'

Could be a Guiberson or similar model Uni-6

Perforations: 3276' - 3408' 4JSPF 0.5 EHD Top of the Cliff House Formation: 3276'

Fill was cleaned out of well on 4/20/06 Fill was orginally tagged at 3325'

Perforations: 3435' - 3460' 4JSPF 0.5 EHD Top of the Menefee Formation: 3400'

RBP: 3520'

5-1/2", 15.5#/ft, Production Casing @3800"

TOC: Surface Hole Size: 7-7/8"

Office	State of New M			Form C-103
District 1 - (575) 393-6161	Energy, Minerals and Nati	ural Resources	WELL API NO.	Revised August 1, 2011
1625 N. French Dr., Hobbs, NM 88240 District II - (575) 748-1283	OIL CONSERVATION	J PARVICIONI	30-045-29002-00	
811 S. First St., Artesia, NM 88210 District III - (505) 334-6178	1220 South St. Fra		5. Indicate Type o	
1000 Rio Brazos Rd., Aztec, NM 87410	Santa Fe, NM 8		STATE [	FEE 🛛
<u>District IV</u> - (505) 476-3460 1220 S. St. Francis Dr., Santa Fe, NM 87505	Santa PC, Nivi o	7303	6. State Oil & Gas N/A	Lease No.
SUNDRY NOTI	CES AND REPORTS ON WELL!			Unit Agreement Name
(DO NOT USE THIS FORM FOR PROPOSE DIFFERENT RESERVOIR. USE "APPLICE PROPOSALS.)			Disposal	
	Gas Well 🛛 Other - (Disposal		8. Well Number:	
Name of Operator San Juan Res Bloomfield Refinery	ining Co. / Western Refining Sout	hwest, Inc	9. OGRID Numbe	
3. Address of Operator # 50 Road 4990, Bloomfield, NM,	B7413		10. Pool name or \ Blanco/Mesa Verd	
4. Well Location				
Unit LetterI24	feet from the south	line and12:	50 feet from the	_eastline
Section 27		Range 11 E	NMPM	County San Juan
	11. Elevation (Show whather DR	, RKB, RT, GR, etc.,	)	
12. Check A	appropriate Box to Indicate N	lature of Notice,	Report or Other I	Data
NOTICE OF IN	TENTION TO	l cum	CEOUENT DEC	
NOTICE OF IN PERFORM REMEDIAL WORK	PLUG AND ABANDON	REMEDIAL WOR	SEQUENT REP	ORTOF: ALTERING CASING [7]
TEMPORARILY ABANDON	CHANGE PLANS	COMMENCE DRI		P AND A
PULL OR ALTER CASING	MULTIPLE COMPL	CASING/CEMEN	•	,
DOWNHOLE COMMINGLE				
OTHER: Annual Fall-Off Test	<u>⊠</u>	OTHER:		<u> </u>
of starting any proposed wa	eted operations. (Clearly state all rk). SEE RULE 19.15.7.14 NMA(	pertinent delaits, and	a give perinent dates	, including estimated date
proposed completion or reco		c. Poi ividilipie Coi	nprenons. Anach we	moore diagram of
<b>PPPPP</b>				
Western Refining Southwest, Inc I	Hoomfold Daffman, manage norm	icaina to madama th	a annual Eall Offer	d am tha Claus I belonder
well referenced above. The injection	build-up period will been followi	ission to perform the ne the Acid Stirmls	tannarran-On res	t on the Class I injection
Monday, September 29th. Following	a minimum of 24 hours of stable is	njection down-hole,	the bottom hole pres	Sure memory gauges will
be lowered into the well (two memory	y gauges) and allowed to stabilize.	Pending OCD appr	roval, Western anticip	pates installing the
memory gauges on Friday, Septembe	23, 2011. The gauges will be all	owed to stabilize an	d the well will be shu	t-in on Monday,
September 26th. The well will be shu	I in for a minimum of 12 hours.			
A more detailed outline of the propos	ed procedure is attached.			
	·			
		f		<del></del> 1
Spud Date:	Rig Release Da	ite:		
	<del> </del>			·
I hereby certify that the information a	bove is true and complete to the be	est of my knowledge	and belief.	
1000	•			
SIGNATURE XellyCole	MUTITLEEn	vironmental Superv	isorDATE	9/16/2011
Type or print name Kelly Robinse	E-mail address:	kelly.robinson@	wnr.com PHONE:	505-632-4166
For State Use Only			_	
APPROVED RV:	Chine TITLE A.	in the TT &	a. i nam	c 9/16/2011
Conditions of Approval (if any):		CHIM-MAY D	June DAII	117 5
APPROVED BY: last of Conditions of Approval (if any):  1) Test to be run  2) Test to be Cons approved fall-off	after scale rem	ovel & Well	lacid stir	nulation.
a) A.L. L. L. Com	intent w attached &	7/20/2010 8	-mail msg.	to operator d
of less to be cons	Test Plan			
will show and - ac	E-state to			t materials

#### 2011 WELL BUILDUP/FALLOFF TEST PLAN WESTERN REFINERY - BLOOMFIELD, NM WASTE DISPOSAL WELL NO. 1

#### 1.0 INTRODUCTION

The following procedure describes the proposed activities to be conducted to perform the annual bottom-hole pressure survey and pressure fall-off test on Waste Disposal Well (WDW) #1, located at the Bloomfield Refinery in Bloomfield, New Mexico. The proposed procedures are in accordance with the United States Environmental Protection Agency (USEPA) 40 FCR 146.13 and the State of New Mexico Fall-Off Guidelines.

#### 1.1 Well Information

Well Name & No.	OCD UIC or	Well Classification	API Number
	Discharge Permit #	: · · · ·	
WDW #1	UIC-CL1-009	Class I Non-	30-045-29002
	GW-130	Hazardous	

#### 2.0 BACKGROUND

#### 2.1 Previous Fall-Off Testing

Western Refining (formally Giant Refining) has conducted fall-off tests annually on WDW-1 using quartz crystal bottom-hole memory gauges. The tests followed EPA guidelines and complied with OCD directives for UIC non-hazardous Class I injection wells.

In July 2006, a build-up/fall-off test was conducted after the well stimulation. The 72 hour build-up portion of the testing was done at a constant injection rate of 70 gallons per minute (gpm). The fall-off portion of the testing was terminated after 84 hours.

In August 2008, an additional test was conducted with a final flowing rate of 80 gpm prior to shutting in the well for a fall-off monitoring duration of 189 hours.

The results of the previous fall-off tests produced measureable results with all flow skin, storage, and linear flow regimes present. The WDW-1 had linear flow at the end of these fall-off tests. Radial flow was not observed. As a result, the calculated permeability based on radial flow equations is not a reliable estimate of injection zone permeability.

#### 2.2 Geology

The injection zones are porous sandstones of the lower portion of the Cliff House formation and the carbonate section of the Menefee formation. These formations occur in Waste Disposal Well #1 at the depths shows in the table below. The injection zones are shown in the attached well log for Waste Disposal Well #1.

	Waste Disposal Well #1			
Injection Zone Formation	KB Elevation = 5545 feet			
	MD below KB (ft)	SS Depth (ft)		
Cliff House	3,276	2,269		
Menefee	3,435	2,110		

The WDW-1 is in a confined low permeability sand interval and historically is not capable of producing a bottom-hole 100 psi differential pressure drop between the final injection and shut-in pressures. Records show that WDW-1 was hydraulically fractured after it was drilled. The 2006, 2008, 2009, and 2010 Fall-Off Test data confirm this with a linear flow regime observed after the end of storage effects.

#### 3.0 SUMMARY OF PROPOSED TESTING ACTIVITES

#### 3.1 Data Research

Before performing the 2011 Fall-Off Test, a one-mile Area of Review (AOR) will be conducted to determine the status of any off-set wells that may be injecting into or producing from the WDW-1 injection interval. If any are found, arrangements will be made with the owners of the wells to monitor the well(s) during the build-up/fall-off test period. Historically there has not been any production or injection in the current injection interval within a one mile radius of WDW-1.

#### 3.2 Summary of Field Activities

The proposed Fall-Off Test is similar to the procedures conducted in years prior. The initial three days of testing activities are considered the "build-up" phase of the test. The Bloomfield Refinery injection well (WDW-1) will be operated at a constant rate for a minimum of 72 hours.

After 24 hours of stable injection, bottom-hole pressure memory gauges will be lowered into the well (two gauges total) and allowed to equalize for a minimum of 48 hours, during which time down-hole pressure readings will be recorded. The memory gauges that will be used are SP-2000 hybrid-quartz gauges provided by Tefteller, Inc. These gauges will have a resolution of 0.01 psi and an accuracy of  $\pm$  0.05% of full scale. The pressure range of the gauges will be from 0-5,000 psi, minimum.

After installation and equalization of the down-hole gauges, the injection well will be blockedin and the pressure down-hole will be monitored using bottom-hole pressure memory gauges. The recording period will be set to record pressures at a minimum of every 5 minutes, with more frequent readings collected during the early part of the fall-off test period.

The amount of time anticipated to monitor down-hole pressures will be approximately three to eight days. After such time as elapsed, the bottom-hole pressure gauges will be pulled from the well, making gradient stops every 1,000 feet. A more detailed listing of activities to be completed is described below.

The fluid that will be used for the injection test is the refinery's brine waste water (effluent). A current waste analysis of the fluid will be included in the final report.

Attachment 1 (Figure 1 from the 2008 fall-off test report) is the well schematic for WDW-1 which is the same as submitted in 2010. Table 1 is a summary of the injection intervals for the well. Table 2 is a summary of the injection fluid analysis. Table 3 is a summary of the formation fluid analysis. A connate water analysis prior to injection was not found in any of the records, therefore the original formation water properties will have to be estimated from offset wells. The majority of the background information can also be found in the permit

application that was submitted to the State of New Mexico Oil Conservation Division for the well on September 10, 1992.

#### 3.3 Chronology of Field Activities

The following is a day-to-day summary of the activities proposed to fulfill the annual Fall-Off Testing requirement for the Bloomfield Refinery injection well (WDW-1).

#### During the Initial 72-hours of Testing (Build-up Phase):

- 1. A stabilized injection rate (approximately 40 gallons per minute) will be established using the Refinery pumps. The optimal injection rate for the three day period will be equivalent to the average injection rate for the prior 30 days of operation. A stable injection rate will be maintained for a minimum of 24-hours before the memory gauges are installed.
- 2. The injection well is equipped with a crown valve. Using a slick-line unit, the tandem memory gauges will be run down-hole through the crown valve and lubricator to 3,250 feet, the top of the injection interval.
- Stable injection of the Refinery's effluent will continue into the well for a minimum of 48 hours following placement of the tandem memory gauges to allow the tandem memory gauges to stabilize. During this time, down-hole pressure readings will be recorded.
- 4. Once the stabilization time for the memory gauges has elapsed, the injection pump will be shut down and the well blocked-in by closing wing valve on the wellhead and in the pump room.

#### Pressure Fall-Off Monitoring:

5. While the well is isolated from service, bottom hole pressure readings will be recorded for a minimum of three days and up to eight days. The recording period will be set to record pressures at a minimum of every 5 minutes, with more frequent readings recorded during the early part of the fall-off test period.

#### Following Down-Hole Monitoring:

- 6. Once the appropriate fall-off monitoring time has elapsed, the memory gauges will be pulled making five minute gradient stops at 3250 ft, 3000 ft, 2000 ft, 1000 ft.
- After the gradient interval pressure readings are collected, the fall-off test is considered complete. The slick line unit will rig down and the well will return to normal operation.

#### 4.0 TESTING REPORT

All background information will be included in the final report, which will include a log of the events (Chronology of Field Activity), a overview of the geology, a current Area-of-Review (AOR) update, fall-off analysis including previous injection data (rate and volume history), gauge calibration certificates, bottom hole pressure analysis, well schematic, electric logs, reservoir fluid description, and injection fluid analysis. The procedure to do the fall-off test will also be included in the final report. If necessary, an AOR update will be included prior to the build-up/fall-off testing to ascertain the offset injection wells current condition.

Historically there has not been any production or injection in the current injection interval within a one mile radius of WDW-1.

#### 4.1 Evaluation of the Test Results

The fall-off and other analysis will be completed by a geologist and/or qualified engineer. The Reservoir Engineer will utilize the standard transient pressure analysis methods and the results will be reviewed for accuracy by a licensed professional engineer (PE). The fall-off analysis will include the following:

- A log-log plot with a derivative diagnostic plot used to identify flow regimes.
- A wellbore storage portion and infinite acting portion of the plot.
- A linear flow plot with wellbore storage, P*, and slope.
- An expanded portion of the linear flow plot showing the infinite acting pressure portion (linear flow).
- The height of the injection interval used for the calculations will be 106 feet (average of 27 feet and 185 feet) unless test data indicate a different interval should be used.
- The viscosity of the formation fluid used for the calculations will be based on historical data.
- A summary of all the equations used for the analysis.
- An explanation of any temperature or pressure anomalous.

The injection records for one year prior to the testing will be included in the analysis.

Well Data Table 1

	WDW - 1				
Tubing	2.875", 7.55 lb/ft, Fluoroline Cement Lined, 3221'				
Packer	5.5"x 2.875", Guiberson Tools, Uni-6, ID 1.87", 3221'				
Perforations	Top of the Cliff House at 3276' 3276' - 3408', 4SPF 0.5 EHD Top of the Menefee at 3400' 3435' - 3460', 4SPF 0.5 EHD				
Protection Casing	5.5", 15.5 lb/ft, 3600"				
Cement Top Protection Casing	Surface				
PBTD / TD	RBP at 3520', Fill Tagged on 4/20/06 at 3325' & cleaned of				
Formation	Cliff House / Menefee				

Injected Brine Waste Water Table 2

Chemical	Refinery Waste	Refinery Waste
Chemicai	Water	Water
Date	March 10, 1998	Sept 27, 2005
Arsenic (mg/L)	0.014	-
Calcium (mg/L)	120	68
Magnesium (mg/L)	39	33
Potassium (mg/L)	27	*
Sodium (mg/L)	920	1659
Chloride (mg/L)	1200	2200
Sulfate (mg/L)	400	708
Alkalinity (CaCO3) (mg/L)	330	100
pH (s.u.)	7.7	8,0
Specific Gravity (g/L)	1.00 - 1.01	1.00 - 1.01

Formation Brine Waste Water Table 3

Chemical	Formation Water
Date.	May 22, 1995
Arsenic (mg/L)	0.023
Cadmium (mg/L)	0.003
Calcium (mg/L)	375
Lead (mg/L)	0.063
Magnesium (mg/L)	99
Potassium (mg/L)	69
Selenium (mg/L)	0.006
Sodium (mg/L)	3610
Chloride (mg/L)	5370
Sulfate (mg/L)	1620
Alkalinity (CaCO3) (mg/L)	306
pH (s.u.)	8.5
Specific Gravity (g/L)	- ·

# **APPENDIX B**



#### COVER LETTER

Thursday, February 03, 2011

Cindy Hurtado Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4161 FAX (505) 632-3911

RE: Injection Well 1st QTR 2011

Dear Cindy Hurtado:

Order No.: 1101665

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 1/20/2011 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites.

Reporting limits are determined by EPA methodology.

Please do not hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Laboratory Manager

NM Lab # NM9425 NM0901 AZ license # AZ0682 ORELAP Lab # NM100001 Texas Lab# T104704424-08-TX



CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1101665

Project:

Injection Well 1st QTR 2011

Lab ID:

1101665-01

Date: 03-Feb-11

Client Sample ID: Injection Well

Collection Date: 1/19/2011 10:45:00 AM

Date Received: 1/20/2011
Matrix: AQUEOUS

Lab 1D: 1101003-01						
Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					سعاب بسخنف اناتده	Analyst: SRM
Chloride	390	25	·	ng/L	50	1/25/2011 9:16:25 PM
Sulfate	<b>9</b> 7	2.5	.1	ng/L	5	1/22/2011 7:32:03 PM
EPA METHOD 7470: MERCURY						Analyst: ELS
Mercury	ND	0.00020	r	ng/L	1	1/27/2011 11:13:34 AM
EPA 6010B: TOTAL RECOVERABLE	METALS					Analyst: RAGS
Arsenic	ND	0.020	r	ng/L	1	1/26/2011 8:43:55 AM
Barlum	0.29	0.020	r	ng/L	1	1/26/2011 8:43:55 AM
Cadmium	ND	0.0020	r	ng/L	. 1	1/26/2011 8:43:55 AM
Calcium	<b>8</b> 5	1.0	· n	ng/L	1	1/26/2011 8:43:55 AM
Chromium	ND	0.0060	n	ng/L	1	1/26/2011 8:43:55 AM
Lead	ND	0.0050	п	ng/L	1	1/26/2011 8:43:55 AM
Magnesium	21	1.0	n	ng/L	1	1/26/2011 8:43:55 AM
Potassium	6.0	1.0	n	ng/L	1	1/26/2011 8:43:55 AM
Selenium	ND	0.050	n	ng/L	1	1/26/2011 8:43:55 AM
Silver	ΝÞ	0.0050	n	ng/L	1	1/26/2011 8:43:55 AM
Sodium	330	5.0	n	ng/L	5	1/26/2011 11:34:42 AM
EPA METHOD 8270C: SEMIVOLATILE	S			,		Analyst: MAW
Acenaphthene	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
Acenaphthylene	ND	· 10	μ	g/L	1	1/25/2011 5:19:39 PM
Aniline	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
Anthracene	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
Azobenzene	ND	• 10	μ	g/L	1	1/25/2011 5:19:39 PM
Benz(a)anthracene	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
Benzo(a)pyrene	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
Benzo(b)fluoranthene	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
Benzo(g,h,i)perylene	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
Benzo(k)fluoranthene	ND	. 10	μ	g/L	1	1/25/2011 5:19:39 PM
Benzoic acid	39	20	μ	g/L	1	1/25/2011 5:19:39 PM
Benzyl alcohol	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
Bis(2-chloroethoxy)methane	ND	10	΄ μ	g/L	1	1/25/2011 5:19:39 PM
Bis(2-chloroethyl)ether	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
Bis(2-chloroisopropyl)ether	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
Bis(2-ethylhexyl)phthalate	13	10	μ	g/L	1	1/25/2011 5:19:39 PM
4-Bromophenyl phenyl ether	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
Butyl benzyl phthalate	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
Carbazole	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
4-Chloro-3-methylphenol	ND	10	μ	g/L	1	1/25/2011 5:19:39 PM
4-Chloroaniline	ND	10	þ	g/L	1	1/25/2011 5:19:39 PM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Date: 03-Feb-11

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1101665

Project:

Injection Well 1st QTR 2011

Lab ID:

1101665-01

Client Sample ID: Injection Well

Collection Date: 1/19/2011 10:45:00 AM

Date Received: 1/20/2011

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLA	TILES	·.··	<del></del>		Analyst: MAV
2-Chloronaphthalene	ND .	10	μ <b>g/L</b>	1	1/25/2011 5:19:39 PM
2-Chlorophenol	ND	10	µg/L	1	1/25/2011 5:19:39 PM
4-Chlorophenyl phenyl ether	ND	10	μg/L	1	1/25/2011 5:19:39 PM
Chrysene	ND	. 10	μg/L	. 1	1/25/2011 5:19:39 PM
DI-n-butyl phthalate	ND	10	μg/L	1	1/25/2011 5:19:39 PM
Di-n-octyl phthalate	, ND	10	µg/L	1	1/25/2011 5:19:39 PM
Dibenz(a,h)anthracene	ND	10	μg/L	1	1/25/2011 5:19:39 PM
Dibenzofuran	ND	10	µg/L	1	1/25/2011 5:19:39 PM
1,2-Dichlorobenzene	ND	10	μg/L	1	1/25/2011 5:19:39 PM
1,3-Dichlorobenzene	. ND	10	μg/L	1	1/25/2011 5:19:39 PM
1,4-Dichlorobenzene	· ND	10	µg/L	1 .	1/25/2011 5:19:39 PM
3,3'-Dichlorobenzidine	ND.	10	μg/L	1	1/25/2011 5:19:39 PM
Diethyl phthalate	. ND	10	μg/L	1	1/25/2011 5:19:39 PM
Dimethyl phthalate	ND	10	μg/L	1	1/25/2011 5:19:39 PM
2,4-Dichlorophenol	ND	20	µg/L	1	1/25/2011 5:19:39 PM
2,4-Dimethylphenol	21	10	μg/L	1	1/25/2011 5:19:39 PM
4,6-Dinitro-2-methylphenol	ND .	20	µg/L	1	1/25/2011 5:19:39.PM
2,4-Dinitrophenol	ND	20	µg/L	1	1/25/2011 5:19:39 PM
2,4-Dinitrotoluene	ND	10	μg/L	1	1/25/2011 5:19:39 PM
2,6-Dinitrotoluene	ND	· 10	μg/L	1	1/25/2011 5:19:39 PM
Fluoranthene	ND	10	µg/L	1	1/25/2011 5:19:39 PM
Fluorene	ND	10	μg/L	1	1/25/2011 5:19:39 PM
Hexachlorobenzene	. ND	10	µg/L	1	1/25/2011 5:19:39 PM
Hexachlorobutadiene	ND	10	μg/L	. 1	1/25/2011 5:19:39 PM
Hexachlorocyclopentadiene	ND	10	µg/L	1	1/25/2011 5:19:39 PM
Hexachloroethane	ND	10	µg/L	1	1/25/2011 5:19:39 PM
Indeno(1,2,3-cd)pyrene	ND	10	μg/L	1	1/25/2011 5:19:39 PM
Isophorone	ND .	10	μg/L	1	1/25/2011 5:19:39 PM
2-Methylnaphthalene	ND	10	μg/L	1	1/25/2011 5:19:39 PM
2-Mathylphenol	27	10	µg/L	1	1/25/2011 5:19:39 PM
3+4-Methylphenol	23	10	µg/L	1	1/25/2011 5:19:39 PM
N-Nitrosodi-n-propylamine	ND	10	µg/L	1	1/25/2011 5:19:39 PM
N-Nitrosodimethylamine	ND	10	μg/L	1	1/25/2011 5:19:39 PM
N-Nitrosodiphenylamine	ND	- 10	µg/L	1	1/25/2011 5:19:39 PM
Naphthalene	ND	10	μg/L ·	1	1/25/2011 5:19:39 PM
2-Nitroaniline	ND	10	µg/L	1	1/25/2011 5:19:39 PM
3-Nitroaniline	ND	10	μg/L	1	1/25/2011 5:19:39 PM
4-Nitroaniline	ND .	20	μg/L	1	1/25/2011 5:19:39 PM
Nitrobenzene	· ND	10	µg/L	1	1/25/2011 5:19:39 PM
2-Nitrophenol	ND	10	μg/L	1	1/25/2011 5:19:39 PM
4-Nitrophenol	ND	10	µg/L	1	1/25/2011 5:19:39 PM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Date: 03-Feb-11

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1101665

Project:

Injection Well 1st QTR 2011

Lab ID:

1101665-01

Client Sample ID: Injection Well

Collection Date: 1/19/2011 10:45:00 AM

Date Received: 1/20/2011 Matrix: AQUEOUS

Analyses	Result	PQL	Qual Un	its	DF	Date Analyzed
<b>EPA METHOD 8270C: SEMIVOLATILES</b>		****				Analyst: MAW
Pentachlorophenol	ND	20	μg/i	L	1	1/25/2011 5:19:39 PM
Phenanthrene	ND	10	μg/		1	1/25/2011 5:19:39 PM
Phenol	19	10	μg/		1	1/25/2011 5:19:39 PM
Pyrene	ND	10	μ <b>g</b> /		1	1/25/2011 5:19:39 PM
Pyridine	ND	10	μg/i	L .	1	1/25/2011 5:19:39 PM
1,2,4-Trichlorobenzene	ND	10	μg/l	L	1	1/25/2011 5:19:39 PM
2,4,5-Trichlorophenol	ND	10	µg/l	L	1	1/25/2011 5:19:39 PM
2,4,6-Trichlorophenol	ND	10	μg/l	Ĺ	1 .	1/25/2011 5:19:39 PM
Surr: 2,4,6-Tribromophenol	72.4	17.5-104	%R	EC	1	1/25/2011 5:19:39 PM
Surr: 2-Fluorobiphenyl	82.6	30.9-98.9	%R	EC	1	1/25/2011 5:19:39 PM
Surr: 2-Fluorophenol	45.3	12.4-90.1	%R	EC	1	1/25/2011 5:19:39 PM
Surr: 4-Terphenyl-d14	65.3	43.5-91.9	%R	EC	1	1/25/2011 5:19:39 PM
Surr: Nitrobenzene-d5	79.6	26.2-108	%R	EC	1	1/25/2011 5:19:39 PM
Surr: Phenol-d5	29.1	11.8-73.1	%R	EC	1	1/25/2011 5:19:39 PM
EPA METHOD 8260B: VOLATILES						Analyst; RAA
Benzene	ND	1.0	μg/l	L	1	1/22/2011 8:35:16 AM
Toluene	ND	1.0	μg/l		1	1/22/2011 6:35:16 AM
Ethylbenzene	ND	1.0	μg/L		1	1/22/2011 6:35:16 AM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L		1	1/22/2011 6:35:16 AM
1,2,4-Trimethylbenzene	ND	1.0	μg/L		1 .	1/22/2011 6:35:16 AM
1,3,5-Trimethylbenzene	ND	1.0	µg/L		1	1/22/2011 6:35:16 AM
1,2-Dichloroethane (EDC)	ND	1.0	μg/L		1	1/22/2011 6:35:16 AM
1,2-Dibromoethane (EDB)	ND	1.0	µg/L		1	1/22/2011 6:35:16 AM
Naphthalene	ND	2.0	µg/L		1	1/22/2011 6:35:16 AM
1-Methylnaphthalene	ND	4.0	μg/L		1	1/22/2011 6:35:16 AM
2-Methylnaphthalene	ND	4.0	μg/L		1	1/22/2011 6:35:16 AM
Acetone	ND	10	µg/L		1	1/22/2011 6:35:16 AM
Bromobenzene	ND	1.0	µg/L	_	1	1/22/2011 6:35:16 AM
Bromodichloromethane	ND	1.0	μg/L		1	1/22/2011 6:35:16 AM
Bromoform	ND	1.0	μg/L	-	1	1/22/2011 6:35:16 AM
Bromomethane	ND	3.0	μg/L		1	1/22/2011 6:35:16 AM
2-Butanone	ND	10	µg/L		1	1/22/2011 6:35:16 AM
Carbon disulfide	ND	10	µg/L		1	1/22/2011 6:35:16 AM
Carbon Tetrachloride	ND	1.0	µg/L		1	1/22/2011 6:35:16 AM
Chlorobenzene	ND	1.0	μg/L		1	1/22/2011 6:35:16 AM
Chloroethane	ND	2.0	µg/L		1	1/22/2011 6:35:16 AM
Chloroform	ND	1.0	μg/L		1	1/22/2011 8:35:16 AM
Chloromethane	ND	3.0	μg/L		1	1/22/2011 6:35:16 AM
2-Chlorotoluene	ND	1.0	μg/L		1	1/22/2011 6:35:16 AM
4-Chiorotoluene	ND	1.0	μg/L		1	1/22/2011 6:35:16 AM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- Analyte detected below quantitation limits
- Non-Chlorinated
- PQL Practical Quantitation Limit

- В Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits  $\boldsymbol{3}$

Page 3 of 7

Date: 03-Feb-11

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1101665

Project:

Injection Well 1st QTR 2011

Lab ID:

1101665-01

Client Sample ID: Injection Well

Collection Date: 1/19/2011 10:45:00 AM

Date Received: 1/20/2011

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Unit	s DF	Date Analyzed
EPA METHOD 8260B: VOLATILES				· · · · · · · · · · · · · · · · · · ·	Analyst: RAA
cls-1,2-DCE	ND	1.0	µg/L	1	1/22/2011 6:35:16 AM
cis-1,3-Dichloropropene	ND	1.0	µg/L	1	1/22/2011 6:35:16 AM
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	1/22/2011 6:35:16 AM
Dibromochloromethane	. ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
Dibromomethane	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
1,2-Dichlorobenzene	, ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
1,3-Dichlorobenzene	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
1,4-Dichlorobenzene	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
Dichlorodifluoromethane	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
1,1-Dichloroethane	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
1,1-Dichloroethene	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
1,2-Dichloropropane	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
1,3-Dichloropropane	ND	1.0	µg/L	. 1	1/22/2011 6:35:16 AM
2,2-Dichloropropane	ND	2.0	μg/L	1	1/22/2011 6:35:16 AM
1,1-Dichloropropena	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
Hexachlorobutadiene	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
2-Hexanone	ND	10	μg/L	1	1/22/2011 6:35:16 AM
Isopropylbenzene	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
4-Isopropyltoluene	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
4-Methyl-2-pentanone	ND	10	μg/L	1	1/22/2011 6:35:16 AM
Methylene Chloride	ND	3.0	μg/L	1	1/22/2011 6:35:16 AM
n-Butylbenzene	ND	1.0	μġ/L	1	1/22/2011 6:35:16 AM
n-Propyibenzene	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
sec-Butylbenzene	ND ND	1.0	μg/L	· 1	1/22/2011 6:35:16 AM
Styrene	ND	1.0	μg/L	. 1	1/22/2011 6:35:16 AM
tert-Butylbenzene	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	1/22/2011 6:35:16 AM
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
trans-1,2-DCE	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
1,2,3-Trichiorobenzene	ND	1.0	μg/L	. 1	1/22/2011 6:35:16 AM
1,2,4-Trichlorobenzene	ND	. 1.0	µg/L	1	1/22/2011 6:35:16 AM
1,1,1-Trichloroethane	ND	1.0	µg/L	1	1/22/2011 6:35:16 AM
1,1,2-Trichloroethane	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
Trichloroethene (TCE)	ND	1.0	μg/L	1	1/22/2011 8:35:16 AM
Trichlorofluoromethane	ND	1.0	μg/Ľ	1	1/22/2011 6:35:18 AM
1,2,3-Trichioropropane	ND	2.0	μg/L	1	1/22/2011 6:35:16 AM
Vinyi chloride	ND	1.0	μg/L	1	1/22/2011 6:35:16 AM
Xylenes, Total	ND	1.5	µg/L	1	1/22/2011 6:35:16 AM
Surr: 1,2-Dichloroethane-d4	108	77.7-113	%REC	1	1/22/2011 6:35:16 AM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
  - S Spike recovery outside accepted recovery limits

Page 4 of 7

Date: 03-Feb-11

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1101665

Project:

Injection Well 1st QTR 2011

Lab ID:

1101665-01

Client Sample ID: Injection Well

Collection Date: 1/19/2011 10:45:00 AM

Date Received: 1/20/2011

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES		100 ft 100 ft 100 ft 100 ft 100 ft 100 ft 100 ft 100 ft 100 ft 100 ft 100 ft 100 ft 100 ft 100 ft 100 ft 100 ft		<del></del>	Analyst: RAA
Surr: 4-Bromofluorobenzene	95.0	76.4-106	%REC	1	1/22/2011 6:35:16 AM
Surr: Dibromofluoromethane	110	91.6-125	%REC	1	1/22/2011 6:35:16 AM
Surr: Toluene-d8	103	92.3-107	%REC	1	1/22/2011 6:35:16 AM
SM 2320B: ALKALINITY					Analyst: IC
Alkalinity, Total (As CaCO3)	290	20	mg/L CaCO3	1	1/25/2011 12:40:00 PM
Carbonate	ND	2.0	mg/L CaCO3	1	1/25/2011 12:40:00 PM
Bicarbonate	290	20	mg/L CaCO3	1	1/25/2011 12:40:00 PM
EPA 120.1: SPECIFIC CONDUCTANCE		,			Analyst: IC
Specific Conductance	2100	0.010	μmhos/cm	1	1/25/2011 12:40:00 PM
SM4500-H+B: PH					Analyst: IC
рН	7.29	0.100	pH units	1	1/25/2011 12:40:00 PM
SM2540C MOD: TOTAL DISSOLVED SOI	LIDS	•			Analyst: KS
Total Dissolved Solids	1300	20.0	mg/L	1	1/26/2011 9:36:00 AM

#### Qualiflers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Date: 03-Feb-11

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1101665

Injection Well 1st QTR 2011

Project: Lab ID:

1101665-02

Client Sample ID: TRIP BLANK

**Collection Date:** 

Date Received: 1/20/2011

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					<del>117 7 1</del>	Analyst: RA
Benzene	ND	1.0	<u> </u>	µg/L	1	1/22/2011 7:01:34 AM
Toluene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
Ethylbenzene	ND	1.0	1	µg/L	1	1/22/2011 7:01:34 AM
Methyl tert-butyl ether (MTBE)	ND	1.0	! 1	µg/Ł	1	1/22/2011 7:01:34 AM
1,2,4-Trimethylbenzene	ND	1.0	a de	μg/L	1	1/22/2011 7:01:34 AM
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
Naphthalene	ND	2.0		µg/L	1	1/22/2011 7:01:34 AM
1-Methylnaphthalene	ND	4.0		µg/L	1	1/22/2011 7:01:34 AM
2-Methylnaphthalene	ND .	4.0		μg/L	1	1/22/2011 7:01:34 AM
Acetone	ND	10		µg/L	1	1/22/2011 7:01:34 AM
Bromobenzene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
Bromodichloromethane	ND	1.0		μg/L	1	1/22/2011 7:01:34 AM
Bromoform	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
Bromomethane	ND	3.0		μg/L	1	1/22/2011 7:01:34 AM
2-Butanone	ND	10		µg/L	1	1/22/2011 7:01:34 AM
Carbon disulfide	ND	10		µg/L	1	1/22/2011 7:01:34 AM
Carbon Tetrachloride	ND	1.0		ug/L	1	1/22/2011 7:01:34 AM
Chlorobenzene	ND	1.0		ug/L	1	1/22/2011 7:01:34 AM
Chloroethane	ND	2.0		ug/L	1	1/22/2011 7:01:34 AM
Chloroform	ND	1.0		ig/L	1	1/22/2011 7:01:34 AM
Chloromethane	ND	3.0		ıg/L	1	1/22/2011 7:01:34 AM
2-Chlorotoluene	ND	1.0		ıg/L	1	1/22/2011 7:01:34 AM
4-Chlorotoluene	ND	1.0		ıg/L	1	1/22/2011 7:01:34 AM
cis-1,2-DCE	ND	1.0		ıg/L	1	1/22/2011 7:01:34 AM
cis-1,3-Dichloropropene	ND	1.0		ıg/L	1	1/22/2011 7:01:34 AM
1,2-Dibromo-3-chloropropane	ND	2.0	•	ıg/L	1	1/22/2011 7:01:34 AM
Dibromochloromethane	ND	1.0	•	ıġ/L	1	1/22/2011 7:01:34 AM
Dibromomethane	ND	1.0		ıg/L	1	. 1/22/2011 7:01:34 AM
1,2-Dichlorobenzene	ND	1.0		ıg/L	1	1/22/2011 7:01:34 AM
1,3-Dichlorobenzene	ND	1.0	-	ig/L	1	1/22/2011 7:01:34 AM
1,4-Dichlorobenzene	ND	1.0		ıg/L	1	1/22/2011 7:01:34 AM
Dichlorodifluoromethane	ND	1,0		ig/L	1	1/22/2011 7:01:34 AM
1,1-Dichloroethane	ND	1.0		ıg/L	1	1/22/2011 7:01:34 AM
1,1-Dichloroethene	ND	1.0		ıg/L	1	1/22/2011 7:01:34 AM
1,2-Dichloropropane	ND	1.0		ıg/L	1	1/22/2011 7:01:34 AM
1,3-Dichloropropane	ND	1.0		ıg/L	1	1/22/2011 7:01:34 AM
2,2-Dichloropropane	ND	2.0		ıg/L	1	1/22/2011 7:01:34 AM
1,1-Dichloropropene	ND	1.0		18/L	1	1/22/2011 7:01:34 AM
Hexachlorobutadiene	ND	1.0		.g/L	1	1/22/2011 7:01:34 AM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Date: 03-Feb-11

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1101665

Project:

Injection Well 1st QTR 2011

Lab ID:

1101665-02

Client Sample ID: TRIP BLANK

**Collection Date:** 

Date Received: 1/20/2011

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: RAA
2-Hexanone	ND	10		µg/L	1	1/22/2011 7:01:34 AM
Isopropylbenzene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
4-Isopropyitoluene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
4-Methyl-2-pentanone	ND	10	,	μg/L	1	1/22/2011 7:01:34 AM
Methylene Chloride	ND	3.0		μg/L	1	1/22/2011 7:01:34 AM
n-Butylbenzene	, ND	1.0		μ <b>g/</b> L	1	1/22/2011 7:01:34 AM
n-Propylbenzene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
sec-Butylbenzene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
Styrene	ND	1.0		µg/Ĺ	1	1/22/2011 7:01:34 AM
tert-Butylbenzene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,1,1,2-Tetrachloroethane	ND	1.0		μg/L	1	1/22/2011 7:01:34 AM
1,1,2,2-Tetrachloroethane	ND	2.0		μg/L	1	1/22/2011 7:01:34 AM
Tetrachloroethene (PCE)	ND	1.0		μg/L	1	1/22/2011 7:01:34 AM
trans-1,2-DCE	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
trans-1,3-Dichloropropene	ND	1.0		μg/L	1	1/22/2011 7:01:34 AM
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,2,4-Trichlorobenzene	ND	1.0		μg/L	1 '	1/22/2011 7:01:34 AM
1,1,1-Trichloroethane	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,1,2-Trichiorcethane	ND	1.0		μg/L	1	1/22/2011 7:01:34 AM
Trichloroethene (TCE)	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
Trichlorofluoromethane	ND	1.0		µg/L	· 1	1/22/2011 7:01:34 AM
1,2,3-Trichloropropane	ND	2.0		µg/L	1	1/22/2011 7:01:34 AM
Vinyl chloride	ND	1.0		μg/L	1	1/22/2011 7:01:34 AM
Xylenes, Total	, ND	1.5		μg/L	1	1/22/2011 7:01:34 AM
Surr: 1,2-Dichloroethane-d4	103	77.7-113		%REC	1	1/22/2011 7:01:34 AM
Surr: 4-Bromofluorobenzene	107	76.4-106	S	%REC	1	1/22/2011 7:01:34 AM
Surr: Dibromofluoromethane	105	91.6-125		%REC	1	1/22/2011 7:01:34 AM
Surr: Toluene-d8	107	92.3-107		%REC	1	1/22/2011 7:01:34 AM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits 7



YOUR LAB OF CHOICE

12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

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Est. 1970

REPORT OF ANALYSIS

January 28, 2011

Anne Thorne Hall Environmental Analysis Laborat 4901 Hawkins NE Albuquerque, NM 87109

22, 2011

ESC Sample # :

Date Received Description

January 1101665

L498524-01

Sample ID

INJECTION WELL

Site ID :

Project # :

Collected By : Collection Date :

01/19/11 10:45

1101665

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Corrosivity	Non-Corrosive			9040C	01/28/11	1
Flashpoint	See Footnote		deg F	D93/1010A	01/24/11	1
Reactive CN (SW846 7.3.3.2)	BDL	0.125	mg/l	9012B	01/27/11	1
Reactive Sulf. (SW846 7.3.4.1)	BDL	25.	mg/l	9034/9030B	01/26/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL) Note:
The reported analytical results relate only to the sample submitted.
This report shall not be reproduced, except in full, without the written approval from ESC.

. Reported: 01/28/11 16:43 Printed: 01/28/11 16:44 L498524-01 (FLASHPOINT) - Did Not Flash @ 170 F

## **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project: Injection Well 1st QTR 2011

Work Order:

1101665

	<u>j</u>				Work Order. 1101003						
Analyte	Result	Units	PQL	SPK Va	d SPK ref	%Rec L	.owLlmit Hi	ighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: A	nions		į į					•	_		
Sample ID: MB		MBLK				Batch ID:	R43288	Analysi	s Date:	1/22/2011	1:11:11 AN
Chloride	ND	mg/L	0.50							-	
Sulfate Sulfate	ND	mg/L	0.50								
Sample ID: MB		MBLK			•	Batch ID:	R43288	Analysi	s Date:	1/22/2011	1:17:47 AN
Chloride	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		MBLK				Batch ID:	R43362	Analysi	s Date:	1/25/2011 1	1:36:07 AN
Sulfate	ND	mg/L	0.50								
Sample ID: MB		MBLK	!			Batch ID:	R43362	Analysi	s Date:	1/25/2011 1	1:19:57 PN
Chloride	ND	mg/L	0.50						·~		
Sulfate	ND	mg/L	0.50								
Sample ID: LCS		LCS	į		•	Batch ID:	R43288	Analysi	s Date:	1/22/2011	1:22:25 AN
Chloride	4.978	mg/L	0.50	5	0	99.6	90	110			
Sulfate	10.06	mg/L	0.50	10	0	101	90	110			
Sample ID: LCS		LCS				Batch ID:	R43288	Analysis	Date:	1/22/2011 1	1:29:01 AN
Chloride	4.991	mg/L	0.50	5	0	99.8	90	110			
Sulfate	10.07	mg/L	0.50	10	0	101	90	110			_
Sample ID: LCS		LCS	i			Batch ID:	R43352	Analysis	Date:	1/25/2011 1	1:47:22 A
Sulfate	10.07	mg/L	0.50	10	0	101	90	110			`
Sample ID: LCS		LCS				Batch ID:	R43352	Analysis	Date:	1/25/2011 1	1:31:11 PM
Chloride	5.066	mg/L	0.50	5	0	101	90	110			
Sulfate	10.19	mg/L	0.50	10	0	102	90	110			
Method: SM 2320B: Alkalinity					,						
sample ID: 1101665-01BMSD		MSD				Batch ID:	R43323	Analysis	Date:	1/25/2011	1:44:00 PM
lkalinity, Total (As CaCO3)	351.0	mg/L Ca	20	80	285.5	81.9	32.8	119	0.772	7.36	
sample ID: MB-1		MBLK	ļ			Batch ID:	R43323	Analysis	Date:	1/25/2011 1	1:23:00 AM
Mkalinity, Total (As CaCO3)	ND	mg/L Ca	20								
arbonate	ND	mg/L Ca	2.0								
licarbonate	ND	mg/L Ca	20								
ample ID: LCS-1		LCS	1			Batch ID:	R43323	Analysis	Date:	1/25/2011 1	1:28:00 AM
Ikalinity, Total (As CaCO3)	80.08	mg/L Ca	20	80	0	100	96.5	104			
ample ID: 1101665-01BMS		MS				Batch ID:	R43323	Analysis	Date:	1/25/2011	1:19:00 PM
lkalinity, Total (As CaCO3)	353.8	mg/L Ca	20	80	285.5	85.3	32.8	119			

Oua	lifiers:

E Estimated value

R RPD outside accepted recovery limits

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

### **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project: Injection Well 1st QTR 2011

Work Order:

1101665

Analyte	Result	Units	PQL	SPK Val SPK ref	%Rec Lo	owLimit Hi	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B	: VOLATILES							<del></del>	<del></del>	
Sample ID: b4	•	MBLK		•	Batch ID:	R43304	Analysi	s Date:	1/21/2011	12:55:40 P
Benzene ·	ND	μg/L	1.0							
Toluene	ND	μg/L	1.0							
Ethylbenzene	ND	μg/L	1.0		'	•				
Methyl tert-butyl ether (MTBE)	ND	μ <b>g/L</b>	1.0						•	
1,2,4-Trimethylbenzene	ND	μg/L	1.0		I	•			•	
1,3,5-Trimethylbenzene	ND	µg/L	1.0							
1,2-Dichloroethane (EDC)	ND	µg/L	1.0	-						
1,2-Dibromoethane (EDB)	ND	μg/L	1.0		· }			•		
Naphthalene	ND	μg/L	2.0		ι ∳					
1-Methylnaphthalene	ND	µg/L	4.0	• ,	r 16 -					
2-Methylnaphthalene	ND	μg/L	4.0		r J					
Acetone	ND	μg/L	10							
Bromobenzene	ND	μg/L	1.0	A Page 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1	b •					
Bromodichloromethane	ND	μg/L	1.0							
Bromoform	ND	µg/L	1.0		!					
Bromomethane	ND	μg/L	3.0	2	3					
2-Butanone	ND	μg/L	10							
on disulfide	ND	μg/L	10		· ·					
oon Tetrachloride	ND	μg/L	1.0							
Chlorobenzene	ND -	μg/L	1.0				•			
Chioroethane	ND	μ <b>g/L</b>	2.0		ı					
Chloroform	ND	μg/L	1.0			,	•			
Chloromethane	ND	μg/L	3.0		í					
2-Chlorotoluene	ND	µg/L	1.0							
1-Chlorotoluene	ND	µg/L	1.0		r L					
cis-1,2-DCE	ND	μg/L	1.0							
cis-1,3-Dichloropropene	ND	µg/L	1.0	•	,					
,2-Dibromo-3-chloropropane	ND	µg/L	2.0		r r	•				•
Dibromochloromethane	ND	µg/L	1.0						i	
Dibromomethane	ND	µg/L	1.0	•	•				•	
,2-Dichlorobenzene	ND	μg/L	1.0						٠	•
,3-Dichlorobenzene	ND	μg/L	1.0		•					
,4-Dichlorobenzene	ND	μg/L	1.0		. ,					
Dichlorodifluoromethane	ND	µg/L	1.0	•						
,1-Dichloroethane	ND	μg/L	1.0				-			
,1-Dichloroethene	ND	μg/L	1.0	•				-		_
,2-Dichloropropane	ND	μg/L	1.0						•	. •
,3-Dichloropropane	ND	μg/L	1.0							
,2-Dichloropropane	ND	μg/L	2.0			•				
,1-Dichloropropene	ND	µg/L	1.0					•		
fexachlorobutadiene	ND	µg/L	1.0			,÷				•
-Hexanone	ND .	hā/r	10							
sopropylbenzene	ND	h8\r	1.0							
propyitoluene	ND	µg/L	1.0							

Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

RPD outside accepted recovery limits

## QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project: Injection Well 1st QTR 2011

Work Order:

1101665

Analyte	Result	Units	PQL	SPK Val SPK ref	%Rec Lo	owLimit Flig	hLimit	%RPD	RPDLimit	Qua!
Method: EPA Method 8260B	: VOLATILES							•	-	
Sample ID: b4		MBLK			Batch ID:	R43304	Analys	is Date:	1/21/2011 1	2:55:40 Pf
4-Methyl-2-pentanone	ND	μg/L	10							
Methylene Chloride	ND	μg/L	3.0							
n-Butylbenzene	ND	μg/L	1.0							
n-Propylbenzene	ND	μg/L	1.0							
sec-Butyibenzene	ND	μg/L	1.0							
Styrene	ND	µg/L	1.0							
tert-Butyibenzene	ND	µg/L	1.0		•					
1,1,1,2-Tetrachloroethane	ND	μg/L	1.0							
1,1,2,2-Tetrachloroethane	ND	μg/L	2.0					٠.		
Tetrachloroethene (PCE)	ND	μg/L	1.0							
trans-1,2-DCE	ND	μg/L	1.0							
trans-1,3-Dichloropropene	- ND	μg/L	1.0							
1,2,3-Trichlorobenzene	ND	μg/L	1.0							
1,2,4-Trichlorobenzene	ND	µg/L	1.0							
1,1,1-Trichloroethane	ND	μg/L	1.0		•					
1,1,2-Trichloroethane	ND	μg/L	1.0							
Frichloroethene (TCE)	ND	μg/L	1.0							
Frichlorofluoromethane	ND	μg/L	1.0							
1,2,3-Trichloropropane	ND	μg/L	2.0							,
Vinyl chloride	ND	µg/L	1.0						)	
Kylenes, Total	ND	μg/L	1.5							
Sample ID: b9		MBLK	į		Batch ID:	R43304	Analysi	s Date:	1/22/2011 12	2:03:48 AN
Benzene	ND	μg/L	1.0				•	•		
Toluene	ND	μg/L	1.0							
Ethylbenzene	ND	μg/L	1.0							
Methyl tert-butyl ether (MTBE)	ND	μg/L	1.0							
1,2,4-Trimethylbenzene	ND	µg/L	1.0							
1,3,5-Trimethylbenzene	ND	μg/L	1.0,							
1,2-Dichloroethane (EDC)	ND	μg/L	1.0 ¹	٠.,					•	
,2-Dibromoethane (EDB)	ND	µg/L	1.0							
Naphthalene	ND	μg/L	2.0							
-Methylnaphthalene	ND	μg/L	4.0							
?-Methylnaphthalene	ND	μg/L	4.0							
Acetone	ND	μg/L	10							
Bromobenzene	ND	µg/L	1.0							
Promodichloromethane	ND	μg/L	1.0							
Bromoform	ND	μg/L	1.0							
Bromomethane	ND	µg/L	3.0							
-Butanone	ND	µg/L	10							
Carbon disulfide	ND	µg/L	10							
Carbon Tetrachloride	ND	µg/L	1.0							
Chlorobenzene	ND	μg/L	1.0							
Chloroethane	ND	µg/L	2.0							
Chloroform	ND	µg/L	1.0							

#### Qualifiers:

R RPD outside accepted recovery limits

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

# Client:

## **QA/QC SUMMARY REPORT**

Western Refining Southwest, Inc.

Project: Injection Well 1st QTR 2011

Work Order:

1101665

Analyte	Result	Units	PQL	SPK Val SPK ref	%Rec Lo	wLimit Hig	hLimit %RPD	RPDLimit Qual
Method: EPA Method 8260B	: VOLATILES	-						
Sample ID: b9		MBLK			Batch ID:	R43304	Analysis Date:	1/22/2011 12:03:48 AN
Chloromethane	ND	μg/L	3.0			,		
2-Chiorotoluene	ND	µg/L	1.0					•
4-Chlorotoluene	ND	µg/L	1.0				•	
cis-1,2-DCE	ND	µg/L	1.0					
cis-1,3-Dichloropropene	ND	µg/L	1.0					
1,2-Dibromo-3-chloropropane	ND	µg/L	2.0				-	, and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second
Dibromochloromethane	ND	µg/L	1.0				•	
Dibromomethane	ND	ha/r	1.0	•				•
1,2-Dichlorobenzene	ND	µg/L	1:0	**				•
1,3-Dichlorobenzene	ND	μg/L	1.0					
1,4-Dichlorobenzene	ND	μg/L	1.0	-				<b>1</b>
Dichlorodifluoromethane	ND	μg/L	1.0			•		+ .*
1,1-Dichloroethane	ND	μg/L	1.0					
1,1-Dichloroethene	ND	μg/L	1.0					
1,2-Dichloropropane	ND	µg/L	1.0				•	•
1,3-Dichloropropane	ND	µg/L	1.0					
2,2-Dichloropropane	ND	μg/L	2.0					
ichloropropene	ND	µg/L	1.0			•		•
chlorobutadiene	ND	μg/L	1.0					
2-Hexanone	ND	µg/L	10					
Isopropylbenzene	ND	μg/L	1.0	•				
4-Isopropyltoluene	ND	µg/L	1.0					
4-Methyl-2-pentanone	ND	μg/L	10				•	
Methylene Chloride	ND	µg/L	3.0					
n-Butylbenzene	ND	µg/L	1.0				·	•
n-Propylbanzene	ND	µg/L	1.0					
sec-Butylbenzene	ND	µg/L	1.0		1			
Styrene	ND	µg/L	1.0		'n			
tert-Butylbenzene	ND	µg/L	1.0		:		•	
1,1,1,2-Tetrachloroethane	ND	µg/L	1.0		,			
1,1,2,2-Tetrachloroethane	ND .	μg/L	2.0		4			
Tetrachloroethene (PCE)	ND	µg/L	1.0				•	
trans-1,2-DCE	ND	µg/L	1.0					
trans-1,3-Dichloropropene	ND	µg/L	1.0	•			,	•
1,2,3-Trichlorobenzene	ND	μg/L	1.0					
1,2,4-Trichlorobenzene	ND	µg/L	1.0		•	•	,	
1,1,1-Trichloroethane	ND	µg/L	1.0					
1,1,2-Trichloroethane	ND	µg/L	1.0					
Trichloroethene (TCE)	ND	µg/L	1.0					
Trichlorofluoromethane	ND	μg/L	1.0					
1,2,3-Trichioropropane	ND	μg/L	2.0	•				
1,2,3-1 richloroproparie Vinyl chloride	ND	µg/L	1.0					
~	ND	μg/L	1.5					
Xylenes, Total	NU	MBLK MBLK	1.0		Batch ID:	R43304	Analysis Date:	1/22/2011 10:56:32 AN
ele ID: b13		WIDLK			waten 12.	1 410004	, manyor base.	

#### Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

RPD outside accepted recovery limits

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project: Injection Well 1st QTR 2011

Work Order:

1101665

Project: injection v	veii ist QIR	ZUII _.					<del></del>	WOLK	Order:	1101665
Analyte	Result	Units	PQL	SPK Val SPK ref	%Rec L	owLimit Hip	ghLimit	%RPD	RPDLimit	Quai
Method: EPA Method 8260B:	VOLATILES									
Sample ID: b13		MBLK			Batch ID:	R43304	Analya	is Date:	1/22/2011 1	0:56:32 AN
Benzene	ND	µg/L	1.0							
Toluene	ND	μg/L	1.0							
Ethylbenzene	ND	µg/L	1.0							
Methyl tert-butyl ether (MTBE)	ND	μg/L	1.0						•	
1,2,4-Trimethylbenzene	ND	μg/L	1.0							
1,3,5-Trimethylbenzene	ND	µg/L	1.0							
1,2-Dichloroethane (EDC)	ND	μg/L	1.0	•						
1,2-Dibromoethane (EDB)	ND	μg/L	1.0							
Naphthalene	ND	μg/L	2.0							
1-Methylnaphthalene	ND	μg/L	4.0							
2-Methylnaphthalene	ND	μg/L	4.0							
Acetone	ND	μg/L	10							
Bromobenzene	ND	μg/L	1.0							
Bromodichioromethane	ND	µg/L	1.0							
Bromoform	ND	µg/L	1.0							
Bromomethane	ND	μg/L μg/L	3.0							
2-Butanone	ND	μg/L	10							
Carbon disulfide	ND		10							4
Carbon Tetrachloride	ND	µg/L								
Chlorobenzene	ND	µg/L	1.0							
Chloroethane		μg/L	1.0							
	ND	µg/L	2.0							
Chloroform	ND	µg/L	1.0							
Chloromethane	ND	µg/L	3.0							
2-Chlorotoluene	ND	µg/L	1.0							
4-Chlorotoluene	ND	µg/L	1.0							
cis-1,2-DCE	ND	μg/L	1.0							
cls-1,3-Dichloropropene	ND	μg/L "	1.0							
1,2-Dibromo-3-chloropropane	ND	μg/L	2.0							
Dibromochloromethane	ND	μg/L	1.0							
Olbromomethane	ND	μg/L	1.0							
1,2-Dichlorobenzene	ND	μg/L "	1.0							•
1,3-Dichlorobenzene	ND	μg/L	1.0							
1,4-Dichlorobenzene	ND	µg/L	1.0	•		•				
Dichlorodifluoromethane	ND	µg/L	1.0							
1,1-Dichloroethane	ND	µg/L	1.0							
,1-Dichloroethene	ND	µg/L	1.0							
,2-Dichloropropane	ND	h@/r	1.0							
,3-Dichloropropane	ND	µg/L	1.0							
2,2-Dichloropropane	ND	µg/L	2.0							
,1-Dichloropropene	ND	µg/L	1.0							
fexachlorobutadiene	ND	µg/L	1.0							
?-Hexanone	ND	µg/L	10							
sopropylbenzene	ND	μg/L	1.0							4
i-laopropyitoluene	ND	µg/L	1.0							

#### Qualifiers:

R RPD outside accepted recovery limits

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated



## **QA/QC SUMMARY REPORT**

Client: Project: Western Refining Southwest, Inc. Injection Well 1st QTR 2011

Work Order:

1101665

Analyte	Result	Units	PQL	SPK Val	SPK ref	%Rec i	_owLimit Hi	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260	B: VOLATILES		<del></del>			P r		. •	·		
Sample ID: b13		MBLK				Batch ID:	R43304	Anaiysi	B Date:	1/22/2011 1	0:56:32 AN
4-Methyl-2-pentanone	ND	μg/L	10			ŀ					
Methylene Chloride	ND	µg/L	3.0								
n-Butylbenzene	ND	μg/L	1.0			1			•		
n-Propylbenzene	ND	µg/L	1.0					•			
sec-Butylbenzene	ND	μg/L	1.0	:							÷*
Styrene	ND	μg/L	1.0			1			*	*	
tert-Butylbenzene	ΝĎ	μg/L	1.0		٠.						*
1,1,1,2-Tetrachloroethane	ND	μg/L	1.0								
1,1,2,2-Tetrachloroethane	ND	μg/L	2.0			į					• •
Tetrachloroethene (PCE)	ND	μg/L	1.0							•	
trans-1,2-DCE	ND	μg/L	1.0			*		•			
trans-1,3-Dichloropropene	ND	μg/L	1.0								
1,2,3-Trichlorobenzene	ND	µg/L	1.0	₂ **		if Ir	*				
1,2,4-Trichlorobenzene	ND	µg/L	1.0	. ,	ter,	*		•			•
1,1,1-Trichloroethane	ND -	μg/L	1.0			P					. •
1,1,2-Trichloroethane	ND	µg/L	1.0			4	-				
Trichloroethene (TCE)	, ND	µg/L	1.0	\				٠.		,	
orofluoromethane	ND	µg/L	1.0			1	•				•
1,∠,3-Trichloropropane	ND	μg/L	2.0		,	h		•	4		
Vinyl chloride	ND	µg/L	1.0			.1	•	•			
Xylenes, Total	ND	μg/L	1.5				•				
Sample ID: 100ng ics		LCS				Batch ID:	R43304	Analysis	Date:	1/21/2011	2:32:43 PM
Benzene	19.24	μg/L	1.0	20	0	96.2	84.6	109		•	÷ .
Toluene	22.01	μg/L	1.0	20	0	110	81	114			
Chlorobenzene	21.42	μg/L	1.0	20	0	107	85.2	113			
1,1-Dichloroethene	18.24	μg/L	1.0	20	0	91.2	79.6	124			
Trichloroethene (TCE)	20.09	µg/L	1.0	20	0	100	78.3	102		•	
Sample ID: 100ng Ics2		LCS				Batch ID:	R43304	Analysis	Date:	1/22/2011 1:	2:56:19 AM
Benzene	20.09	µg/L	1.0	20	0	100	84.6	109			
Toluene	20.23	μg/L	1.0	20	0	101	81	114		•	
Chlorobenzene	20.20	μg/L	1.0	20	0	101	85.2	113			
1,1-Dichloroethene	19.08	µg/L	1.0	20	0	95.4	79.6	124	٠.		.,
Trichloroethene (TCE)	20.02	μg/L	1.0	20	0	100	78.3	102	•		



E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project: Injection Well 1st QTR 2011

Work Order:

1101665

	ojeci. Injecticii Woli 13t Q1K 2011					·			Order:	1101002
Analyte	Result	Units	PQL	SPK·Val SPK ref	%Rec Lo	wLimit Hig	hLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C	: Semivolatiles	1							1	
Sample ID: mb-25369		MBLK			Batch ID:	25369	Analys	is Date:	1/25/2011	3:52:27 PI
Acenaphthene	ND	μg/L	10							
Acenaphthylene	ND	µg/L	10							
Anlline	ND	µg/L	10							
Anthracene	ND ·	μg/L	10	•						
Azobenzene	ND	μg/L	10							
Benz(a)anthracene	ND	μg/L	10							
Benzo(a)pyrene	. ND	μg/L	10			_				
Benzo(b)fluoranthene	ND	μg/L	10			-				
Benzo(g,h,i)perylene	ND	µg/L	10							
Benzo(k)fluoranthene	ND	µg/L	10							
Benzoic acid	ND	µg/L	20						•	
Benzyl alcohol	ND .	µg/L	10				,			
Bis(2-chloroethoxy)methane	ND	µg/L	10							
Bis(2-chloroethyl)ether	ND	μg/L	10			·				
Bis(2-chloroisopropyl)ether	ND	μg/L	10							
Bis(2-ethylhexyl)phthalate	ND	μg/L	10							
4-Bromophenyl phenyl ether	ND	µg/L	. 10							
Butyl benzyl phthalate	NĐ	μg/L	10							
Carbazole	ND	μg/L	10							
4-Chloro-3-methylphenol	ND	μg/L	10				,			
4-Chloroaniline	ND	µg/L	10							:
2-Chloronaphthalene	ND	µg/L	10							
2-Chlorophenol	ND	μg/L	10							
4-Chlorophenyl phenyl ether	ND	μg/L	10							
Chrysene	ND	µg/L	10	•						
Di-n-butyl phthalate	ND	μg/L	10							
Di-n-octyl phthalate	ND	µg/L	10	•						
Dibenz(a,h)anthracene	ND	μg/L	10							
Dibenzofuran	ND	μg/L	10							
1,2-Dichlorobenzeле	ND	μg/L	10							
1,3-Dichlorobenzene	ND	μg/L	10							
1,4-Dichlorobenzene	ND	μg/L	10							
3,3'-Dichlorobenzidine	ND	µg/L	10	•						
Diethyl phthalate	ND	μg/L	10	,						
Dimethyl phthalate	ND	µg/L	10							
2,4-Dichlorophenol	ND	µg/L	20							
2,4-Dimethylphenol	ND	μg/L	10							
1,6-Dinitro-2-methylphenol	ND	μg/L	20							
2,4-Dinitrophenol	ND	μg/L	20							
2,4-Dinitrotoluene	ND	μg/L	10							
2,6-Dinitrotoluene	ND .	μg/L	10		•					
-luoranthene	ND	μg/L	10							
Fluorene	ND	µg/L	10							
lexachlorobenzene	ND	µg/L	10							

#### Qualifiers:

RPD outside accepted recovery limits

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated



## **QA/QC SUMMARY REPORT**

Client: Project: Western Refining Southwest, Inc.

et: Injection Well 1st QTR 2011

Work Order:

1101665

Analyte	Result	Units	PQL	SPK Val S	SPK ref	%Rec L	owLimit H	ighLimit	%RPD	<b>RPDLimit</b>	Qual
Method: EPA Method 8270C:	Semiyolatile		<del> </del>				****				,
Sample ID: mb-25369	Jenny Jiathe	MBLK				Batch ID:	25369	Analysi	s Date:	1/25/2011	3:52:27 PN
Hexachlorobutadiene	ND -	µg/L	10								
Hexachlorocyclopentadiene	ND	μg/L	10							•,	
Hexachloroethane	ND	h8/F	10			•					•
Indeno(1,2,3-cd)pyrene	ND	µg/L	10			4		: '			•
sophorone	ND	µg/L	10	•							•
2-Methylnaphthalene	ND	hg/L	10	,			1				
2-Methylphenol	ND	μg/L	10			•					
3+4-Methylphenol	ND	μg/L	10			* .					
N-Nitrosodi-n-propylamine	ND	µg/L	10								
N-Nitrosodimethylamine	ND	μg/L	10								
N-Nitrosodiphenylamine	ND	μg/L	10								
Vaphthalene	ND	μg/L	10					_			
2-Nitroaniline	ND	μg/Ľ	10	,	•					4.	
3-Nitroaniline	ND	μg/L	10								
1-Nitroaniline	ND	μg/L	20	ř	•	£					
Nitrobenzene	ND	µg/L µg/L	10							•	
Nitrophenol	ND	μg/L	10								
rophenol	ND		10							•	
entachlorophenol	. ND	μg/L	20			ŧ					**
Phenanthrene	ND	µg/L µg/L	10					•			
Phenol	ND	μg/L	10		•		•	•			
Pyrene	ND	μg/L μg/L	10								
Pyridine	ND	μg/L μg/L	10								
,2,4-Trichlorobenzene	ND	μg/L	10				•				
2,4,5-Trichlorophenol	ND ND	μg/L μg/L	10					•	*		
2,4,6-Trichlorophenol	ND	μg/L	10								
Sample ID: Ics-26369	, AD	LCS				Batch ID:	25369	Analysis	Date:	1/25/2011 4	-21-38 DA
·	44.00		40	400			31	99.4	Date.	1/20/20114	7.21.30 FN
Acenaphthene I-Chloro-3-methylphenol	44.26 84.46	μg/L	10 10	100 200	0	44.3 42.2	34.3	99.4 111			•
P-Chiorophenol	76.22	μg/L	10	200	. 0	38.1	24.1	98.7			
.4-Dichlorobenzene	36.10	µg/L µg/L :	10	100	0	36.1	20.6	85.6			
2,4-Dinitrotoluene	37.96	hâ\r hâ\r	10	100	0	38.0	26.6	126			
V-Nitrosodi-n-propylamine	38.32	μg/L	10	100	0	38.3	29.2	94.4			
-Nitrophenol	55.14	μg/L	10	200	. 0	27.6	9.87	86			
Pentachlorophenol	93.44	μg/L	20	200	Ō	46.7	20	97.8	.`		
henol	55.62	μg/L	10	200	0	27.8	17.5	60.5			
Pyrene	51.74	μg/L	10	.100	0	51.7	46.8	92.2			
,2,4-Trichlorobenzene	40.72	μg/L	10	100	0	40.7	25.2	92.3			
Sample ID: Icsd-25369	70.12	LCSD		. 100	J	Batch ID:	25369	Analysis	Date:	1/25/2011 4	50:41 PN:
cenaphthene	45.20	μg/L	10	100	. 0	45.2	31	99.4	2.10	30	
-Chloro-3-methylphenol	45.20 87.78		10	200	. 0	45.2 43.9	34:3	111	3.86	30.8	
-Chioro-3-methylphenol -Chiorophenol		µg/L				43. <del>9</del> 46.2	, ·		19.3		
~CHROIODHBHOI	92.46	µg/L	10	200	0		24.1	98.7		31	
Dichlorobenzene	38.32	μg/L	10	100	0	38.3	20.6	85.6	5.97	37	

### Qualifiers:

R RPD outside accepted recovery limits

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

## **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project: Injection Well 1st QTR 2011

Work Order:

1101665

PA Method 82700 lcsd-25369 propylamine	Result C: Semivolatiles	Units	PQL	SPK Val	SPK ref	%Rec L	owLimit H	ighLlmit	%RPD	RPDLimit	Qual
csd-25369	C: Semivolatiles		1								
propylamine		LCSD				Batch ID:	25369	Analysi	s Date:	1/25/2011	4:50:41 PM
	42.46	μg/L	· 10	100	0	42.5	29.2	.94.4	10.3	30.8	
	59.42	μg/L	10	200	0	29.7	9.87	86	7.47	61.1	
nenol	96.82	µg/L	20	200	O	48.4	20	97.8	3.55	64.8	
	58.76	µg/L	10	200	0	29.4	17.5	60.5	5.49	31.4	
	59.08	μg/L	10	100	0	59.1	46.8	92.2	13.2	29.8	
benzene	39.92	µg/L	10	100	0	39.9	25.2	92.3	1.98	30.9	
	Mercury										
MB-25427		MBLK				Batch ID:	25427	Analysi	s Date:	1/27/2011 10	):48:28 AM
	ND	mg/L	0.00020	•							
CS-25427		LCS	,			Batch ID:	25427	Analysi	B Date:	1/27/2011 10	):50:12 AM
	0.005109	ma/L	0.00020	0.005	n	102	80	120			
CS-25427		-			·				s Date:	1/27/2011 10	):51:57 AM
	0.005114		0.00020	0.005	0			-			
DA ROADBI Tatal D					<u>_</u>			<u>-</u> -		·····	
	Geçoverable iylet					Betch ID:	25356	Analysis	s Date:	1/26/2011	1·38·10 AM
1	ND		0.000			Daton ID.	20000	, utalyon	J Dato.	HEUROTT	7.00.10 AW
	•	_	i								
	•										
				•							
		•	1					•			
		-	1								
		_	1								
		_	1								
			1							•	
1B-25356		_	0.000			Batch ID:	25356	Analysis	Date:	1/26/2011 11	:06:34 AM
	ND		1.0								
CS-25356		LCS				Batch ID:	25356	Analysis	Date:	1/26/2011 8	:41:12 AM
	0.5694	mg/L	0.020	0.5	0	114	80	120		•	
	0.4957	-	0.020		•						
	0.5312										
	53.20	_	1.0		0		80				
	0.5292	_			0						
	0.5321	mg/L	0.0050		0						
	53.35	mg/L	1.0	50	0	107	80	120			
	55.66	mg/L	1.0	50	0	111	80	120			
	0.5858	mg/L	0.050	0.5	0	117	. 80	120			
	0.5104	mg/L	0.0050	0.5			80	120			
CS-25356		LCS				Batch ID:	25356		Date:	1/26/2011 11	09:57 AM
•	51.06		1.0	50	0	102	80	-			
	MB-25427 LCS-25427 LCS-25427	Denzene 39.92  PA Method 7470: Mercury MB-25427  ND LCS-25427  0.005109 LCS-26427  0.005114  PA 6010B: Total Recoverable Met MB-25356  ND ND ND ND ND ND ND ND ND ND ND ND ND	PA Method 7470: Mercury   MB-25427   MBLK   ND   mg/L   LCS   0.005109   mg/L   LCS   0.005114   mg/L   LCS   0.005114   mg/L   MB-26356   MBLK   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   mg/L   ND   ND   mg/L   ND   ND   mg/L   ND   ND   ND   ND   ND   ND   ND   N	Debarage   39.92   μg/L   10   PA Method 7470: Mercury   MB-25427   MBLK   ND   mg/L   0.00020   LCS-25427   LCS   0.005109   mg/L   0.00020   LCS-25427   LCS   0.005114   mg/L   0.00020   PA 6010B: Total Recoverable Metals   MBLK   ND   mg/L   0.020   ND   mg/L   0.020   ND   mg/L   0.020   ND   mg/L   0.0050   ND   mg/L   1.0   ND   mg/L   1.0   ND   mg/L   1.0   ND   mg/L   1.0   ND   mg/L   1.0   ND   mg/L   0.0050   ND   mg/L   0.0050   ND   mg/L   0.0050   ND   mg/L   0.0050   ND   mg/L   0.0050   ND   mg/L   0.0050   ND   mg/L   0.0050   ND   mg/L   0.0020   0.5312   mg/L   0.0020   0.5321   mg/L   0.0020   0.5321   mg/L   0.0050   0.5321   mg/L   0.0050   0.5321   mg/L   0.0050   0.5321   mg/L   0.0050   0.5321   mg/L   0.0050   0.5321   mg/L   0.0050   0.5321   mg/L   0.0050   0.5321   mg/L   0.0050   0.5325   mg/L   0.0050   0.5858   mg/L   0.0050   0.5858   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.0050   0.5104   mg/L   0.005	Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific   Specific	Spenzene   39.92   µg/L   10   100   0	Debanzene   39.92   pg/L   10   100   0   39.9	Debato   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   Septemb	Debanzene   39.92   µg/L   10   100   0   39.9   25.2   92.3     PA Method 7470: Mercury   MB_K   Batch ID:   25427   Analysis     ND   mg/L   0.00020   0.005   0   102   80   120     LCS   Batch ID:   25427   Analysis     LCS-26427   LCS   Batch ID:   25427   Analysis     LCS-26427   LCS   Batch ID:   25427   Analysis     LCS-26427   LCS   Batch ID:   25427   Analysis     LCS-26427   LCS   Batch ID:   25427   Analysis     LCS-26427   LCS   Batch ID:   25427   Analysis     LCS-26427   LCS   Batch ID:   25427   Analysis     LCS-26427   LCS   Batch ID:   25427   Analysis     LCS-26427   LCS   Batch ID:   25427   Analysis     LCS-26427   LCS   Batch ID:   25356   Analysis     PA 6010B: Total Recoverable Metals   MBLK   Batch ID:   25356   Analysis     MB-26356   MBLK   Batch ID:   25356   Analysis     ND mg/L 0.0020   ND mg/L 0.0050   ND mg/L 0.0050     ND mg/L 0.0050   ND mg/L 0.0050   ND mg/L 0.0050     ND mg/L 0.0050   MBLK   Batch ID:   25356   Analysis     Analysis   LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   Batch ID:   25356   Analysis     LCS   B	Debanzene   39.92   µg/L   10   100   0   39.9   25.2   92.3   1.98     PA Method 7470: Mercury   MBLK	### PAMethod 7470: Mercury ####################################

#### Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

ient:

Western Refining Southwest, Inc.

Project:

Injection Well 1st QTR 2011

Work Order:

1101665

A alut-	Danill	A 8 14		000000000000000000000000000000000000000	0/2 1		- Name of DDD	DDDI (mil) Over
Analyte	Result	Units	PQL	SPK Val SPK ref	%Rec Lo	wLimit Hig	hLimit %RPD	RPDLimit Qual
Method: SM2540C MOD: To	otal Dissolved S	Bolids						
Sample ID: MB-25352		MBLK			Batch ID:	25352	Analysis Date:	1/26/2011 9:38:00 AM
Total Dissolved Solids	ND	mg/i.	20.0	j.				•
Sample ID: LCS-25352		LCS		ì	Batch ID:	25352	Analysis Date:	1/26/2011 9:36:00 AM
Total Dissolved Solids	1020	mg/L	20.0	1000 11	101	80	120	



E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

Client Name WESTERN REFINING SOUT

### Sample Receipt Checklist

Date Received:

1/20/2011

Checklist completed by Signature	Sample ID labels checked by:
Matrix: Carrier name: UPS	
Shipping container/cooler in good condition? Yes ✓	No Not Present
Custody seals intact on shipping container/cooler?	No Not Present Not Shipped
Custody seals intact on sample bottles?	No N/A ✓
Chain of custody present? Yes ✓	No
Chain of custody signed when relinquished and received?	. No
Chain of custody agrees with sample labels? Yes ✔	No ·
Samples in proper container/bottle? Yes ✔	No
Sample containers intact? Yes ✔	No
Sufficient sample volume for indicated test? Yes ✔	No
All samples received within holding time? Yes ✓	No Number of preserved
Water - VOA vials have zero headspace? No VOA vials submitted	bottles checked for Yes V No pH:
Water - Preservation labels on bottle and cap match? Yes ❤	NO N/A J. N
Water - pH acceptable upon receipt? Yes ✔	No N/A (<2) 72 unless noted
Container/Temp Blank temperature? 1.1°	<6° C Acceptable
COMMENTS:	If given sufficient time to cool.
·	
Client contacted Date contacted:	Person contacted
Contacted by: Regarding:	
Comments:	

Corrective Action

Air Bubbles (Y or M) **ANALYSIS LABORATORY** HALL ENVIRONMENTAL if necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report. LIPISAMO) Š 4901 Hawkins NE - Albuquerque, NM 87109 Fax 505-345-4107 ₹ Y (AOV-ima2) 07S8  $\prec$ www.hallenvironmental.com **Analysis Request** ∠ (AOV) 80828 8081 Pesticides / 8082 PCB's Anions (F,CI,NO3,NO2,PO4,SO4) RCRA 8 Metals X Tel. 505-345-3975 (HA9 10 AN9) 01:E8 SACK UP X (GasiQ\ss&) 43 f 08 bodfeM H97 Remarks: BTEX + MTBE + TPH (Gas only) BTEX + MTBE + TMB's (8021) INJECTION Well 1st OTR 2011 2011 1100 Time □ Rush Preservative -500ml 2m Acetal -50m H2804 Na OH Anber -58m H NO2 Sample Temperature: **望** Turn-Around Time: Project Manager: Project Name: X Standard -500ml On Ice 1-1iter Type and # - 500A Container 1-500m Sampler: 3-16A Project #: Received by <u>ح</u> Level 4 (Full Validation) Sample Request ID INJECTION WELL ank Chargof-Custody Record - Bloomfreld, NM 874/3 email or Fax#: 505-633-39// Client Western Refining Mailing Address: 50 CR 4990 Phone #: 55,5-632- 4/6/ Relinquished by: Relinquished by: Other O Matrix 1/10;45 H2O 1-19-11/3:00 Time QA/QC Package: □ EDD (Type) Accreditation Time: 区 Standard □ NELAP Date

7



#### **COVER LETTER**

Wednesday, April 20, 2011

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4161 FAX (505) 632-3911

RE: Injection Well 2nd QTR 4-11

Dear Kelly Robinson:

Order No.: 1104184

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 4/5/2011 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag.

Please do not hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Laboratory Manager

NM Lab # NM9425 NM0901 AZ license # AZ0682 ORELAP Lab # NM100001 Texas Lab# T104704424-08-TX



Date: 20-Apr-11

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1104184

Project:

Injection Well 2nd QTR 4-11

Lab ID:

1104184-01

Client Sample ID: Injection Well

Collection Date: 4/4/2011 12:45:00 PM

Date Received: 4/5/2011

Matrix: AQUEOUS

					r			
Analyses	Result	PQL	Qual Units	DF	Date Analyzed			
EPA METHOD 300.0: ANIONS	·			والمستجد المستحد المستحد المستحد المستحد المستحد المستحد المستحد المستحد المستحد المستحد المستحد المستحد المستحد	Analyst: SRM			
Chloride	900	50	mg/L	100 -	4/9/2011 2:09:24 PM			
Sulfate	110	2.5	mg/L	5	4/6/2011 11:05:42 AM			
EPA METHOD 7470: MERCURY					Analyst: TES			
Mercury	0.00053	0.00020	mg/L	1	4/15/2011 2:45:08 PM			
EPA 6010B: TOTAL RECOVERABLE	METALS	••			Analyst: RAGS			
Arsenic	ND	0.020	mg/L	1	4/15/2011 11:04:28 AM			
Barium	0.40	0.020	mg/L	1	4/15/2011 11:04:28 AM			
Cadmium	ND	0.0020	mg/L	1	4/15/2011 11:04:28 AM			
Calcium	140	5.0	mg/L	5	4/13/2011 3:53:35 PM			
Chromium	0.0079	0.0060	mg/L	1	4/15/2011 11:04:28 AM			
Lead	ND	0.0050	mg/L	. 1	4/15/2011 11:04:28 AM			
Magnesium	33	1.0	mg/L	1	4/15/2011 11:04:28 AM			
Potassium	9.4	1.0	mg/L	1	4/15/2011 11:04:28 AM			
Selenium	ND	0.050	mg/L	1	4/15/2011 11:04:28 AM			
Silver	ND	0.0050	mg/L	1	4/15/2011 11:04:28 AM			
Sodium	530	10	mg/L	. 10	4/15/2011 11:17:21 AM			
EPA METHOD 8270C: SEMIVOLATIL	ES				Analyst: JDC			
Acenaphthene	ND	10	μg/L	1	4/14/2011 6.58:21 PM			
Acenaphthylene	ND	10	μg/L	1	4/14/2011 6:58:21 PM			
Anlline	ND	10	μg/L	1	4/14/2011 6:58:21 PM			
Anthracene	ND	10	μg/L	1	4/14/2011 6:58:21 PM			
Azobenzene	ND	10	µg/L	1	4/14/2011 6:58:21 PM			
Benz(a)anthracene	ND	10	μg/L	1	4/14/2011 6:58:21 PM			
Benzo(a)pyrene	ND	10	μg/L	1	4/14/2011 6:58:21 PM			
Benzo(b)fluoranthene	ND	10	μg/L	11	4/14/2011 6:58:21 PM			
Benzo(g,h,i)perylene	ND	10	μg/L	1	4/14/2011 6:58:21 PM			
Benzo(k)fluoranthene	ND	10	μg/L	1	4/14/2011 6:58:21 PM			
Benzoic acid	20	20	μg/L	, 1	4/14/2011 6:58:21 PM			
Benzyi alcohol	ND	10	μg/L	1 .	4/14/2011 6:58:21 PM			
Bis(2-chloroethoxy)methane	ПN	10	μg/L	1	4/14/2011 6:58:21 PM			
Bis(2-chloroethyl)ether	ND	10	μg/L	1	4/14/2011 6:58:21 PM			
Bis(2-chloroisopropyl)ether	ND	10	μg/L	1 .	4/14/2011 6:58:21 PM			
Bis(2-ethylhexyl)phthalate	13	10	μg/L	1	4/14/2011 6:58:21 PM			
4-Bromophenyl phenyl ether	ND	10	μg/L	1	4/14/2011 6:58:21 PM			
Butyl benzyl phthalate	ND	10	μg/L	1	4/14/2011 6:58:21 PM			
Carbazole	ND	10	μg/L	· 1	4/14/2011 6:58:21 PM			
4-Chloro-3-methylphenol	ND	10	μg/L	1	4/14/2011 6:58:21 PM			
4-Chloroaniline	ND	10	μg/L	1	4/14/2011 6:58:21 PM			
	i							

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 1 of 7

Date: 20-Apr-11

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1104184

Project:

Injection Well 2nd QTR 4-11

Lab ID:

1104184-01

Client Sample ID: Injection Well

Collection Date: 4/4/2011 12:45:00 PM

Date Received: 4/5/2011

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
PA METHOD 8270C: SEMIVOLATIL	.ES				Analyst: JD0
2-Chloronaphthalene	ND	10	μg/L	1	4/14/2011 6:58:21 PM
2-Chlorophenol	ND	10	μg/L	1	4/14/2011 6:58:21 PM
4-Chlorophenyl phenyl ether	ND	10	. µg/L	1	4/14/2011 6:58:21 PM
Chrysene	ND	10	μg/L	1	4/14/2011 6:58:21 PM
Di-n-butyl phthalate	ND	10	µg/L	1	4/14/2011 6:58:21 PM
Di-n-octyl phthalate	ND	10	µg/L	1	4/14/2011 6:58:21 PM
Dibenz(a,h)anthracene	ND	10	µg/L	· 1	4/14/2011 6:58:21 PM
Dibenzofuran	ND	10	μg/L	1	4/14/2011 6:58:21 PM
1,2-Dichlorobenzene	ND ·	10	μg/L	1	4/14/2011 6:58:21 PM
1,3-Dichlorobenzene	ND	10	μg/L	1	4/14/2011 6:58:21 PM
1,4-Dichlorobenzene	ND	10	μg/L	1	4/14/2011 6:58:21 PM
3,3'-Dichlorobenzidine	ND	10	µg/L	1	4/14/2011 6:58:21 PM
Diethyl phthalate	ND	10	μg/L	1	4/14/2011 6:58:21 PM
Dimethyl phthalate	ND	10	µg/L	1	4/14/2011 6:58:21 PM
2,4-Dichlorophenol	ND	20	μg/L	1	4/14/2011 6:58:21 PM
2,4-Dimethylphenol	ND	10	μg/L	1	4/14/2011 6:58:21 PM
4,6-Dinitro-2-methylphenol	ND	20	μg/L	1	4/14/2011 6:58:21 PM
2,4-Dinitrophenol	ND	20	μg/L	1 .	4/14/2011 6:58:21 PM
2,4-Dinitrotoluene	ND	10	µg/L	·1	4/14/2011 6:58:21 PM
2,6-Dinitrotoluene	ND	10	μg/L	1	4/14/2011 6:58:21 PM
Fluoranthene	ND	10	μg/L	1	4/14/2011 6:58:21 PM
Fluorene	ND '	10	μg/L	1	4/14/2011 6:58:21 PM
Hexachlorobenzene	ND	10	μg/L	1	4/14/2011 6:58:21 PM
Hexachlorobutadiene	ND	10	µg/L	1	4/14/2011 6:58:21 PM
Hexachlorocyclopentadlene	ND	10	μg/L	1	4/14/2011 6:58:21 PM
Hexachloroethane	ND	10	μg/L	1	4/14/2011 6:58:21 PM
Indeno(1,2,3-cd)pyrene	ND	10	μg/L	1	4/14/2011 6:58:21 PM
Isophorone .	ND	10	μg/L	1	4/14/2011 6:58:21 PM
2-Methylnaphthalene	ND	10	µg/L	1	4/14/2011 6:58:21 PM
2-Methylphenol	26	10	µg/L	1	4/14/2011 6:58:21 PM
3+4-Methylphenol	72	10	µg/L	1	4/14/2011 6:58:21 PM
N-Nitrosodi-n-propylamine	ND	10	μg/L	1	4/14/2011 6:58:21 PM
N-Nitrosodimethylamine	ND	10	μg/L	1	4/14/2011 6:58:21 PM
N-Nitrosodiphenylamine	ND	10	µg/L	1	4/14/2011 6:58:21 PM
Naphthalene	ND	10	μg/L	1	4/14/2011 6:58:21 PM
2-Nitroaniline	ND	10	µg/L	1	4/14/2011 6:58:21 PM
3-Nitroaniline	ND	10	µg/L	1	4/14/2011 6:58:21 PM
I-Nitroaniline	ND	20	µg/L	1	4/14/2011 6:58:21 PM
Vitrobenzene	ND	10	µg/L	1	4/14/2011 6:58:21 PM
2-Nitrophenoi	ND	10	µg/L	1	4/14/2011 6:58:21 PM
4-Nitrophenol	ND	10	µg/L	1	4/14/2011 6:58:21 PM

#### Qualiflers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 2 of 7

Western Refining Southwest, Inc.

Lab Order:

1104184

Project: Injection Well 2nd QTR 4-11

Lab ID:

CLIENT:

1104184-01

Date: 20-Apr-11

Client Sample ID: Injection Well

Collection Date: 4/4/2011 12:45:00 PM

Date Received: 4/5/2011

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
<b>EPA METHOD 8270C: SEMIVOLATILES</b>	;			<del></del>	Analyst: JDC
Pentachlorophenol	. ND	20	μg/L	1	4/14/2011 6:58:21 PM
Phenanthrene	ND	10	µg/L	1	4/14/2011 6:58:21 PM
Phenol	13	10	µg/L	1	4/14/2011 6:58:21 PM
Pyrene	ND	10	· µg/L	1	4/14/2011 6:58:21 PM
Pyridine	ND	10	µg/L	1	4/14/2011 6:58:21 PM
1,2,4-Trichlorobenzene	ND	10	μg/L	1	4/14/2011 6:58:21 PM
2,4,5-Trichlorophenol	ND	10	μg/L	1	4/14/2011 6:58:21 PM
2,4,6-Trichlorophenol	ND	10	μg/L	1	4/14/2011 6:58:21 PM
Surr: 2,4,6-Tribromophenol	72.4	17.5-104	%REC	1	4/14/2011 6:58:21 PM
Surr: 2-Fluorobiphenyl	57.2	30.9-98.9	%REC	1	4/14/2011 6:58:21 PM
Surr: 2-Fluorophenol	49.7	12.4-90.1	%REC	1	4/14/2011 6:58:21 PM
Surr: 4-Terphenyl-d14	51.9	43.5-91.9	%REC	1	4/14/2011 6:58:21 PM
Surr: Nitrobenzene-d5	55.5	26.2-108	%REC	1	4/14/2011 6:58:21 PM
Surr: Phenol-d5	43.8	11.8-73.1	%REC	1	4/14/2011 6:58:21 PM
EPA METHOD 8260B: VOLATILES					Analyst: BDH
Benzene	ND	5.0	µg/L	5	4/11/2011 5:31:08 PM
Toluene	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
Ethylbenzene	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
Methyl tert-butyl ether (MTBE)	· ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
1,2,4-Trimethylbenzene	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
1,3,5-Trimethylbenzene	, ND	5.0	µg/L	. 5	4/11/2011 5:31:08 PM
1,2-Dichloroethane (EDC)	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
1,2-Dibromoethane (EDB)	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
Naphthalene	ND	10	μg/L	5	4/11/2011 5:31:08 PM
1-Methylnaphthalene	ND	20	μg/L	5	4/11/2011 5:31:08 PM
2-Methylnaphthalene	ND	20	μg/L	5	4/11/2011 5:31:08 PM
Acetone	600	50	µg/L	6	4/11/2011 5:31:08 PM
Bromobenzene	ND	5.0	µg/L	5	4/11/2011 5:31:08 PM
Bromodichloromethane	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
Bromoform	ND ND	5.0	µg/L	5	4/11/2011 5:31:08 PM
Bromomethane	ND	15	µg/L	5	4/11/2011 5:31:08 PM
2-Butanone	ND	50	μg/L	5	4/11/2011 5:31:08 PM
Carbon disulfide	ND	50	μg/L	5	4/11/2011 5:31:08 PM
Carbon Tetrachloride	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
Chlorobenzene	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
Chloroethane	ND	10	µg/L	5	4/11/2011 5:31:08 PM
Chloroform	ND	5.0	µg/L	5	4/11/2011 5:31:08 PM
Chloromethane	ND	15	μg/L	5	4/11/2011 5:31:08 PM
2-Chlorotoluene	ND	5.0	µg/L	5	4/11/2011 5:31:08 PM
4-Chlorotoluene	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
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- S Spike recovery outside accepted recovery limits

Page 3 of 7

Date: 20-Apr-11

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1104184

Project:

Injection Well 2nd QTR 4-11

Lab ID:

1104184-01

Client Sample ID: Injection Well

Collection Date: 4/4/2011 12:45:00 PM

Date Received: 4/5/2011

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Uni	ts DF	Date Analyzed
EPA METHOD 8260B: VOLATILES				·	Analyst: BD
cls-1,2-DCE	ND	5.0	µg/L	. 5	4/11/2011 5:31:08 PM
cis-1,3-Dichloropropene	ND	5.0	μg/L	. 5	4/11/2011 5:31:08 PM
1,2-Dibromo-3-chloropropane	ND	10	μg/L		4/11/2011 5:31:08 PM
Dibromochloromethane	ND	5.0		•	4/11/2011 5:31:08 PM
Dibromomethane	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
1,2-Dichlorobenzene	ND	5.0	μg/L	. 5	4/11/2011 5:31:08 PM
1,3-Dichlorobenzene	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
1,4-Dichlorobenzene	ND	5.0	µg/L	. 5	4/11/2011 5:31:08 PM
Dichlorodifluoromethane	ND	5.0	ͺμg/L	5	4/11/2011 5:31:08 PM
1,1-Dichloroethane	ND	5.0	µg/L	5	4/11/2011 5:31:08 PM
1,1-Dichlorgethene	ND	5.0	µg/L	5	4/11/2011 5:31:08 PM
1,2-Dichloropropane	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
1,3-Dichloropropane	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
2,2-Dichloropropane	ND	10	µg/L	5	4/11/2011 5:31:08 PM
1,1-Dichloropropene	ND	5.0	μ <b>g/L</b>	5	4/11/2011 5:31:08 PM
Hexachlorobutadiene	ND	5.0	(µg/L	5	4/11/2011 5:31:08 PM
2-Hexanone	ND	· <b>50</b>	μg/L	5	4/11/2011 5:31:08 PM
Isopropylbenzene	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
4-isopropyitoluene	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
4-Methyl-2-pentanone	ND	50	µg/L	5	4/11/2011 5:31:08 PM
Methylene Chloride	ND	15	μg/Ł	5	4/11/2011 5:31:08 PM
n-Butylbenzene	ND	5.0	μg/Ł	5	4/11/2011 5:31:08 PM
n-Propylbenzene	ND	5.0	µg/L	5	4/11/2011 5:31:08 PM
sec-Butylbenzene	ND	5.0	†µg/L	5	4/11/2011 5:31:08 PM
Styrene	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
tert-Butylbenzene	ND	5.0	μg/L	. 5	4/11/2011 5:31:08 PM
1,1,1,2-Tetrachloroethane	ND	5.0	μg/L	· 5	4/11/2011 5:31:08 PM
1,1,2,2-Tetrachloroethane	ND	10	μg/L	5	4/11/2011 5:31:08 PM
Tetrachloroethene (PCE)	ND	5.0	µg/L	5	4/11/2011 5:31:08 PM
trans-1,2-DCE	ND	5.0	µg/L	5	4/11/2011 5:31:08 PM
trans-1,3-Dichloropropene	ND	5.0	"µg/L	5	4/11/2011 5:31:08 PM
1,2,3-Trichlorobenzene	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
1,2,4-Trichlorobenzene	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
1,1,1-Trichloroethane	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
1,1,2-Trichloroethane	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
Trichloroethene (TCE)	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
Trichlorofluoromethane	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
1,2,3-Trichloropropane	ND	10	µg/L	5	4/11/2011 5:31:08 PM
Vinyi chloride	ND	5.0	μg/L	5	4/11/2011 5:31:08 PM
Xylenes, Total	ND	7.5	μg/L	5	4/11/2011 5:31:08 PM
Surr: 1,2-Dichloroethane-d4	101	65.8-138	%RE	C 5	4/11/2011 5:31:08 PM

### Qualiflers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 4 of 7

Date: 20-Apr-11

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1104184

Project:

Injection Well 2nd QTR 4-11

Lab ID:

1104184-01

Client Sample ID: Injection Well

Collection Date: 4/4/2011 12:45:00 PM

Date Received: 4/5/2011

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Analyst: BDH
Surr: 4-Bromofluorobenzene	102	72.7-128	%REC	5	4/11/2011 5:31:08 PM
Surr: Dibromofluoromethane	106	69-135	%REC	<b>5</b> .	4/11/2011 5:31:08 PM
Surr: Toluene-d8	103	86.1-134	%REC	5	4/11/2011 5:31:08 PM
SM 2320B: ALKALINITY			•		Analyst: LJB
Alkalinity, Total (As CaCO3)	310	20	mg/L CaCO3	1	4/6/2011 8:57:00 PM
Carbonate	ND	2.0	mg/L CaCO3	1	4/6/2011 8:57:00 PM
Bicarbonate	310	20	mg/L CaCO3	1	4/6/2011 8:57:00 PM
EPA 120.1: SPECIFIC CONDUCTANCE					Analyst: LJB
Specific Conductance	3400	0.010	µmhos/cm	1	4/6/2011 8:57:00 PM
SM4500-H+B: PH					Analyst: LJB
PΗ	7.16	0.100	pH units	1	4/6/2011 8:57:00 PM
SM2540C MOD: TOTAL DISSOLVED SO	LIDS				Analyst: KS
Total Dissolved Solids	2090	40.0	mg/L	1	4/11/2011 2:00:00 PM

#### Qualiflers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
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- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
  - S Spike recovery outside accepted recovery limits

Date: 20-Apr-11

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1104184

Project:

Injection Well 2nd QTR 4-11

Lab ID:

1104184-02

Client Sample ID: TRIP BLANK

**Collection Date:** 

Date Received: 4/5/2011

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual Ur	its	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES		<del></del>	P			Analyst: BDI
Benzene	ND	1.0	μg/	'L	1	4/10/2011 4:19:47 AM
Toluene	ND	1.0	µg/		1	4/10/2011 4:19:47 AM
Ethylbenzene	ND	1.0	μg/		1	4/10/2011 4:19:47 AM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/		1	4/10/2011 4:19:47 AM
1,2,4-Trimethylbenzene	ND	1.0	μg/		1	4/10/2011 4:19:47 AM
1,3,5-Trimethylbenzene	ND	1.0	µg/		1	4/10/2011 4:19:47 AM
1,2-Dichloroethane (EDC)	ND	1.0	µg/		1	4/10/2011 4:19:47 AM
1,2-Dibromoethane (EDB)	ND	1.0	μg/		1	4/10/2011 4:19:47 AM
Naphthalene	ND	2.0	μg/		1	4/10/2011 4:19:47 AM
1-Methylnaphthalene	ND	4.0	µg/		1	4/10/2011 4:19:47 AM
2-Methylnaphthaiene	ND	4.0	μg/		1	4/10/2011 4:19:47 AM
Acetone	ND	10	μg/		1	4/10/2011 4:19:47 AM
Bromobenzene	ND	1.0	μg/l		1	4/10/2011 4:19:47 AM
Bromodichloromethane	ND	1.0	μg/l		1	4/10/2011 4:19:47 AM
Bromoform	ND	1.0	μg/i		1	4/10/2011 4:19:47 AM
Bromomethane	ND	3.0	μg/l		1	4/10/2011 4:19:47 AM
2-Butanone	ND	10	μg/l	,	1	4/10/2011 4:19:47 AM
Carbon disulfide	ND	10	µg/l		1	4/10/2011 4:19:47 AM
Carbon Tetrachloride	ND	1.0	μ <b>g/</b> l		1	4/10/2011 4:19:47 AM
Chlorobenzene	ND .	1.0	μg/l		1	4/10/2011 4:19:47 AM
Chloroethane	ND	2.0	μg/I		1	4/10/2011 4:19:47 AM
Chloroform	ND	1.0	μg/l		1	4/10/2011 4:19:47 AM
Chloromethane	ND	3.0	μg/l		1	4/10/2011 4:19:47 AM
2-Chlorotoluene	ND	1.0	µg/l		1	4/10/2011 4:19:47 AM
4-Chlorotoluene	ND	1.0	μg/l		1	4/10/2011 4:19:47 AM
cis-1,2-DCE	ND	1.0	μg/l		1	4/10/2011 4:19:47 AM
cis-1,3-Dichloropropene	ND ·	1.0	μg/L		1	4/10/2011 4:19:47 AM
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L		1	4/10/2011 4:19:47 AM
Dibromochloromethane	ND	1.0	μg/L		1	4/10/2011 4:19:47 AM
Dibromomethane	ND	1.0	μg/L		1	4/10/2011 4:19:47 AM
I,2-Dichlorobenzene	ND	1.0	μg/L		1	4/10/2011 4:19:47 AM
I,3-Dichlorobenzene	ND	1.0	µg/L		1	4/10/2011 4:19:47 AM
,4-Dichlorobenzene	ND	1.0	µg/L		1	4/10/2011 4:19:47 AM
Dichlorodifluoromethane	ND	1.0	μg/L		1	4/10/2011 4:19:47 AM
,1-Dichloroethane	ND	1.0	μg/L		1	4/10/2011 4:19:47 AM
,1-Dichloroethene	ND	1.0	μg/L		1	4/10/2011 4:19:47 AM
,2-Dichloropropane	ND	1.0	μg/L		1.	4/10/2011 4:19:47 AM
,3-Dichloropropane	ND	1.0	µg/L		1	4/10/2011 4:19:47 AM
2,2-Dichloropropane	ND	2.0	μg/L		1	4/10/2011 4:19:47 AM
1,1-Dichloropropene	ND	1.0	μg/L		1	4/10/2011 4:19:47 AM
-lexachlorobutadiene	ND	1.0	μg/L		1	4/10/2011 4:19:47 AM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
  - S Spike recovery outside accepted recovery limits

Page 6 of 7

Date: 20-Apr-11

**CLIENT:** 

Western Refining Southwest, Inc.

Lab Order:

1104184

Project:

Injection Well 2nd QTR 4-11

Lab ID:

1104184-02

Client Sample ID: TFIP BLANK

**Collection Date:** 

Date Received: 4/5/2011

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES		···			Analyst: BDH
2-Hexanone	ND	10	μg/L	1	4/10/2011 4:19:47 AM
Isopropylbenzene	ND	1.0	μg/L	1	4/10/2011 4:19:47 AM
4-Isopropyltoluene	ND	1.0	µg/L	1	4/10/2011 4:19:47 AM
4-Methyl-2-pentanone	ND	10	μg/L	· 1	4/10/2011 4:19:47 AM
Methylene Chloride	ND	3.0	μg/L	1	4/10/2011 4:19:47 AM
n-Butylbenzene	ND	1.0	μg/L	. 1	4/10/2011 4:19:47 AM
n-Propylbenzene	ND	1.0	μg/L	1	4/10/2011 4:19:47 AM
sec-Butylbenzene	ND	1.0	µg/L	1	4/10/2011 4:19:47 AM
Styrene	ND	1.0	μg/L	1	4/10/2011 4:19:47 AM
tert-Butylbenzene	ND	1.0	µg/L	1	4/10/2011 4:19:47 AM
1,1,1,2-Tetrachioroethane	ND	1.0	μg/L	1	4/10/2011 4:19:47 AM
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	4/10/2011 4:19:47 AM
Tetrachloroethene (PCE)	NĐ	1.0	μg/L	1	4/10/2011 4:19:47 AM
trans-1,2-DCE	ND	1.0	μg/L	1	4/10/2011 4:19:47 AM
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	4/10/2011 4:19:47 AM
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	4/10/2011 4:19:47 AM
1,2,4-Trichlorobenzene	ND	1.0	µg/L	1	4/10/2011 4:19:47 AM
1,1,1-Trichloroethane	ND	1.0	μg/L	1	4/10/2011 4:19:47 AM
1,1,2-Trichloroethane	ND	1.0	μg/L	1	4/10/2011 4:19:47 AM
Trichloroethene (TCE)	ND	1.0	μg/L	1	4/10/2011 4:19:47 AM
Trichlorofluoromethane	ND	1.0	µg/L	1	4/10/2011 4:19:47 AM
1,2,3-Trichloropropane	ND	.2.0	µg/L	1	4/10/2011 4:19:47 AM
Vinyl chloride	ND	1.0	μg/L	1	4/10/2011 4:19:47 AM .
Xylenes, Total	ND	1.5	µg/L	1	4/10/2011 4:19:47 AM
Surr: 1,2-Dichloroethane-d4	99.5	65.8-138	%REC	1	4/10/2011 4:19:47 AM
Surr: 4-Bromofluorobenzene	106	72.7-128	%REC	1	4/10/2011 4:19:47 AM
Surr: Dibromofluoromethane	105	69-135	%REC	1	4/10/2011 4:19:47 AM
Surr: Toluene-d8	104	86.1-134	%REC	1	4/10/2011 4:19:47 AM

### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- Analyte detected below quantitation limits
- Non-Chlorinated
- PQL Practical Quantitation Limit

- В Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits 7

# Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9248 • email moscow@anatekiabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anatekiabs.com

Client:

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

110407046

Address:

4901 HAWKINS NE SUITE D

**Project Name:** 

1104184

Addiess

ALBUQUERQUE, NM 87109

Attn:

**ANDY FREEMAN** 

#### **Analytical Results Report**

Sample Number

110407046-001

Sampling Date

4/4/2011 12:45 PM Date/Time Received

4/7/2011 12:30 PM

Client Sample ID

1104184-01E / INJECTION WELL

Sampling Time

**Extraction Date** 

12.001

Matrix

Water

Sample Location

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	0.1	4/11/2011	JTT.	SW846 CH7	
Flashpoint	>200	°F		4/18/2011	MAH	EPA 1010	
pН	6.78	ph Units		4/14/2011	CRW	EPA 150.1	
Reactive suifide	1.20	mg/kg	1	4/18/2011	JTT	SW846 CH7	

**Authorized Signature** 

John Coddington, Lab Manager

MÇL

EPA's Maximum Contaminant Level

ND Not Detected

PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory. The results reported relate only to the samples indicated.

Soil/solid results are reported on a dry-weight basis unless otherwise noted.

## QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd QTR 4-11

Work Order:

1104184

										0	1107107
Analyte	Result	Units	PQL	SPK Va S	PK ref	%Rec L	owLimit H	ighLimit	%RPD	RPDLim	it Qual
Method: EPA Method 300.0:	Anions						. :				
Sample ID: MB	• .	MBLK				Batch ID:	R44598	Analysis	Date:	4/6/2011	10:43:20 AM
Chloride	ND	mg/L	0.50					, .			
Sulfate	ND	mg/L	0.50								
Sample ID: MB		MBLK				Batch ID:	R44664	Analysis	Date:	4/9/2011	12:59:45 PM
Chloride	ND	mg/L	0.50								*
Sulfate	ND	mg/L	0.50								
Sample ID: LCS		LCS				Batch ID:	R44598	Analysis	Date:	4/6/2011	10:54:31 AM
Chloride "	4.911	mg/L	0.50	. 5	0	98.2	90	110			
Sulfate	9.968	mg/L	0.50	10	0 -	99.7	90	110			
Sample ID: LCS		LCS	ŀ			Batch ID:	R4465i4	Analysis	Date:	4/9/2011	l 1:17:10 PM
Chloride	4.929	mg/L	0.50	5	0	98.6	90	110	28.0	0	
Sulfate	10.22	mg/L	0.50	10	0	102	90	110	4.50	0	
Method: SM 2320B: Alkalinity	У					•					
Sample ID: MB-1		MBLK	-	• .		Batch ID:	R44617	Analysis	Date:	4/6/2011	5:44:00 PM
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20								
Carbonate	ND	mg/L Ca	2.0								
Bicarbonate	ND	mg/L Ca	20								_
Sample ID: LCS-1		LCS				Batch ID:	R44617	Analysis	Date:	4/6/2011	5:50:00 P
Alkalinity, Total (As CaCO3)	80.36	mg/L Ca	20	80	0	100	98.7	102			

Qu	al	ífi	er	٠.
٧u	41	31,1	u	

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

Chent:

7

Western Refining Southwest, Inc.

Project:

Injection Well 2nd QTR 4-11

Work Order:

1104184

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	owLimit Hig	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B:	VOLATILES						•			
Sample ID: b12		MBLK		•	Batch ID:	R44651	Analys	ls Date:	4/9/2011 1	1:24:39 AN
Benzene	ND	µg/L	1.0					•		
Toluene	ND	μg/L	1.0						_	
Ethylbenzene	ND	µg/L	1.0							
Methyl tert-butyl ether (MTBE)	ND	µg/L	1.0							
1,2,4-Trimethylbenzene	ND	μg/L	1.0							
1,3,5-Trimethylbenzene	ND	μg/L	1.0							
1,2-Dichloroethane (EDC)	ND	μg/L	1.0							
1,2-Dibromoethane (EDB)	ND	μg/L	1.0							
Naphthalene	ND	µg/L	2.0							
1-Methylnaphthalene	ND	μg/L	4.0							
2-Methylnaphthalene	ND	μg/L	4.0							
Acetone	ND .	μg/L	10							
Bromobenzene	NĐ	μg/L	1.0						•	
Bromodichloromethane	ND	μg/L	1.0							
Bromoform	ND	µg/L	1.0		. :	•				
Bromomethane	ND	μg/L	3.0			1				
2-Butanone	ND	μg/L	10							
en bon disulfide	ND	μg/L	10							
on Tetrachloride	ND	μg/L	1.0		·					
Chlorobenzene	ND	μg/L	1.0							
Chloroethane	ND	μg/L	2.0		•					
Chloroform	ND	μg/L	1.0							
Chloromethane	ND	μg/L	3.0							
2-Chlorotoluene	ND	μg/L	1.0							
4-Chlorotoluene	ND	μg/L	1.0							
cis-1,2-DCE	ND	μg/L	1.0	•	•		,			
cis-1,3-Dichloropropene	ND	μg/L	1.0							
1,2-Dibromo-3-chioropropane	ND	μg/L	2.0	,	· .					
Dibromochioromethane	ND	μg/L	1.0							
Dibromomethane	ND	μg/L	1.0							
1,2-Dichlorobenzene	ND	μg/L	1.0							
1,3-Dichlorobenzene	ND	μg/L	1.0							
1,4-Dichlorobenzene	ND	μg/L	1.0							
Dichlorodifluoromethane	ND	μg/L	1.0							-
1,1-Dichtoroethane	ND	μg/L	1.0							
1,1-Dichloroethene	ND	μg/L	1.0			•				
1,2-Dichtoropropane	ND	µg/L	1.0	••						
1,3-Dichloropropane	ND	μg/L	1.0							
2,2-Dichloropropane	ND	μg/L	2.0				-			
1,1-Dichloropropene	ND	µg/L	1.0				t.			
Hexachlorobutadiene	ND	μg/L	1.0	•			• .			
?-Hexanone	ND	µg/L	10						·	
sopropylbenżene	ND.	µg/L	1.0							
propyltoluene	ND	μg/L	1.0							
		-								

#### Qualifiers:

- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit

- H Holding times for preparation or analysis exceeded
- NC Non-Chlorinated
- R RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd QTR 4-11

Work Order: 1104184

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	owLlmit Hig	ghLimit %RP[	RPDLimit Qual
Method: EPA Method 8260B	: VOLATILES	· · · · · · · · · · · · · · · · · · ·			·			
Sample ID: b12		MBLK	į		Batch ID:	R44851	Analysis Date:	4/9/2011 11:24:39 AM
4-Methyl-2-pantanone	ND	μg/L	10					
Methylene Chloride	ND	μg/L	3.0					
n-Butylbenzene	ND	µg/L	1,0					
n-Propylbenzene	ND	μg/L	10	•				
sec-Butylbenzene	ND	µg/L	10					
Styrene	ND	µg/L	10		*			
tert-Butylbenzene	ND	μg/L	10				•	
1,1,1,2-Tetrachioroethane	ND	μg/L	1.0					
1,1,2,2-Tetrachloroethane	ND	µg/L	2.0					•
Tetrachloroethene (PCE)	ND	µg/L	1.0					
trans-1,2-DCE	. ND	μg/L	1.0					
trans-1,3-Dichloropropene	ND	μg/L	1.0					
1,2,3-Trichforobenzene	ND	μg/L	1.0					
1,2,4-Trichtorobenzene	ND	µg/L	1.0	•				•
1,1,1-Trichteroethane	· ND	μg/L	1.0				•	
1,1,2-Trichloroethane	ND	μg/L	1.0					
Trichloroethene (TCE)	ND	µg/L	1.0					
Trichlorofluoromethane	ND	µg/L	1.0		•			
1,2,3-Trichloropropane	ND	μg/L	2.0					
Vinyl chloride	ND	μg/L	1.0					
Xylenes, Total	ND	μg/L	1.5					
Sample ID: 5mL rb		MBLK	}		Batch ID:	R44868	Analysis Date:	4/11/2011 8:22:37 AM
Benzene	ND	µg/L	1.0					
Foluene	ND	µg/L	1.0		•			
Ethylbenzene	ND	µg/L	1.0			•		
Methyl tert-butyl ether (MTBE)	ND	µg/L	1.0					
,2,4-Trimethylbenzene	ND	μg/L	1.0					
1,3,5-Trimethylbenzene	ND	μg/L	1.0				•	•
,2-Dichloroethane (EDC)	ND	μg/L	1.0					
,2-Dibromoethane (EDB)	ND	μg/L	1.0					
Naphthalene	ND	μg/L	2.0				, .	
-Methylnaphthalene	ND	μg/L	4.0					
2-Methylnaphthalene	ND	μg/L	4.0					
Acetone	ND	μg/L	10		•			
Bromobenzene	ND	μg/L	1.0					
Bromodichloromethane	ND	μg/L	1.0					
Bromoform	ND	μg/L	1.0	•				
Bromomethane	ND	μg/L	3.0				•	
-Butanone	ND	µg/L	10					
Carbon disulfide	ND	µg/L	10			•	•	
Carbon Tetrachloride	ND	μg/L	1.0					
			1.0					
Chlorobenzene	ND	µg/L	1.0					
Chlorobenzene Chloroethane	ND ND	µg/L	2.0					•

Qualifiers:

ND Not Detected at the Reporting Limit NC Non-Chlorinated

RPD outside accepted recovery limits

E Estimated value

J Analyte detected below quantitation limits

Н Holding times for preparation or analysis exceeded



## **QA/QC SUMMARY REPORT**

Western Refining Southwest, Inc.

Project: Injection Well 2nd QTR 4-11

Work Order:

1104184

Chloromethane	alyte	Result	Units	PQL	SPK Va SPK ref	%Rec L	owLimit Hig	ghLimit %RPD	RPDLImit Q	ual
Chloromethane	od: EPA Method 8260B	VOLATILES								
2-Chlorotoluene         ND         μg/L         1.0           4-Chlorotoluene         ND         μg/L         1.0           cis-1,3-Dichloropropene         ND         μg/L         1.0           cis-1,3-Dichloropropene         ND         μg/L         1.0           Dibromo-3-chloropropene         ND         μg/L         1.0           Dibromo-3-chloropropene         ND         μg/L         1.0           1,2-Dichloromemene         ND         μg/L         1.0           1,2-Dichlorobenzene         ND         μg/L         1.0           1,4-Dichlorobenzene         ND         μg/L         1.0           1,4-Dichlorobenzene         ND         μg/L         1.0           1,4-Dichlorobenzene         ND         μg/L         1.0           1,1-Dichlorobenzene         ND         μg/L         1.0           1,1-Dichlorobethene         ND         μg/L         1.0           1,2-Dichloropropane         ND         μg/L         1.0           2,2-Dichloropropane         ND         μg/L         1.0           2,2-Dichloropropane         ND         μg/L         1.0           2,2-Dichloropropane         ND         μg/L         1.0	pie ID: 5mL rb		MBLK			Batch ID:	R44668	Analysis Date:	4/11/2011 8:22	:37 AN
4-Chlorotoluene   ND	romethane	ND	μg/L	3.0		ì				
4-Chlorotoluene   ND	lorotoluene	ND	μg/L	1.0						
Cis-1,3-Dichloropropene   ND	lorotoluene	ND		1.0		1				
1,2-Dibromo-3-chloropropane   ND	2-DCE	ND	μg/L	1.0				•		
Dibromochloromethane         ND         µg/L         1.0           Dibromomethane         ND         µg/L         1.0           1,2-Dichlorobenzene         ND         µg/L         1.0           1,3-Dichlorobenzene         ND         µg/L         1.0           1,4-Dichlorobenzene         ND         µg/L         1.0           1,1-Dichloroethane         ND         µg/L         1.0           1,1-Dichloroethane         ND         µg/L         1.0           1,1-Dichloropropane         ND         µg/L         1.0           1,2-Dichloropropane         ND         µg/L         1.0           1,3-Dichloropropane         ND         µg/L         1.0           1,3-Dichloropropane         ND         µg/L         1.0           1,4-Dichloropropane         ND         µg/L         1.0           1,2-Dichloropropane         ND         µg/L         1.0           1,2-Dichloropropane         ND         µg/L         1.0           1,3-Dichloropropane         ND         µg/L         1.0           1,4-Dichloropropane         ND         µg/L         1.0           1,4-Dichloropropane         ND         µg/L         1.0           1,4-D	3-Dichloropropene	ND	μg/L	1.0		+				
Dibromomethane         ND         µg/L         1.0           1,2-Dichlorobenzene         ND         µg/L         1.0           1,3-Dichlorobenzene         ND         µg/L         1.0           1,4-Dichlorobenzene         ND         µg/L         1.0           1,1-Dichloroethane         ND         µg/L         1.0           1,1-Dichloropropane         ND         µg/L         1.0           1,2-Dichloropropane         ND         µg/L         1.0           1,3-Dichloropropane         ND         µg/L         1.0           2,2-Dichloropropane         ND         µg/L         1.0           2,2-Dichloropropane         ND         µg/L         1.0           1,3-Dichloropropane         ND         µg/L         1.0           1,3-Dichloropropane         ND         µg/L         1.0           2,2-Dichloropropane         ND         µg/L         1.0           4-Methyl-acpenene         ND         µg/L         1.0           4-Holloropropane         ND         µg/L         1.0           4-Hospropylbonzene         ND         µg/L         1.0           4-Hospropylbonzene         ND         µg/L         1.0           4-Hospropylb	lbromo-3-chloropropane	ND	µg/L	2.0					•	
1,2-Dichlorobenzene 1,3-Dichlorobenzene ND μg/L 1.0 1,3-Dichlorobenzene ND μg/L 1.0 Dichlorodifluoromethane ND μg/L 1.0 Dichlorodifluoromethane ND μg/L 1.0 1,1-Dichloroethane ND μg/L 1.0 1,1-Dichloropropane ND μg/L 1.0 1,3-Dichloropropane ND μg/L 1.0 1-Dichloropropane	mochloromethane	ND	µg/L	1.0						
1,3-Dichlorobenzene ND μg/L 1.0 1,4-Dichlorodifluoromethane ND μg/L 1.0 1,1-Dichlorodifluoromethane ND μg/L 1.0 1,1-Dichlorodifluoromethane ND μg/L 1.0 1,1-Dichloroethane ND μg/L 1.0 1,2-Dichloropropane ND μg/L 1.0 1,2-Dichloropropane ND μg/L 1.0 1,2-Dichloropropane ND μg/L 1.0 1,2-Dichloropropane ND μg/L 1.0 1,2-Dichloropropane ND μg/L 1.0 1,3-Dichloropropane ND μg/L 1.0 1,3-Dichloropropane ND μg/L 1.0 1,3-Dichloropropane ND μg/L 1.0 1,3-Dichloropropane ND μg/L 1.0 1,4-Dichloropropane ND μg/L 1.0 1,4-Trichloroethane (PCE) ND μg/L 1.0 1,4-Trichlorobenzene ND μg/L 1.0 1,2-Trichlorobenzene ND μg/L 1.0 1,2-Trichlorobenzene ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,2-Trichloropropane ND μg/L 1.0 1,0-Trichloropropane ND μg/L 1.0 1,0-Trichloropropane ND μg/L 1.0 1,0-Trichloropropane ND μg/L 1.0	momethane	ND	μg/L	1.0	•		·			
1,4-Dichlorobenzene ND μg/L 1.0 Dichlorodifluoromethane ND μg/L 1.0 1,1-Dichloroethane ND μg/L 1.0 1,1-Dichloroethane ND μg/L 1.0 1,1-Dichloroethane ND μg/L 1.0 1,2-Dichloropropane ND μg/L 1.0 1,3-Dichloropropane ND μg/L 1.0 1,3-Dichloropropane ND μg/L 1.0 1,3-Dichloropropane ND μg/L 1.0 1,3-Dichloropropane ND μg/L 1.0 1,1-Dichloropropane ND μg/L 1.0 1,1-Dichloropropane ND μg/L 1.0 1,1-Dichloropropane ND μg/L 1.0 1,1-Oichloropropane ND μg/L 1.0 1,2-Oichloropropane ND μg/L 1.0 1,0-Oichloropropane ND μg/L	Pichlorobenzene	ND	µg/L	1.0						
Dichlorodifluoromethane	ochlorobenzene	ND	µg/L	1.0						
1,1-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethane 1,1-Dichloropropane 1,2-Dichloropropane 1,3-Dichloropropane 1,1-Dichloropropane 1,1-Dichl	ichlorobenzene	ND	µg/L	1.0						
1,1-Dichloroethene 1,2-Dichloropropane ND μg/L 1,0-Dichloropropane ND μg/L 1,0-Dichloropropane ND μg/L 1.0 2,2-Dichloropropane ND μg/L 1.0 2,2-Dichloropropane ND μg/L 1.0 1-Dichloropropane orodifluoromethane	ND	μg/Ľ	1.0		, = "a .					
1,2-Dichloropropane 1,3-Dichloropropane ND μg/L 1,0 2,2-Dichloropropane ND μg/L 2,0 14-Dichloropropane ND μg/L 1,0 14-Dichloropropane ND μg/L 1,0 14-Dichloropropane ND μg/L 1,0 1-Dichloropropane ND μg/L 1,0 1,1,2-Tetrachloroethane ND μg/L 1,0 1,1,2-Tetrachloroethane ND μg/L 1,0 1,1,2-Tetrachloropethane ND μg/L 1,0 1,1,2-Tetrachloropethane ND μg/L 1,0 1,1,2-Tetrachloropethane ND μg/L 1,0 1,1,2-Tetrachloropethane ND μg/L 1,0 1,1,1-Dichloropropane ND μg/L 1,0 1,2-Trichlorobenzene ND μg/L 1,0 1,1-Trichloropethane ND μg/L 1,0 1,1,2-Trichloropethane ND μg/L 1,0 1,0 1,1,2-Trichloropethane ND μg/L 1,0 1,0 1,1,2-Trichloropethane ND μg/L 1,0 1,0 1,0 1,0 1,0 1,0 1,0 1,0 1,0 1,0	ichloroethane	ND	μg/L	1.0						
1,3-Dichloropropane 1,2-Dichloropropane ND µg/L 2,2-Dichloropropane ND µg/L 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	Pichloroethene	ND	μg/L	1.0			-			
2,2-Dichloropropane	ichloropropane	ND	μg/L	1.0						
A Dichloropropene   ND	ichloropropane	ND	μg/L	1.0						
Chilorobutadiene   ND	ichloropropane	ND	μg/L	2.0	•					
Philosoputadiene   ND	ichloropropene	ND	μg/L	1.0						
Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  Sepropy  S	No. of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the con	ND		1.0						
### ### ##############################	kanone	ND	μg/L	10						•
#-Isopropyltoluene	pylbenzene	ND	µg/L	1.0						
#-Methyl-2-pentanone ND µg/L 10 #-Butylbenzene ND µg/L 1.0 #-Propylbenzene ND µg/L 1.0		ND		1.0						
Alethylene Chloride		ND		10						
n-Butylbenzene         ND         μg/L         1.0           n-Propylbenzene         ND         μg/L         1.0           per-Butylbenzene         ND         μg/L         1.0           Styrene         ND         μg/L         1.0           pert-Butylbenzene         ND	•			3.0						
1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0			. –							
Styrene										
ND	· ·									
ert-Butylbenzene         ND         μg/L         1.0           I,1,1,2-Tetrachloroethane         ND         μg/L         1.0           I,1,2,2-Tetrachloroethane         ND         μg/L         2.0           Tetrachloroethane (PCE)         ND         μg/L         1.0           rans-1,2-DCE         ND         μg/L         1.0           rans-1,3-Dichloropropene         ND         μg/L         1.0           I,2,3-Trichlorobenzene         ND         μg/L         1.0           I,2,4-Trichloroethane         ND         μg/L         1.0           I,1,1-Trichloroethane         ND         μg/L         1.0           I,1,2-Trichloroethane         ND         μg/L         1.0           Trichlorofluoromethane         ND         μg/L         1.0           Trichlorofluoromethane         ND         μg/L         1.0           Invyl chloride         ND         μg/L         1.0					*					
1,1,2-Tetrachloroethane						*				
1,1,2,2-Tetrachloroethane	= =									
Tetrachloroethene (PCE)         ND         μg/L         1.0           rans-1,2-DCE         ND         μg/L         1.0           rans-1,3-Dichloropropene         ND         μg/L         1.0           1,2,3-Trichlorobenzene         ND         μg/L         1.0           1,2,4-Trichlorobenzene         ND         μg/L         1.0           1,1,1-Trichloroethane         ND         μg/L         1.0           1,2-Trichloroethane         ND         μg/L         1.0           Trichloroethane         ND         μg/L         1.0           Trichlorofluoromethane         ND         μg/L         1.0           1,2,3-Trichloropropane         ND         μg/L         2.0           /inyl chloride         ND         μg/L         1.0	•									
rans-1,2-DCE         ND         μg/L         1.0           rans-1,3-Dichloropropene         ND         μg/L         1.0           1,2,3-Trichlorobenzene         ND         μg/L         1.0           1,2,4-Trichlorobenzene         ND         μg/L         1.0           1,1,1-Trichloroethane         ND         μg/L         1.0           1,2-Trichloroethane         ND         μg/L         1.0           Irichloroethane         ND         μg/L         1.0           Irichlorofluoromethane         ND         μg/L         1.0           1,2,3-Trichloropropane         ND         μg/L         2.0           Inyl chloride         ND         μg/L         1.0						•	•			
rans-1,3-Dichloropropene       ND       μg/L       1.0         1,2,3-Trichlorobenzene       ND       μg/L       1.0         1,2,4-Trichlorobenzene       ND       μg/L       1.0         1,1,1-Trichloroethane       ND       μg/L       1.0         1,1,2-Trichloroethane       ND       μg/L       1.0         Irichloroethene (TCE)       ND       μg/L       1.0         Irichlorofluoromethane       ND       μg/L       1.0         1,2,3-Trichloropropane       ND       μg/L       2.0         Vinyl chloride       ND       μg/L       1.0	• •						• • • •			
,2,3-Trichlorobenzene   ND   μg/L   1.0     ,2,4-Trichlorobenzene   ND   μg/L   1.0     ,1,1-Trichloroethane   ND   μg/L   1.0     ,1,2-Trichloroethane   ND   μg/L   1.0     Trichloroethane   ND   μg/L   1.0     Trichloroethane   ND   μg/L   1.0     Trichlorofluoromethane   ND   μg/L   1.0     ,2,3-Trichloropropane   ND   μg/L   2.0     Trichlorofluoromethane   ND   μg/L   1.0     Trichlorofluoromethane   ND   μg/L   1.0     Trichloropropane   ND   μg/L   1.0     Trichlorofluoromethane   ND   μg/L   1.0     Trichlorofluoromethane   ND   μg/L   1.0     Trichlorofluoromethane   ND   μg/L   1.0     Trichloropropane   ND   μg/L   1.0										
,2,4-Trichlorobenzene	•									
,1,1-Trichloroethane ND µg/L 1.0 ,1,2-Trichloroethane ND µg/L 1.0 richloroethane (TCE) ND µg/L 1.0 richlorofluoromethane ND µg/L 1.0 ,2,3-Trichloropropane ND µg/L 2.0 /inyl chloride ND µg/L 1.0								-		
,1,2-Trichloroethane ND µg/L 1.0  Trichloroethane (TCE) ND µg/L 1.0  Trichlorofluoromethane ND µg/L 1.0  ,2,3-Trichloropropane ND µg/L 2.0  /inyl chloride ND µg/L 1.0	· · · · · ·									
richloroethene (TCE)  ND  µg/L  1.0  richlorofluoromethane  ND  µg/L  1.0  ,2,3-Trichloropropane  ND  µg/L  2.0  /inyl chloride  ND  µg/L  1.0							•		•	
richlorofluoromethane ND µg/L 1.0 ,2,3-Trichloropropane ND µg/L 2.0 /inyl chloride ND µg/L 1.0										
,2,3-Trichloropropane ND µg/L 2.0 'inyl chloride ND µg/L 1.0										
linyl chloride ND μg/L 1.0										
· ·									•	
		ND	µg/L	1.5						
· · · · · · · · · · · · · · · · · · ·					•	Batch ID:	R44851	Analysis Date:	4/10/2011 11:35:	56 AM

#### Qualifiers:

ND Not Detected at the Reporting Limit

NC Non-Chlorinated

R RPD outside accepted recovery limits

E Estimated value

J Analyte detected below quantitation limits

H Holding times for preparation or analysis exceeded

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project: Injection Well 2nd QTR 4-11

Work Order:

1104184

1 Tojecti Injection	Ven zna Q11							44 OLK	Orger:	104184
Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec L	owLimit Hi	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B	VOLATILES									
Sample ID: b24		MBLK			Batch ID:	R44651	Analys	is Date:	4/10/2011 1	1:35:56 AN
Benzene	ND	μg/L	1.0							
Toluene	ND	µg/L	10							
Ethylbenzene	ND	µg/L	1.0	•						•
Methyl tert-butyl ether (MTBE)	ND	μg/L	10							
1,2,4-Trimethylbenzene	ND	µg/L	1.0							
1,3,5-Trimethylbenzene	ND	μg/L	1.0							
1,2-Dichloroethane (EDC)	ND	μg/L	1.0							
1,2-Dibromoethane (EDB)	ND	μg/L	1.0					•		
Naphthalene	ND	μg/Ļ	2.0							
1-Methylnaphthalene	ND	ha.÷	4.0		-					
2-Methylnaphthalene	ND	µg/L	4.0							
Acetone	ND	μg/L	10							
Bromobenzene	ND	μg/L	1.0							
Bromodichloromethane	ND	µg/L	1.0							
Bromoform	ND	μg/L	1.0	•						
Bromomethane	ND	μg/L	3.0	, .	-					
2-Butanone	ND	μg/L	10							
Carbon disulfide,	ND	μg/L	10 10							
Carbon Tetrachloride	ND	μg/L μg/L	10 1.0							
Chlorobenzene	ND	µg/L µg/L	1.0							
Chloroethane	ND	μg/L	2.0							
Chloroform	ND		2.0 1.0							
Chloromethane	ND	μg/L	3.0							
2-Chlorotoluene	ND	µg/L	1.0							
1-Chiorotoluene	ND	µg/L	1.0						•	
sis-1,2-DCE	ND	μg/L	1.0 1.0							
cis-1,3-Dichloropropene	ND	μg/L μg/L	1.0							
,2-Dibromo-3-chloropropane	ND	μg/L μg/L	2.0		,					
Dibromochloromethane			1.0			•				
Dibromochiolomethane	ND	µg/L	1							
1,2-Dichlorobenzene	ND ND	μg/L	1.0							
,3-Dichlorobenzene	ND ND	μg/L	1.0							
		μg/L	1.0							
,4-Dichlorobenzene	ND	μg/L	1.0							
Dichlorodifiuoromethane	ND .	μg/L	1.0							
,1-Dichloroethane	ND	µg/L	1.0							
,1-Dichloroethene	ND	µg/L	1.0							
,2-Dichloropropane	ND	μg/L	1.0							
,3-Dichloropropane	ND	μg/L	1.0							
,2-Dichloropropane	ND	µg/L	2.0							
,1-Dichloropropene	ND	µg/L	1.0							
lexachlorobutadiene	ND	μg/L	1.0						•	
-Hexanone	ND	μg/L 	10							
sopropylbanzene	ND	µg/L	1.0							
-Isopropyltoluene	ND	µg/L	1.0							4
			1							V

#### Qualifiers:

ND Not Detected at the Reporting Limit

NC Non-Chlorinated

R RPD outside accepted recovery limits

E Estimated value

J Analyte detected below quantitation limits

H Holding times for preparation or analysis exceeded

### **QA/QC SUMMARY REPORT**

ment:

Western Refining Southwest, Inc.

Project: Injection Well 2nd QTR 4-11

Work Order:

1104184

Analyte	Result	Units	PQL	SPK Va SPK	ref %Rec l	LowLimit H	ighLimit %RPI	O RPDLimit Qual
Method: EPA Method 8260	B: VOLATILES		,		Ý.			
Sample ID: b24		MBLK			Batch ID:	R44651	Analysis Date:	4/10/2011 11:35:56 AN
4-Methyl-2-pentanone	NĎ	μg/L	10		•			•
Methylene Chloride	ND	μg/L	3.0	•				
n-Butylbenzene	ND	μg/L	1.0					
n-Propylbenzene	ND	μg/L	1.0					
sec-Butylbenzene	ND	μg/L	. 1.0			•		
Styrene	ND	µg/L	1.0		•			The second second
tert-Butylbenzene	ND	μg/L	1.0				-	÷ 11 11 1
1,1,1,2-Tetrachioroethane	ND	μg/L	1.0		_			
1,1,2,2-Tetrachloroethane	ND	μg/L	2.0					
Tetrachloroethene (PCE)	ND	µg/L	1.0					
trans-1,2-DCE	ND	μg/L	1.0			-		•
trans-1,3-Dichloropropene	ND	μg/L	1.0					•
1,2,3-Trichlorobenzene	ŅD	μg/L	1.0					
1,2,4-Trichlorobenzene	ND	μg/L	1.0					
1,1,1-Trichloroethane	ND	μg/L	1.0					
1,1,2-Trichloroethane	ND	μg/L	1.0					
Trichloroethene (TCE)	ND	μg/L	1.0					
Eichlorofluoromethane	ND	μg/L	1.0					
-Trichloropropane	ND	μg/L	2.0					
Vinyl chloride	ND	μg/L	1.0					
Xylenes, Total	ND	μg/L	1.5					
Sample ID: 100ng lcs-2		LCS			Batch ID:	R44651	Analysis Date:	4/9/2011 10:56:28 AN
Benzene	21.37	μg/L	1.0	20 0	107	85.2	121	
Toluene	20.56	µg/L	1.0	20 0.155	102	88.3	121	
Chlorobenzene	19.35	μg/L	1.0	20 0.2426	95.6	91.9	110	
1,1-Dichloroethene	24.14	μg/L	1.0	20 0	121	91.5	134	
Trichioroethene (TCE)	19.05	µg/L	1.0	20 0	95.3	78.3	102	
Sample ID: 100ng ics		LCS			Batch ID:	R44668	Analysis Date:	4/11/2011 9:45:31 AM
Benzene .	21.19	μg/L	1.0	20 0	106	85.2	121	
Toluene	20.33	µg/L	1.0	20 · 0		88.3	121	
Chlorobenzene	19.84	µg/L	1.0	20 0		91.9	110	
I,1-Dichlorcethene	25.11	μg/L	1.0	20 0		91.5	134	
Frichloroethene (TCE)	19.73	μg/L	1.0	20 0		78.3	102	•
Sample ID: 100ng Ics-3		LCS		•	Batch iD:	R44651	Analysis Date:	4/10/2011 11:07:47 AM
Benzene	21.72	μg/L	1.0	20 葷 0		85.2	121	
roluene	21.72	μg/L μg/L	1.0	20 0.1342		88.3	121	
Chiorobenzene	20.07	µg/L	1.0	20 0.1342		91.9	110	•
,1-Dichloroethene	23.97	µg/L	1.0	20 0,244		91.5	134	
richloroethene (TCE)	23.97 19.32	µg/L	1.0	20 0		78.3	102	



E Estimated value

ND Not Detected at the Reporting Limit

NC Non-Chlorinated

R RPD outside accepted recovery limits

J Analyte detected below quantitation limits

H Holding times for preparation or analysis exceeded

## QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd QTR 4-11

Work Order:

1104184

Analyte	Result l	Jnits PQ	SPK Va SPK ref	%Rec Lo	wLimit Hip	ghLimit [.]	%RPD	RPDLimit	Qual
Method: EPA Method 82700									
Sample ID: mb-26338	•	MBLK		Batch ID:	26338	Analys	is Date:	4/14/2011	5:59:47 Pi
Acenaphthene		μg/L 1Ç		•					
Acenaphthylene		µg/L 1Ç	l						
Aniline		µg/L 10	l					•	•
Anthracene		µg/L 1Ç	•						•
Azobenzene		μg/L 10							
Benz(a)anthracene		µg/L 10							
Benzo(a)pyrene		µg/L 10							-
Benzo(b)fluoranthene		µg/L 10						•	
Benzo(g,h,i)perylene		µg/L 1Ó							
Benzo(k)fluoranthene		ug/L 10							
Benzolc acid		ug/L 20 ug/L 10							
Benzyl alcohol	ND I								
3is(2-chloroethoxy)methane	ND (	μ <b>g/L 1</b> 0							
3is(2-chloroethyl)ether	ND I	ug/L 10							
3is(2-chloroisopropyl)ether	ND I	.lg/L 10							
3is(2-ethylhexyl)phthalate	ND I	ug/L 10							
i-Bromophenyl phenyl ether	ND I	Jg/L 10̇́			•			•	
Butyl benzyl phthalate	ND i	ig/L 10							4
Carbazole		ug/L: 10							
I-Chloro-3-methylphenol	ND I	ug/L 10							·
I-Chloroaniline	ND j	ıg/L 10							
2-Chloronaphthalene	ND i	ig/L 10							
2-Chlorophenol	ND I	ıg/L 10							
I-Chlorophenyl phenyl ether	ND I	ıg/L 10							
Chrysene	ND I	ıg/L 10							
Di-n-butyl phthalate		ig/L 10							
Di-n-octyl phthalate	ND I	ıg/L 10							
Dibenz(a,h)anthracene	ND ;	ıg/L 10							
Dibenzofuran	ND ;	ıg/L 10	•						
,2-Dichlorobenzene	ND L	ıg/L 10							
,3-Dichlorobenzene	ND h	ıg/L 10							
,4-Dichlorobenzene	ND µ	ıg/L 10							•
,3'-Dichlorobenzidine	ND j	ıg/L 10							
ethyl phthalate	ND h	ıg/L 10							
imethyl phthalate	ND H	ıg/L 10							
.4-Dichlorophenol	ND µ	ıg/L 20							
,4-Dimethylphenol	ND µ	g/L 10							
,6-Dinitro-2-methylphenol		g/L 20							•
,4-Dinitrophenol		g/L 20	•						
,4-Dinitrotoluene		g/L 10							
,6-Dinitrotoluene		g/L 10							
luoranthene		g/L 10							
luorene		g/L 10							
lexachlorobenzene		g/L 10							

### Qualifiers:

ND Not Detected at the Reporting Limit

NC Non-Chlorinated

R RPD outside accepted recovery limits

E Estimated value

J Analyte detected below quantitation limits

H Holding times for preparation or analysis exceeded



E

ND

Estimated value

Analyte detected below quantitation limits

Not Detected at the Reporting Limit

## **QA/QC SUMMARY REPORT**

Western Refining Southwest, Inc.

Project: Injection Well 2nd QTR 4-11

Work Order:

1104184

Page 8

Analyte	Result	Units	PQL	SPK V	a SPK re	F %Rec I	LowLimit H	lighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 82700	: Semivolatiles	,	<del></del>		******						
Sample ID: mb-26338		MBLK				Batch ID:	26338	Analys	is Date:	4/14/2011	5:59:47 P
Hexachlorobutadiene	ND	μg/L	10	•							
Hexachlorocyclopentadiene	ND	μg/L	10								
Hexachloroethane	ND	µg/L	10			•					
indeno(1,2,3-cd)pyrene	ND	μg/L	10								
Isophorone	ND	μg/L	10		•	•					
2-Methylnaphthalene	ND	μg/L	10			+					
2-Methylphenol	ND	μg/L	10								
3+4-Methylphenol	ND	μg/L	10								
N-Nitrosodi-n-propylamine	ND	μg/L	10								
N-Nitrosodimethylamine	ND	µg/L	10				•				
N-Nitrosodiphenylamine	ND	μg/L	10			e .					
Naphthalene	ND	µg/L	10			d -					
2-Nitroaniline	ND	μg/L	10			,					
3-Nitroaniline	ND	µg/L	10								٠.
1-Nitroaniline	ND	µg/L	20								
Nitrobenzene	ΝĎ	µg/L	10			,					
2-Nitrophenol	ND	μg/L	10								
- <u>Nit</u> rophenol	ND .	µg/L	10								
schlorophenol	ND	μg/L	20					-			
nenanthrene	ND	µg/L	10								
Phenol	ND	μg/L	10								•
Pyrene	ND	μg/L	.10							•	
Pyridine	ND	µg/L	10								
,2,4-Trichlorobenzene	ND	μg/L	10								
2,4,5-Trichlorophenol	ND	μg/L	10								
2,4,6-Trichlorophenol	ND	μg/L	10								-
Sample ID: lcs-26338		LCS				Batch ID:	26338	Analysis	s Date:	4/14/2011 6	:29:07 PM
Acenaphthene	67,42	μg/L	10	100	0	67.4	31	99.4			
-Chloro-3-methylphenol	70.28	μg/L	10	100	.0	70.3	34.3	111			
-Chlorophenol	65.46	µg/L	10	100	0	65.5	24.1	98.7			
,4-Dichlorobenzene	49.96	µg/L	10	100	O	50.0	20.6	85.6			
.,4-Dinitrotoluene	68.66	µg/L	10	100	0	68.7	26.6	126			
I-Nitrosodi-n-propylamine	65.98	μg/L	10	100	0	66.0	29.2	94.4			
-Nitrophenol	36.42	µg/L	10	100	6.26	30.2	9.87	86			
entachlorophenol	49.12	μg/L	20	100	. 0	49.1	20	97.8			
Phenol	45.58	µg/L	10	100	0	45.6	17.5	60.5			
yrene	61.02	μg/L	10	100	0	61.0	46.8	92.2			
,2,4-Trichlorobenzene	57.02	µg/L	10	100	0	57.0	25.2	92.3			
Nethod: EPA Method 7470: N	flercury			•					_		
ample ID: MB-26430	•	MBLK	•			Batch ID:	26430	Analysis	Date:	4/15/2011 2	:39:54 PM
lercury	ND	mg/L	0.00020	•			•				
ample ID: LCS-26430		LCS				Batch ID:	26430	Analysis	Date:	4/15/2011 2	41:38 PM
ury	0.005134	mg/L	0.00020	0.005	3E-05	102	80	120			

Non-Chlorinated

Н

NC

R

Holding times for preparation or analysis exceeded

RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project: Injection Well 2nd QTR 4-11

Work Order:

1104184

									WORK		104184
Analyte	Result	Units	PQL	SPK V	a SPK ref	%Rec L	owLimit Hi	lghLim <b>i</b> t	%RPD	RPDLimit	Qual
Method: EPA 6010B	Total Recoverable M										
Sample ID: MB-26363		MBLK				Batch ID:	26363	Analysis	Date:	4/13/2011 1	:52:02 PN
Arsenic	ND	mg/L	0.020								
Barlum	ND	mg/L	0.020								
Cadmium	ND	mg/L	0.0020								
Calcium	ND	mg/L	1.0								
Chromlum	ND	mg/L	0.0060								
Lead	ND	mg/L	0.0050								
Magnesium	ND	mg/L	1.Ò								•
Potassium	ND	mg/L	1.Ò								
Selenium	ND	mg/L	0.050		•						
Silver	ND	mg/L	0.0050								
Sodium	ND	mg/L	1.Ò				•				
Sample ID: LCS-26363	1	LCS				Batch ID:	26363	Analysis	Date:	4/13/2011 1	:54:59 PN
Arsenic	0.5247	mg/L	0.020	0.5	. 0	105	80	120			•
Barium	0.4764	mg/L	0.020	0.5	O	95.3	80	120			
Cadmium	0.4981	mg/L	0.0020	0.5	0.0003	99.6	80	120			
Calcium	52.24	mg/L	1.Ò	50	0.0715	104	80	120			
Chromlum ·	0.5230	mg/L	0.0060	0.5	0	105	80	120			
Lead '	0.4959	mg/L	0.0050	0.5	. 0	99.2	80	120			4
Magnesium	53.05	mg/L	1.0	50	0	106	80	120			
Potassium	55.46	mg/L	1.0	50	0.3116	110	80	120			
Selenium	0.5052	mg/L	0.050	0.5	0	101	80	120			
Silver	0.5158	mg/L	0.0050	0.5	. 0	103	80	120			
Sodium	51.17	mg/L	1.0	50	0	102	80	120			
Sample ID: LCS-26363	i	LCS			•	Batch ID:	26363	Analysis	Date:	4/13/2011 1	57:43 PM
Arsenic	0.5285	mg/L	0.020	0.5	. 0	106	80	120			
Barium	0.4745	mg/L	0.020	0.5	0	94.9	80	120			
Cadmium	0.4993	mg/L	0.0020	0.5	0.0003	99.8	80	120			
Calcium	51.81	mg/L	1.0	50	0.0715	103	80	120			
Chromium	0,5196	mg/L	0.0060	0.5	0	· 104	80	120			
Lead	0.4967	mg/L	0.0050	0.5	0	99.3	80	120			
Magnesium	51.72	mg/L	1.0	50	0	103	80	120			
Potassium	55.52	mg/L	1.0	50	0.3116	110	80	120			
Selenium	0.5120	mg/L	0.050	0.5	0	102	80	120			
Silver	0.5150	mg/L	0.0050	0.5	0	103	80	120			
Sodium	51.23	mg/L	1.0	50	0	102	80	120			
Wethod: SM2540C M	OD: Total Dissolved S	olids									
Sample ID: MB-26320		MBLK			•	Batch ID:	26320	Analysis	Date:	4/11/2011 2:	00:00 PM
Fotal Dissolved Solids	ND	mg/L	20.0								
Sample ID: LCS-26320		LCS	į			Batch ID:	26320	Analysis	Date:	4/11/2011 2:	00:00 PM
sample in rog-roger											



E Estimated value

ND Not Detected at the Reporting Limit

NC Non-Chlorinated

R RPD outside accepted recovery limits

J Analyte detected below quantitation limits

H Holding times for preparation or analysis exceeded

	Sampl	le Rec	eipt	Check	dist	•			
ent Name WESTERN REFINING SOUT			,		ate Recei	ived:		4/5/2011	•
Work Order Number 1104184	( )				Received	by: LNM		٨	
				c11.	Sample II	D labels checked	by:	AT	. v
Checklist completed by:			. <u>/</u> /	7/03	<u> </u>	_		initials	
Malin		, ,,,,,,			f			•	4.
Matrix:	Carrier name	: UPS	!			ē		• • • • • • • • • • • • • • • • • • •	
Shipping container/cooler in good condition?		Yes	$\mathbf{V}$		No 🗆	Not Present			
Custody seals intact on shipping container/coo	ler?	Yes	$\square$		No 🗆	Not Present		Not Shipped	
Custody seals intact on sample bottles?		Yes			No 🗆	N/A	$\checkmark$		
Chain of custody present?		Yes	V	•	No 🗆				
Chain of custody signed when relinquished and	received?	Yes	$\checkmark$		No 🗆				
Chain of custody agrees with sample labels?		Yes	V		No 🗆				
Samples in proper container/bottle?		Yes	$\checkmark$		No 🗆				
Sample containers intact?		Yes	$\square$		No 🗌				
Sufficient sample volume for indicated test?		Yes	$\checkmark$		No 🗌	• .			
All samples received within holding time?		Yes	$\checkmark$		No 🗔		•		preserved
ter - VOA vials have zero headspace?	No VOA vials sub	mitted		Y	es 🗹	No 🗆		bottles che	S///
rater - Preservation labels on bottle and cap in	natch?	Yes	V	•	No 🗆	N/A □		3-2-	
Water - pH acceptable upon receipt?		Yes	$\checkmark$	•	No 🗌	Ņ/A 🗆		<2/>2)>12)unio	ess noted
Container/Temp Blank temperature?	,	4.	8°		C Accept		•	DOJOW.	
COMMENTS:				If gi	ven sufficie	ent time to cool.			
				í	•		•		
<b></b>			<del>-</del> -		====		==:		_======================================
				·.					
	, <b>.</b>			1					
						,		•	
Client contacted	Date contacted:	•		• • •	P6	erson contacted			
Contacted by:	Regarding:							· 	
Comments:									
								•	
	· .								
***************************************						• •			,
Corrective Action		•	•			***			· .
						·			

#### Air Bubbles (Y or N) **ANALYSIS LABORATORY** HALL ENVIRONMENTAL X ves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical 4901 Hawkins NE - Albuquerque, NM 87109 Fax 505-345-4107 www.hallenvironmental.com **Analysis Request** (AOV) 808S8 8081 Pesticides / 8082 PCB's Anions (F,CI,NO3,NO2,PO4,SO4) Tel. 505-345-3975 (HA9 10 ANA) 01E8 Remarks: TMB's (8021) INJECTION Well 2nd OIR 4- -11 (SS) j Time ples submitted to Hall Environmental may be subcontracted to other accredited laboratories. 1-500m1 = N ACETATE Preservative □ Rush Amber H2504 Na OH HNOZ 7 Tum-Around Time: Project Manager: Project Name: X Standard 1-Liter 11-250m Container Type and # (1-50m) 11-50m 11-500m 1-500m 13-16A Received by: Received by: Sampler: -Sample-Request-ID-□ Level 4 (Full Validation) **Chain-of-Custody Record** K. Con INJECTION Well Bloomfield, NM BD413 Mailing Address: #53 CR +990 CALINING email or Fax#: 525-633 — 391/ Phone #. 505-659-4/6 Q Z Relipersished by: Relinquished by Client: Western K □ Other D: 45 HaD 12:45 3:00 QA/QC Package: ☐ EDD (Type) Accreditation Time: If necessa X Standard Time: O NELAP 11-4-4 11-4-4



#### COVER LETTER

Wednesday, July 27, 2011

Kelly Robinson Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4161 FAX (505) 632-3911

RE: Injection Well 3rd Qtr

Dear Kelly Robinson:

Order No.: 1107575

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 7/15/2011 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

Please do not hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Laboratory Manager

NM Lab # NM9425 NM0901 AZ license # AZ0682



Date: 27-Jul-11
Analytical Report

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1107575

Project:

Injection Well 3rd Qtr

Lab ID:

1107575-01

Client Sample ID: Injection Well

Collection Date: 7/14/2011 2:10:00 PM

Date Received: 7/15/2011

Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					·	Analyst: SRM
Chloride .	180	10		mg/L	20	7/16/2011 10:40:59 AM
Suifate	62	2.5	r	ng/L	5	7/16/2011 11:50:38 AM
EPA METHOD 7470: MERCURY						Analyst: MBR
Mercury	0.00023	0.00020	'. r	mg/L	1	7/19/2011 2:59:05 PM
EPA 6010B: TOTAL RECOVERABLE	METALS					Analyst: ELS
Arsenic	ND	0.020	r	ng/L	1	7/21/2011 8:37:50 AM
Barium	0.21	0.020	r	ng/L	1	7/22/2011 1:45:51 PM
Cadmium	ND	0.0020	r	ng/L	1	7/21/2011 8:37:50 AM
Calcium	61	1.0	r	ng/L	1	7/22/2011 1:45:51 PM
Chromium	0.014	0.0060	r	ng/L	1	7/21/2011 8:37:50 AM
Lead	ND	0.0050	r	ng/L	1	7/21/2011 8:37:50 AM
Magnesium	12	1.0	r	ng/L	1	7/21/2011 8:37:50 AM
Potassium	4.5	1.0	n	ng/L	1	7/21/2011 8:37:50 AM
Selenium	ND	0.050	. n	ng/L	1	7/21/2011 8:37:50 AM
Silver	ND	0.0050	. <b>n</b>	ng/L	1	7/21/2011 8:37:50 AM
Sodium	. 140	5.0	'n	ng/L	5	7/22/2011 1:47:52 PM
EPA METHOD 8270C: SEMIVOLATILE	ES					Analyst: JDC
Acenaphthene	ND	10	μ	ig/L	1	7/20/2011 1:26:20 PM
Acenaphthylene	ND	10	μ	g/L	1	7/20/2011 1:26:20 PM
Aniline	ND	10	μ	ıg/L	1	7/20/2011 1:26:20 PM
Anthracene	ND	10	μ	ıg/L	1	7/20/2011 1:26:20 PM
Azobenzene	ND	10	μ	g/L	1	7/20/2011 1:26:20 PM
Benz(a)anthracene	ND	10	μ	g/L	1	7/20/2011 1:26:20 PM
Benzo(a)pyrene	ND	10	μ	g/L	1	7/20/2011 1:26:20 PM
Benzo(b)fluoranthene	ND	10	μ	g/L	1	7/20/2011 1:26:20 PM
Benzo(g,h,i)perylene	ND	10	μ	g/L	1	7/20/2011 1:26:20 PM
Benzo(k)fluoranthene	ND J	10	μ	g/L	1	7/20/2011 1:26:20 PM
Benzoic acid	26	20	μ	g/L	1	7/20/2011 1:26:20 PM
Benzyl alcohol	ND	10	μ	g/L	1	7/20/2011 1:26:20 PM
Bis(2-chloroethoxy)methane	ND	10	j.i.	g/L	1	7/20/2011 1:26:20 PM
Bis(2-chloroethyl)ether	ND	10	μ	g/L	1 `	7/20/2011 1:26:20 PM
Bis(2-chloroisopropyl)ether	ND	10	<b>µ</b> ;	g/L	1	7/20/2011 1:26:20 PM
Bis(2-ethylhexyl)phthalate	ND	10	μ	g/L	1	7/20/2011 1:26:20 PM
4-Bromophenyl phenyl ether	ND	10	μ	g/L	1	7/20/2011 1:26:20 PM
Butyl benzył phthalate	ND	10	þ	g/L	1	7/20/2011 1:26:20 PM
Carbazole	ND	10	þi	g/L	1	7/20/2011 1:26:20 PM
4-Chloro-3-methylphenol	. ND	10	μ	g/L	1	7/20/2011 1:26:20 PM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded

MCL Maximum Contaminant Level

- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 1 of 7

Date: 27-Jul-11

Analytical Report

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1107575

Project:

Injection Well 3rd Qtr

Lab ID:

1107575-01

Client Sample ID: Injection Well

Collection Date: 7/14/2011 2:10:00 PM

Date Received: 7/15/2011
Matrix: AQUEOUS

Analyses	Result	PQL	Qual U	nits D	)F	Date Analyzed
<b>EPA METHOD 8270C: SEMIVOLATILES</b>		· · · · · · · · · · · · · · · · · · ·			**	Analyst: JDC
4-Chloroaniline	ND	10	. µg	/L 1		7/20/2011 1:26:20 PM
2-Chloronaphthalene	ND	10	μ̈́g			7/20/2011 1:26:20 PM
2-Chlorophenol	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
4-Chlorophenyl phenyl ether	ND	10	hã	/L 1		7/20/2011 1:26:20 PM
Chrysene	ND	10	րց	/L 1		7/20/2011 1:26:20 PM
Di-n-butyl phthalate	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
Di-n-octyl phthalate	ND	10	hâ	/L 1		7/20/2011 1:26:20 PM
Dibenz(a,h)anthracene	ND	10	μg	/L 1	*	7/20/2011 1:26:20 PM
Dibenzofuran	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
1,2-Dichlorobenzene	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
1,3-Dichlorobenzene	ND	10	μ̈́g	/L 1		7/20/2011 1:26:20 PM
1,4-Dichlorobenzene	ND	10	μg	<i>I</i> L 1		7/20/2011 1:26:20 PM
3,3'-Dichlorobenzidine	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
Diethyl phthalate	ND	10	μg	/L _ 1		7/20/2011 1:26:20 PM
Dimethyl phthalate	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
2,4-Dichlorophenol	ND	20	μg	/L 1		7/20/2011 1:26:20 PM
2,4-Dimethylphenol	ND	10	μ̈g	/L 1		7/20/2011 1:26:20 PM
4,6-Dinitro-2-methylphenol	ND	20	μg	/L 1		7/20/2011 1:26:20 PM
2,4-Dinitrophenol	ND	20	μg	/L 1		7/20/2011 1:26:20 PM
2,4-Dinitrotoluene	ND	10	hā	/L 1	•	7/20/2011 1:26:20 PM
2,6-Dinitrotoluene	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
Fluoranthene	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
Fluorene	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
Hexachlorobenzene	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
Hexachlorobutadiene	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
Hexachlorocyclopentadiene	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
Hexachloroethane	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
Indeno(1,2,3-cd)pyrene	ND	10	Ьā	/L 1		7/20/2011 1:26:20 PM
Isophorone	ND	10	h8	/L 1		7/20/2011 1:26;20 PM
2-Methylnaphthalene	ND	10	hã	/L 1		7/20/2011 1:26:20 PM
2-Methylphenol	14	10	рд	/L 1		7/20/2011 1:26:20 PM
3+4-Methylphenol	13	10	μg	/L 1		7/20/2011 1:26:20 PM
N-Nitrosodi-n-propylamine	ND	10	μg	/L 1		7/20/2011 1:26:20 PM
N-Nitrosodimethylamine	. ND	10	μg	/L 1		7/20/2011 1:26:20 PM
N-Nitrosodiphenylamine	ND	10	hâ	/L 1		7/20/2011 1:26:20 PM
Naphthalene	ND	10	þg	/L 1		7/20/2011 1:26:20 PM
2-Nitroaniline	ND	10	ha	/L 1		7/20/2011 1:26:20 PM
3-Nitroanlline	ND	10	þĝ	/L 1		7/20/2011 1:26:20 PM
4-Nitroaniline	ND ·	20	μg	/L 1		7/20/2011 1:26:20 PM
Nitrobenzene	ND	10	μg	/L 1		7/20/2011 1:26:20 PM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 2 of 7

Date: 27-Jul-11
Analytical Report

**CLIENT:** 

Western Refining Southwest, Inc.

Lab Order:

1107575

Project:

Injection Well 3rd Qtr

Lab ID:

1107575-01

Client Sample ID: Injection Well

Collection Date: 7/14/2011 2:10:00 PM

Date Received: 7/15/2011 Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILE	S				Analyst: JDC
2-Nitrophenol	ND	10	µg/L	1	7/20/2011 1:26:20 PM
4-Nitrophenol	ND	10	μg/L	1	7/20/2011 1:26:20 PM
Pentachlorophenol	ND	20	μg/L	1	7/20/2011 1:26:20 PM
Phenanthrene	ND	10	μg/L	1	7/20/2011 1:26:20 PM
Phenol	12	10	µg/L	1	7/20/2011 1:26:20 PM
Pyrene	ND	10	µg/L	1	7/20/2011 1:26:20 PM
Pyridine	ND.	10	μġ/L	1	7/20/2011 1:26:20 PM
1,2,4-Trichlorobenzene	ND	10	µg/L,	1	7/20/2011 1:26:20 PM
2,4,5-Trichlorophenol	ND	10	μg/L	1	7/20/2011 1:26:20 PM
2,4,6-Trichlorophenol	ND	10	μg/L	1	7/20/2011 1:26:20 PM
Surr: 2,4,6-Tribromophenol	87.6	14.4-140	%REC	1	7/20/2011 1:26:20 PM
Surr: 2-Fluoroblphenyl	78.8	31.2-116	%REC	1	7/20/2011 1:26:20 PM
Surr: 2-Fluorophenol	61.9	11.8-102	%REC	1	7/20/2011 1:26:20 PM
Surr: 4-Terphenyl-d14	79.0	19.1-132	%REC	1	7/20/2011 1:26:20 PM
Surr: Nitrobenzene-d5	75.8	21.3-126	%REC	1	7/20/2011 1:26:20 PM
Surr: Phenol-d5	46.4	13.7-82.2	%REC	1	7/20/2011 1:26:20 PM
EPA METHOD 8260B: VOLATILES					Analyst: MMS
Benzene	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
Toluene	2.4	1.0	µg/L	1	7/19/2011 1:39:48 AM
Ethylbenzene	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
1,2,4-Trimethylbenzene	1.4	1.0	μg/L	1	7/19/2011 1:39:48 AM
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
1,2-Dichloroethane (EDC)	ND	1.0	h8∖r	1	7/19/2011 1:39:48 AM
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
Naphthalene	ND	2.0	μg/L	1	7/19/2011 1:39:48 AM
1-Methylnaphthalene	ND	4.0	µg/L	1	7/19/2011 1:39:48 AM
2-Methylnaphthalene	ND	4.0	µg/L	1	7/19/2011 1:39:48 AM
Acetone	330	50	µg/L	5	7/19/2011 1:18:51 PM
Bromobenzene	ND	1.0	µg/L	t	7/19/2011 1:39:48 AM
Bromodichloromethane	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
Bromoform	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
Bromomethane	ND	3.0	µg/L	1	7/19/2011 1:39:48 AM
2-Butanone	ND	10	μg/L	1	7/19/2011 1:39:48 AM
Carbon disulfide	ND	10	μg/L	1	7/19/2011 1:39:48 AM
Carbon Tetrachloride	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
Chlorobenzene	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
Chloroethane	ND	2.0	μg/L	1	7/19/2011 1:39:48 AM
Chloroform	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 3 of 7

Date: 27-Jul-11

Analytical Report

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1107575

Project:

Injection Well 3rd Qtr

Lab ID:

1107575-01

Client Sample ID: Injection Well

Collection Date: 7/14/2011 2:10:00 PM

Date Received: 7/15/2011

Matrix: AQUEOUS

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Analyst: MMS
Chloromethane	ND	3.0	μ <b>g/L</b>	. 1	7/19/2011 1:39:48 AM
2-Chlorotoluenė	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
4-Chlorotoluene	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
cis-1,2-DCE	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	, 1	7/19/2011 1:39:48 AM
Dibromochloromethane	, ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
Dibromomethane	ND	1.0	µg/L	. 1	7/19/2011 1:39:48 AM
1,2-Dichlorobenzene	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
1,3-Dichlorobenzene	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
1,4-Dichlorobenzene	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
Dichlorodifluoromethane	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
1,1-Dichloroethane	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
1,1-Dichloroethene	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
1,2-Dichloropropane	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
1,3-Dichloropropane	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
2,2-Dichloropropane	ND	2.0	μg/L	1 ·	7/19/2011 1:39:48 AM
1,1-Dichloropropene	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
Hexachlorobutadiene	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
2-Hexanone	ND -	10	µg/L	1	7/19/2011 1:39:48 AM
Isopropyibenzene	ND	1.0	μg/L	· 1	7/19/2011 1:39:48 AM
4-Isopropyltoluene	ND	1:0	μg/L	1	7/19/2011 1:39:48 AM
4-Methyl-2-pentanone	ND	10	μg/L	1	7/19/2011 1:39:48 AM
Methylene Chloride	ND	3.0	μg/L	1	7/19/2011 1:39:48 AM
n-Butylbenzene	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
n-Propylbenzene	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
sec-Butylbenzene	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
Styrene	ND	1.0	μg/L	1	7/19/2011 1:39:48 AM
tert-Butylbenzene	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	7/19/2011 1:39:48 AM
Tetrachloroethene (PCE)	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
trans-1,2-DCE	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
trans-1;3-Dichloropropene	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
1,2,3-Trichlorobenzene	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
1,2,4-Trichlorobenzene	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
1,1,1-Trichloroethane	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
1,1,2-Trichloroethane	ND	1.0	µg/L	1	7/19/2011 1:39:48 AM
Trichloroethene (TCE)	ND	1.0	μ <b>g/L</b>	1	7/19/2011 1:39:48 AM
Trichlorofluoromethane	ND	1.0	μ <b>g/</b> L	1	7/19/2011 1:39:48 AM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL. Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
  - S Spike recovery outside accepted recovery limits

Page 4 of 7

Date: 27-Jul-11

Analytical Report

CLIENT: Western Refining Southwest, Inc.

Lab Order:

1107575

Project:

Injection Well 3rd Qtr

Lab ID:

1107575-01

Client Sample ID: Injection Well

Collection Date: 7/14/2011 2:10:00 PM

Date Received: 7/15/2011
Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	i					Analyst: MMS
1,2,3-Trichloropropane	. ND	2.0		µg/L	1	7/19/2011 1:39:48 AM
Vinyl chloride	ND	1.0		µg/L	1	7/19/2011 1:39:48 AM
Xylenes, Total	6.8	1.5		μg/L	1	7/19/2011 1:39:48 AM
Surr: 1,2-Dichloroethane-d4	104	65.8-138		%REC	1	7/19/2011 1:39:48 AM
Surr: 4-Bromofluorobenzene	113	72.7-128		%REC	1	7/19/2011 1:39:48 AM
Surr: Dibromofluoromethane	110	69-135		%REC	1	7/19/2011 1:39:48 AM
Surr: Toluene-d8	104	86.1-134		%REC	1	7/19/2011 1:39:48 AM
SM 2320B: ALKALINITY		•				Analyst: LJB
Alkalinity, Total (As CaCO3)	150	20		mg/L CaCO3	1	7/19/2011 5:47:00 PM
Carbonate	ND	2.0		mg/L CaCO3	1	7/19/2011 5:47:00 PM
Bicarbonate	150	20		mg/L CaCO3	1	7/19/2011 5:47:00 PM
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: LJB
Specific Conductance	1000	0.010		µmhos/cm	1	7/15/2011 7:35:00 PM
SM4500-H+B: PH						Analyst: LJB
рН	7.06	0.100	н	pH units	1	7/15/2011 7:35:00 PM
SM2540C MOD: TOTAL DISSOLVED SOL	.IDS					Analyst: KS
Total Dissolved Solids	700	20.0		mg/L	1	7/19/2011 10:45:00 AM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded.
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 5 of 7

Date: 27-Jul-11
Analytical Report

CLIENT: W

Western Refining Southwest, Inc.

Client Sample ID: Trip Blank

Lab Order:

1107575

**Collection Date:** 

Project:

Injection Well 3rd Qtr

Date Received: 7/15/2011

Lab ID:

1107575-02

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES			!		Analyst: MMS
Benzane	ND	1.0	µg/L	1	7/19/2011 2:08:01 AM
Toluene	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
Ethylbenzene	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
1,3,5-Trimethylbenzene	ND	1.0	µg/L	1	7/19/2011 2:08:01 AM
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
Naphthalene	ND	2.0	µg/L	1	7/19/2011 2:08:01 AM
1-Methylnaphthalene	ND	4.0	μg/L	1	7/19/2011 2:08:01 AM
2-Methylnaphthalene	ND .	4.0	µg/L	1	7/19/2011 2:08:01 AM
Acetone	ND	10	μg/L	1	7/19/2011 2:08:01 AM
Bromobenzene	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
Bromodichloromethane	ND	1.0	µg/L	1	7/19/2011 2:08:01 AM
Bromoform	ND	1.0	µg/L	1	7/19/2011 2:08:01 AM
Bromomethane	ND	3.0	µg/L	1	7/19/2011 2:08:01 AM
2-Butanone	ND	10	μg/L	1	7/19/2011 2:08:01 AM
Carbon disulfide	ND	10	µg/L	1	7/19/2011 2:08:01 AM
Carbon Tetrachloride	ND	1.0	µg/L	.1	7/19/2011 2:08:01 AM
Chlorobenzene	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
Chloroethane	ND	2.0	μg/L	1	7/19/2011 2:08:01 AM
Chloroform	ND	1.0	µg/L	1	7/19/2011 2:08:01 AM
Chloromethane	ND	3.0	, -	1	7/19/2011 2:08:01 AM
2-Chiorotoluene	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
4-Chlorotoluene	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
cis-1,2-DCE	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
cis-1,3-Dichloropropene	ND '	1.0	µ <b>g/</b> L	1	7/19/2011 2:08:01 AM
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	7/19/2011 2:08:01 AM
Dibromochloromethane	ND	1.0	µg/L	1	7/19/2011 2:08:01 AM
Dibromomethane	ND	1.0	µg/L	1	7/19/2011 2:08:01 AM
1,2-Dichlorobenzene	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
1,3-Dichlorobenzene	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
1,4-Dichlorobenzene	ND	1.0	µg/L	1	7/19/2011 2:08:01 AM
Dichlorodifluoromethane	ND	1.0	µg/L	1	7/19/2011 2:08:01 AM
1,1-Dichloroethane	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
1,1-Dichloroethene	ND	1.0	μg/L	. 1	7/19/2011 2:08:01 AM
1,2-Dichloropropane	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
1,3-Dichloropropane	ND	1.0	μg/L	1	7/19/2011 2:08:01 AM
2,2-Dichloropropane	ND	2.0	μg/L	1	7/19/2011 2:08:01 AM
1,1-Dichloropropene	ND	1.0	µg/L	1	7/19/2011 2:08:01 AM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 6 of 7

Date: 27-Jul-11
Analytical Report

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1107575

Project: Lab ID: Injection Well 3rd Qtr

1107575-02

Client Sample ID: Trip Blank

**Collection Date:** 

**Date Received:** 7/15/2011

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual 1	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES				· · · · · · · · · · · · · · · · · · ·		Analyst: MMS
Hexachlorobutadiene	ND	1.0		ug/L	1	7/19/2011 2:08:01 AM
2-Hexanone	ND	10	ı	ug/L	1	7/19/2011 2:08:01 AM
Isopropylbenzene	ND	1.0	ı	ug/L	1	7/19/2011 2:08:01 AM
4-Isopropyltoluene	ND	1.0	3	ug/L	1	7/19/2011 2:08:01 AM
4-Methyl-2-pentanone	ND	10	1	ug/L	1	7/19/2011 2:08:01 AM
Methylene Chloride	ND	3.0		ug/L	1	7/19/2011 2:08:01 AM
n-Butylbenzene	ND	1.0	,	ug/L	1	7/19/2011 2:08:01 AM
n-Propylbenzene	ND	1.0	ı	ug/L	1	7/19/2011 2:08:01 AM
sec-Butylbenzene	ND	1.0	. 1	ug/L	1	7/19/2011 2:08:01 AM
Styrene	ND	1.0		Jg/L	1	7/19/2011 2:08:01 AM
tert-Butylbenzene	ND	1.0		ug/L	1	7/19/2011 2:08:01 AM
1,1,1,2-Tetrachioroethane	ND	1.0		ug/L	1	7/19/2011 2:08:01 AM
1,1,2,2-Tetrachloroethane	ND	2.0		ıg/L	1	7/19/2011 2:08:01 AM
Tetrachloroethene (PCE)	ND	1.0		Jg/L	1	7/19/2011 2:08:01 AM
trans-1,2-DCE	ND	1.0		ug/L	1	7/19/2011 2:08:01 AM
trans-1,3-Dichloropropene	ND	1.0		ıg/L	1	7/19/2011 2:08:01 AM
1,2,3-Trichlorobenzene	ND	1.0		ıg/L	1	7/19/2011 2:08:01 AM
1,2,4-Trichlorobenzene	ND	1.0		ıg/L	1	7/19/2011 2:08:01 AM
1,1,1-Trichloroethane	ND	1.0	-	ıg/L.	1	7/19/2011 2:08:01 AM
1,1,2-Trichloroethane	ND	1.0		ıg/L	1	7/19/2011 2:08:01 AM
Trichloroethene (TCE)	ND	1.0		ıg/L	1	7/19/2011 2:08:01 AM
Trichlorofluoromethane	ND	1.0		ıg/L	1	7/19/2011 2:08:01 AM
1,2,3-Trichloropropane	. ND	2.0		ug/L	1	7/19/2011 2:08:01 AM
Vinyl chloride	ND	1.0		Jg/L	1	7/19/2011 2:08:01 AM
Xylenes, Total	ND	1.5	-	ıg/L	1	7/19/2011 2:08:01 AM
Surr: 1,2-Dichloroethane-d4	107	65.8-138	-	%REC	, <b>1</b>	7/19/2011 2:08:01 AM
Surr: 4-Bromofluorobenzene	104	72.7-128	q	%REC	1	7/19/2011 2:08:01 AM
Surr: Dibromofluoromethane	110	69-135	q	%REC	1	7/19/2011 2:08:01 AM
Surr: Toluene-d8	105	86.1-134	q	%REC	1	7/19/2011 2:08:01 AM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- POL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits



Tax I.D. 62-0814289

Est. 1970

12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

L526363-01

YOUR LAB OF CHOICE

REPORT OF ANALYSIS

July 22, 2011

Anne Thorne Hall Environmental Analysis Laborat 4901 Hawkins NE Albuquerque, NM 87109

ESC Sample # :

Date Received Description

July

16, 2011 .

Site ID :

Sample ID

INJECTION WELL

Project # : 1107575

Collected By : Collection Date :

07/14/11 14:10

Parameter	Result	Det. Limit	Units	Method	Date	e Dil.	
Corrosivity	Non-Corrosive			9045D	07/21,	/11 1	
Ignitability	See Footnote		Deg. F	D93/1010A	07/22	/11 1	
Reactive CN (SW846 7.3.3.2)	BDL	0.125	mg/kg	9012B	07/21	/ <b>11</b> 1	
Reactive Sulf.(SW846 7.3.4.1)	BDL	25.	mg/kg	9034/9030B	. 07/20	/11 1	

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC. . Reported: 07/22/11 17:07 Printed: 07/22/11 17:08 L526363-01 (IGNITABILITY) - Did Not Ignite @ 170 F

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Work Order:

1107575

Analyte	Result	Units	PQL	SPK Va SPK	ref	%Rec Lo	owLlmit Hi	ghLimit %RPD	RPDLimit Qual
Method: EPA Method 300.0: A	nions								
Sample ID: MB		MBLK				Batch ID:	R46573	Analysis Date:	7/15/2011 11:28:12 AM
Chloride	ND	mg/L	0.50						
Sulfate	ND	mg/L	0.50	÷					
Sample ID: MB		MBLK				Batch ID:	R46573	Analysis Date:	7/15/2011 11:56:49 PM
Chloride	ND	mg/L	0.50						
Sulfate	ND	mg/L	0.50						•
Sample ID: LCS		LCS	}			Batch ID:	R46573	Analysis Date:	7/15/2011 11:45:37 AM
Chloride	5.098	mg/L	0.50	5	0	102	90	110	
Sulfate	10.31	mg/L	0.50	10 -	0	103	90	110	
Sample ID: LCS		LCS				Batch ID:	R46573	Analysis Date:	7/16/2011 12:14:14 AM
Chloride	5.135	mg/L	0.50	5	0 .	103	90	110	
Sulfate	10.37	m <b>g/L</b>	0.50	10	0	104	90	110	
Method: SM 2320B: Alkalinity				1 1					
Sample ID: MB-1		MBLK				Batch ID:	R46630	Analysis Date:	7/19/2011 4:34:00 PM
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20			•			
Carbonate	ND	mg/L Ca	2.0						
Bicarbonate	ND	mg/L Ca	20						
Sample ID: LCS-1		LCS	Ì	•		Batch ID:	R46630	Analysis Date:	7/19/2011 4:51:00 PM
Alkalinity, Total (As CaCO3)	79.08	mg/L Ca	20	80	0	98.9	90	110	

Qua	HI	ers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

# QA/QC SUMMARY REPORT

Cat:

Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr

Work Order:

1107575

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	owLimit HighLin	nit %RPD	RPDLimit	Qual
Method: EPA Method 8260B:	VOLATILES				,				
Sample ID: b1		MBLK			Batch ID:	R46597 - Ani	alysis Date:	7/18/2011	7:36:21 PN
Benzene	ND	μg/L	1.0				•		
Toluene	ND	µg/L	1.0					•	
Ethylbenzene	ND	µg/L	1.0				٠		
Methyl tert-butyl ether (MTBE)	ND	µg/L	1.0	-					
1,2,4-Trimethylbenzene	ND	μg/L	1.0						
1,3,5-Trimethylbenzene	ND	µg/L	1.0				·		
1,2-Dichloroethane (EDC)	ND	µg/L	1.0				•		
1,2-Dibromoethane (EDB)	ND	μg/L	1.0						
Naphthalene	ND	μg/L	2.0				•		
1-Methylnaphthalene	ND	µg/L	4.0						
2-Methylnaphthalene	ND	µg/L	4.0	*					
Acetone	ND	µg/L	10						
Bromobenzene	ND	µg/L	1.0						
Bromodichloromethane	ND	μg/L	1.0						•
Bromoform	ND	μg/L	1.0						
Bromomethane .	ND	μg/L	3.0		lı .				
2-Butanone	ND	μg/L	-10		,				
Carbon disulfide	ND	µg/L	10						
Carron Tetrachloride	ND	µg/L	1.0						
obenzene	ND	μg/L	1.0						
Chloroethane	ND	μg/L	2.0			• •			
Chloroform	ND	µg/L	1.0						
Chloromethane	ND	µg/L	3.0						
2-Chiorotoluane	ND	µg/L	1.0			*			
4-Chlorotoluene	ND	µg/L	1.0					~	
cis-1,2-DCE	ND	µg/L	1.0						
cis-1,3-Dichloropropene	ND	μg/L	1.0						
1,2-Dibromo-3-chloropropane	ND	μg/L	2.0						
Dibromochloromethane	ND	µg/L	1.0						
Dibromomethane	ND	μg/L	1.0						
,2-Dichlorobenzene	ND	µg/L µg/L	1.0						
,3-Dichlorobenzene	ND	μ <b>g/</b> L	1.0						
,4-Dichlorobenzene	ND -	μg/L	1.0						
Dichlorodifluoromethane	ND	μg/L μg/L	1.0		•				
,1-Dichloroethene	ND	μg/L	1.0				•		
,2-Dichloropropane	ND	μg/L	1.0				•		
,3-Dichloropropane	ND	μg/L	1.0						
,2-Dichloropropane	ND	µg/L	2.0	, *		* •			
,1-Dichloropropene	ND	μg/L	1.0						
lexachiorobutadiene	ND	µg/L	1.0						
-Hexanone	ND	hã/r hã/r	1.0	<u>.</u> *.			•		
opropylbenzene	ND.	μg/L μg/L	1.0					•	
	ND ND		1.0						
-Isopropyltoluene Mathyl 2 pantanone	ND	µg/L	1.0						
-Methyl-2-pentanone	110	µg/L	10						

lifiers:

. J

Estimated value

Analyte detected below quantitation limits

Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Work Order:

1107575

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec L	owLimit Hi	ghLimit %R	PD RPDLimit Qual
Method: EPA Method 8260E	B: VOLATILES	<u></u>			······································			
Sample ID: b1		MBLK			Batch ID:	R46597	Analysis Date	e: 7/18/2011 7:36:21 PN
Methylene Chloride	ND	µg/L	3.0					
n-Butylbenzene	ND	μg/L	1.0	,				
n-Propylbenzene	ND	μg/L	1.0					
sec-Butylbenzene	ND	µg/L	1.0					
Styrene	ND	μg/L	1.0					
tert-Butylbenzene	ND	μg/L	1.0					
Tetrachloroethene (PCE)	ND	µg/L	1.0					
trans-1,2-DCE	ND	µg/L	1.0					
trans-1,3-Dichloropropene	ND .	μg/L	1.0					
1,2,3-Trichlorobenzene	ND	µg/L	1.0					
1,2,4-Trichlorobenzene	ND	µg/L	1.0					
Trichloroethene (TCE)	ND	µg/L	1.0					
Trichlorofluoromethane	ND	μg/L	1.0					
1,2,3-Trichloropropane	ND	µg/L	2.0					
Vinyl chloride	ND	μg/L	1.0		•			
Xylenes, Total	2.772	µg/L	1.5					
Sample ID: 5ml rb		MBLK			Batch ID:	R46633	Analysis Date	: 7/19/2011 10:00:20 AN
Benzene	ND	μg/L	1.0					•
Toluene	ND	μg/L	1.0		•			
Ethylbenzene	ND	μg/L	1.0	•				•
Methyl tert-bulyl ether (MTBE)	ND	µg/L	1.0	•				
1,2,4-Trimethylbenzene	ND	μg/L	1.0					
1,3,5-Trimethylbenzene	ND	μg/L	1.0					•
1,2-Dichloroethane (EDC)	ND	µg/L	1.0					
1,2-Dibromoethane (EDB)	ND	μg/L	1.0					
Naphthalene	· ND	µg/L	2.0					
1-Methylnaphthalene	ND	μg/L	4.0					
2-Methylnaphthalene	ND	µg/L	4.0					·
Acetone	ND	µg/L	10					
Bromobenzene	ND	μg/L	1.0					
Bromodichloromethane	ND	µg/L	1.0					
Bromoform	ND	μg/L	1.0					
Bromomethane	ND	μg/L	3.0					
2-Butanone	ND	µg/L	10					
Carbon disulfide	ND	μg/L	10					
Carbon Tetrachloride	ND	µg/L	1.0					
Chlorobenzene	ND	µg/L	1.0			•		
Chloroethane	ND	µg/L	2.0					
Chloroform	ND	µg/L	1.0					
Chloromethane	ND	μg/L	3.0		٠			•
2-Chlorotoluene	ND	μg/L	1.0					
1-Chlorotoluene	ND	µg/L	1.0		•			
cis-1,2-DCE	ND	µg/L	1.0					
cis-1,3-Dichloropropene	ND	µg/L	1.0					•
Qualifiers:			<del></del>			······	<del></del>	

Qualifiers:

Page 3

NC

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

Non-Chlorinated

R RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

Cht:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Work Order:

1107575

Analyte	Result	Units	PQL	SPK Va SPK re	f %Rec	LowLimit Hig	ghLimit %RP	D RPDLimit Qual
Method: EPA Method 82608	3: VOLATILES							
Sample ID: 5ml rb		MBLK			Batch ID:	R46633	Analysis Date:	7/19/2011 10:00:20 AI
1,2-Dibromo-3-chioropropane	ND	μg/L	2.0	,		•		
Dibromochloromethane	ND	μg/L	1.0					
Dibromomethane	ND	µg/L	1.0					
1,2-Dichlorobenzene	ND	µg/L	. 1.0					
1,3-Dichlorobenzene	ND	µg/L	1.0					
1,4-Dichlorobenzene	ND	µg/L	1.0		•			·
Dichlorodifluoromethane	ND	μg/L	1.0					
1,1-Dichloroethane	ND T	µg/L	1.0		,			
1,1-Dichloroethene	ND	μg/L	1.0					
1,2-Dichloropropane	ND	µg/L	1.0					
1,3-Dichloropropane	ND	μ <b>g/L</b>	1.0					
2,2-Dichloropropane	ND	µg/L	2.0					
1,1-Dichloropropene	ND	μg/L	1.0		** 1'			
Hexachlorobutadiene	ND	µg/L	1.0		•			
2-Hexanone	ND	µg/L	10					
Isopropyibenzene	ND	µg/L	1.0	•	·			
4-isopropyltoluene	ND	μg/L	1.0					
4-Methyl-2-pentanone	ND	µg/L	10					
Mathylene Chloride	ND	μg/L	3.0		1	,		
ylbenzene	ND	µg/L	1.0					
n-Propylbenzene	ND	μg/L	1.0	•				
sec-Butylbenzene	ND	µg/L	1.0					•
Styrene	ND	μg/L	1.0		•	•		
tert-Butylbenzene	ND	μg/L	1.0					
1,1,1,2-Tetrachloroethane	ND	µg/L	1.0					
1,1,2,2-Tetrachioroethane	ND	µg/L	2.0		ś		•	
Tetrachloroethene (PCE)	ND	hg/r	1.0					
trans-1,2-DCE	ND	µg/L	1.0		h			
rans-1,3-Dichloropropene	ND	µg/L	1.0					•
1,2,3-Trichlorobenzene	ND	μg/L	1.0					
1,2,4-Trichlorobenzene	ND	µg/L	1.0			•		
1,1,1-Trichtoroethane	ND	ha\r	1.0					
1,1,2-Trichloroethane	ND	µg/L	1.0					
Frichloroethene (TCE)	ND	h8/F	1.0					
Frichlorofluoromethane	ND	μg/L	1.0					
1,2,3-Trichloropropane	ND	μg/L	2.0					
/inyl chloride	ND	μg/L	1.0	·				
(ylenes, Total	ND	μg/L	1.5					
Sample ID: 100ng lcs	,,,,	LCS	,		Batch ID:	R46597	Analysis Date:	7/18/2011 8:57:07 PM
•	40.50		4.0	20 0			_	
Benzene .	19.56	μg/L	1.0	20 0	97.8		130	
oluene	20.65	µg/L	1.0	20 0	103		122	
Chlorobenzene	20.53	μg/L	1.0	20 0	103		130	
,1-Dichloroethene	19.37	μ <b>g</b> /L	1.0	20 0	96.8		126	•
richloroethene (TCE)	20.11	µg/L	1.0	20 <b>0</b>	101	67.4	137	

Estimated value

Analyte detected below quantitation limits

Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Work Order:

1107575

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec L	owLimit Hi	ghLlmit %RP	D RPDLimit Qual
Method: EPA Method 8260B: Sample ID: 100ng Ics	VOLATILES	LCS				Batch ID:	R46633	Analysis Date:	7/19/2011 10:56:54 AM
Benzene	21.29	μg/L	1.0	20	0	106	81.1	130	
Toluene .	19.95	μg/L	1.0	20	0	99.7	82.3	122	
Chlorobenzene	19.83	μg/L	1.0	20	0	99.2	70	130	
1,1-Dichloroethene	21.32	μg/L	1.0	20	0	107	83.1	126	•
Trichloroethene (TCE)	21.22	µg/L	1.0	20	0	106	67.4	137	

Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits



## **QA/QC SUMMARY REPORT**

Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr

Work Order:

1107575

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	wLimit Hig	hLimit %RPD	RPDLimit Qual
Method: EPA Method 8270C	: Semivolatile:	,						
Sample ID: mb-27628		MBLK			Batch ID:	27628	Analysis Date:	7/19/2011 12:09:09 P
Acenaphthene	ND	µg/L	10					
Acenaphthylene	ND	hg/L	10					•
Anlline	ND	μg/L	10					
Anthracene	ND	µg/L	10					
Azobenzene	ND	µg/L	10					
Benz(a)anthracene	ND	µg/L	10		4			
Benzo(a)pyrene	ND	μg/L	10					•
Benzo(b)fluoranthene	ND .	h@/r	10					
Benzo(g,h,i)perylene	ND	μg/L	10					
Benzo(k)fluoranthene	ND	μg/L	10					
Benzoic acid	ND	μg/L	20					
Benzyl alcohol	ND	μg/L	10					
Bis(2-chloroethoxy)methane	ND	μg/L	10					
Bis(2-chloroethyl)ether	· ND	µg/L	10					
Bis(2-chloroisopropyl)ether	ND	µg/L	10					
Bis(2-ethylhexyl)phthalate	ND	µg/L	10					
4-Bromophenyl phenyl ether	ND	μg/L	10					
Butyl benzyl phthalate	ND	μg/L	10					
azole	ND	µg/L	10					
oro-3-methylphenol	ND	μg/L	10	•				
4-Chloroaniline	ND	μg/L	10					
2-Chloronaphthalene	ND	μg/L	10					
2-Chlorophenol	ND	µg/L	10					
4-Chlorophenyl phenyl ether	ND	μg/L	10					
Chrysene	ND	µg/L	10		-			
Di-n-butyl phthalate	ND	μg/L	10					
Di-n-octyl phthalate	ND	μg/L	10				•	
Dibenz(a,h)anthracene	ND	μg/L	10					
Dibenzofuran	ND	μg/L	10					
1,2-Dichlorobenzene	ND	µg/L	10		ı			4
1,3-Dichlorobenzene	ND	μg/L	10				•	
I,4-Dichlorobenzene	ND	μg/L	10			•		
3,3'-Dichlorobenzidine	ND	µg/L	10	•				
Diethyl phthalate	ND	μg/L	10					
Dimethyl phthalate	ND	μg/L	10					
2,4-Dichlorophenol	ND	μg/L	20					
2,4-Dimethylphenol	ND	µg/L	10					
1,6-Dinitro-2-methylphenol	ND	µg/L	20					
2,4-Dinitrophenol	ND	μg/L	20					
2,4-Dinitrotoluene	ND	µg/L	10					
2,6-Dinitrotoluene	ND .	μg/L	10					
luoranthene	ND	µg/L	10		t	•		
luorene	ND	µg/L	10					
fexachlorobenzene	ND	µg/L	10					•
IOVECHIOIOPORTECHIC	140	hã. r	10					

lifiers:

E Estimated value

Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

RPD outside accepted recovery limits

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Work Order:

1107575

				<u> </u>							1107575
Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit F	lighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 82700	: Semivolatile					D-4.1.1D					
Sample ID: mb-27628		MBLK				Batch ID:	27628	Analys	sis Date:	7/19/2011 1:	2:09:09 PI
Hexachlorobutadiene	ND	μg/L	10								
Hexachlorocyclopentadiene	ND	µg/L	10								
Hexachloroethane	ND	µg/L	10								
Indeno(1,2,3-cd)pyrene	ND	μg/L	10								
Isophorone	ND	μg/L	10					-			
2-Methylnaphthalene	ND	µg/L	10								
2-Methylphenol	ND	µg/L	10								
3+4-Methylphenol	ND	hB/F	10								
N-Nitrosodi-n-propylamine	ND	µg/L	10								
N-Nitrosodimethylamine	ND	μg/L	10								
N-Nitrosodiphenylamine	ND	μg/L	10								
Naphthalene	ND	µg/L	10			•					
2-Nitroaniline	ND	µg/∟	10								
3-Nitroaniline	ND	µg/L	10	•							
4-Nitroaniline	ND	μg/L	20								
Nitrobenzene	ND	μg/L	10								
2-Nitrophenol	ND	μg/L	10								
4-Nitrophenol	ND	μg/L	10								•
Pentachlorophenol	ND	µg/L	20								
Phenanthrene	ND	µg/L	10				-				
Phenol	ND	µg/L	10								
Pyrene	ND	μ <b>g/L</b>	10								
Pyridine	ND	µg/L	10								
1,2,4-Trichlorobenzene	ND	μg/L	10								
2,4,5-Trichlorophenol	ND	µg/L	10								
2,4,6-Trichlorophenol	ND	µg/L	10								•
Sample ID: Ics-27628		LCS				Batch ID:	27628	Analysi	is Date:	7/19/2011 12	:39:21 PM
Acenaphthene	90.66	µg/L	10	100	0	90.7	31.7	107			
4-Chloro-3-methylphenol	158.9	μg/L	10	200	0	79.5	24.4.	123			
2-Chlorophenol	144.6	µg/L	10	200	0	72.3	24.7	104			
1,4-Dichlorobenzene	73.62	μg/L	10	100	0	73.6	20.3	95			
2,4-Dinitrotoluene	91.30	µg/L	10	100	0	91.3	22.4	106			
N-Nitrosodi-n-propylamine	76.62	µg/L	10	100	0	76.6	25.3	107			
I-Nitrophenol	74.30	hã/ľ	10	200	5.96	34.2	11.6	110			
Pentachlorophenol	112.3	µg/L	20	200	0	56.1	19.5	113			
Phenol	98.52	µg/L	10	200	0	49.3	16.1	59.3			
yrene	85.04	μg/L	10	100	0	85.0	38.3	99.3			
2,4-Trichlorobenzene	78.98	<b>ի</b> 8/Ր	10	100	0	79.0	25	97.3			
Sample ID: Icsd-27628		LCSD				Batch ID:	27628	Analysis	s Date:	7/19/2011 1:	09:27 PM
cenaphthene	93.88	μg/L	10	100	0	93.9	31.7	107	3.49	20	
-Chloro-3-methylphenol	155.4	μg/L	10	200	0	77.7	24.4	123	2.25	20	
-Chlorophenol	127.0	μg/L	10	200	0	63.5	24.7	104	12.9	20	
,4-Dichlorobenzene	73.80	μg/L	10	100	0	73.8	20.3	95	0.244	20	
,4-Dinitrotoluene	92.78	µg/L	10	100	0	92.8	22.4	106	1.61	20	

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

# **QA/QC SUMMARY REPORT**

**O**nt:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd Qtr

Work Order:

1107575

Method: EPA Method 8270C: Sample ID: Icsd-27628 N-Nitrosodi-n-propylamine 4-Nitrophenol Pentachlorophenol Phenol Pyrene 1,2,4-Trichlorobenzene  Method: EPA Method 7470: N	76.12 43.30 78.76 88.54 85.18 69.42	LCSD  pg/L  pg/L  pg/L  pg/L  pg/L  pg/L  pg/L	10 10 20 10	100 200 200	0 5.96	Batch ID:	<b>27628</b> 25.3	Analysi:		7/19/2011	1:09:27 PM
N-Nitrosodi-n-propylamine 4-Nitrophenol Pentachlorophenol Phenol Pyrene 1,2,4-Trichlorobenzene	43.30 78.76 88.54 85.18 69.42	µg/L µg/L µg/L µg/L	10 20 10	200				_			1:09;27 PI
4-Nitrophenol Pentachiorophenol Phenol Pyrene 1,2,4-Trichlorobenzene	43.30 78.76 88.54 85.18 69.42	µg/L µg/L µg/L µg/L	10 20 10	200		76.1	25.3	107		~~	
Pentachiorophenol Phenol Pyrene 1,2,4-Trichlorobenzene	78.76 88.54 85.18 69.42	µg/L µg/L µg/L	20 10		5.96			101	0.655	20	
Phenol Pyrene 1,2,4-Trichlorobenzene	88.54 85.18 69.42	µg/L µg/L	10	200		18.7	11.6	110	52.7	20	R
Pyrene 1,2,4-Trichlorobenzene	85.18 69.42	µg/L			0	39.4	19.5	113	35.1	20	R
1,2,4-Trichlorobenzene	69.42		40	200	0	44.3	16.1	69.3	10.7	20	•
		μg/L	10	100	0	85.2	38.3	99.3	0.164	20	
Method: EPA Method 7470: N	lercury		10	100	0	69.4	25	97.3	12.9	20	
Sample ID: MB-27649		MBLK				Batch ID:	27649	Analysis	s Date:	7/19/2011 :	2:43:07 PN
Mercury	ND	mg/L	0.00020								
Sample ID: LCS-27649		LCS				Batch ID:	27649	Analysis	s Date:	7/19/2011	2:44:51 PN
Mercury	0.005013	mg/L	0.00020	0.005	2E-05	99.9	80	120			
			0.00020	0.000	22.00			120			<del></del>
Method: EPA 6010B: Total Re	coverable Met					Batch ID:	27683	Analysis	n Data:	7/21/2011	7: OA: OA AB
Sample ID: MB-27683	•	MBLK				Daton ID.	2/003	Milalysis	b Date.	112112011	',24.U4 MN
Arsenic	ND	mg/L	0.020		•						
Barium	ND	mg/L	0.020								
Cadmium	ND	mg/L	0.0020								
Calcium	ND ·	mg/L	1.0								
nium	ND	mg/L	0.0060	•	•					•	
Lead	ND	mg/L	0.0050								
Magnesium	ND	mg/L	1.0								
Potassium	ND	mg/L	1.0								
Selenium -	ND	mg/L	0.050								
Silver	ND	mg/L	0.0050								•
Sodium	ND	mg/L	1.0			D 4 6 1D.		A 1	<b>D</b> 4	7/04/0044	
Sample ID: LCS-27683		LCS	•			Batch ID:	27683	Analysis	B Date:	7/21/2011 7	:26:11 AN
Arsenic	0.5225	mg/L	0.020	0.5	0	104	08	120			
Barium	0.4948	mg/L	0.020	0.5	0	99.0	80	120			
Cadmium	0.4885	mg/L	0.0020	0.5	0	97.7	80	120			
Calcium	50.66	mg/L	1.0	50	0	101	80	120			
Chromium	0.5178	mg/L	0.0060	0.5	0	104	80	120			•
Lead	0.4830	mg/L	0.0050	0.5	0	96.6	80	120			
Magnesium	50.52	mg/L	1.0	50	0	101	80	120			
Potassium	48.58	mg/L	1.0	50	. 0	97.2	80	120			
Selenium	0.5014	mg/L	0.050	0.5	0	100	80	120			
Silver	0.1015	mg/L	0.0050	0.1	0	102	80	120			
Sodium	49.79	mg/L	1.0	50	0	99.6	80	120	<del></del>		
Method: SM2540C MOD: Total	Dissolved So	lids									
Sample ID: MB-27616		MBLK				Batch ID:	27616	Analysis	Date:	7/19/2011 10	:45:00 AM
Total Dissolved Solids	ND	mg/L	20.0								
Sample ID: LCS-27616		LCS				Batch ID:	27616	Analysis	Date:	7/19/2011 10	45:00 AM
Total Dissolved Solids	1014	mg/L	20.0	1000	0	101	80	120			

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lifiers: Estimated value

Analyte detected below quantitation limits

Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

### Sample Receipt Checklist

Client Name WESTERN REFINING SOUT		Date Receive	d:	7/15/2011
Work Order Number 1107575		Received by	: LNM	1
Checklist completed by:	7//5	Sample ID le	ibels checked t	by: Inilials
Matrix: Carrier n	ame: <u>UPS</u>			
Shipping container/cooler in good condition?	Yes 🗹	. No 🗀	Not Present	
Custody seals intact on shipping container/cooler?	Yes 🗹	No 🗆	Not Present	☐ Not Shipped ☐
Custody seals intact on sample bottles?	Yes 🗌	No 🗆	N/A	<b>☑</b>
Chain of custody present?	Yes 🗹	No 🗀		
Chain of custody signed when relinquished and received?	Yes 🗹	No 🗆		
Chain of custody agrees with sample labels?	Yes 🗹	No 🗆		
Samples in proper container/bottle?	Yes 🗹	No 🗆		
Sample containers intact?	Yes 🗹	. No 🗆		,
Sufficient sample volume for indicated test?	Yes 🗹	No 🗀		
All samples received within holding time?	Yes 🗹	No 🗀		Number of preserved
Water - VOA vials have zero headspace? No VOA vials	submitted	Yes 🗹	No 🗌	bottles checked for pH:
Water - Preservation labels on bottle and cap match?	Yes 🗹	No 🗆	N/A	2.2
Water - pH acceptable upon receipt?	Yes 🗹	No 🗆	N/A	<2) 12 juniess noted
Container/Temp Blank temperature?	5.4°	<6° C Acceptabl	0	CB/G/OW.
COMMENTS:		If given sufficient	time to cool.	
			•	
•				
	<del> </del>			~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
				•
Client contacted Date contacted:		Perso	on contacted	
Contacted by: Regarding:				
Comments:				
Occupation Assista	<del></del>			
Corrective Action				
	1			

	HALL ENVIRONMENTAL	AINTEGER ABORATOR	www.hallenvironmental.com	phodia - Angel Loca	Tel. 505-345-3975 Fax 505-345-4107	Analysis Request	(1) (A) (A)	seignos	7 <b>7</b>	) Ho	(H) (H) (H) (H)	801 1 P Sels (NO)	MTB thod Meta (F,Cl,	270 (School of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the co	T	×	<b>X</b>	×	X	<b>X</b>	**				Time Remarks:	/ Time
Turn-Around Time:	Standard 🗆 Rush	Project Name:	Twicelian Well 3st	, Project #:	Τ		Project Manager:			1	On 100-100-100-100-100-100-100-100-100-100	Sample Temberature		Type and # Type	3-10A Hel	1-LitzH Amber		1-50ml	1-350ml H3504	1-500ml HNO3	1-500 ml Na 04	1-5com ZNACETATE			Kecewa by.	Redeffed by: Date
Chen-of-Custody Record	Client: Western R. Gains		Mailing Address: 50 CR 4990	ìΖ	110000000000000000000000000000000000000	Phone #: 505-631-4/44	email or Fax#: 505-632-39//	DA/QC Package:	Standard Eevel 4 (Full Validation)	creditation	□ NELAP □ Other	□ EDD (Type)		Date   Time   Matrix   Sample Request ID	14-11 3:10 Has INJECTION WELL									Defo. Time. Delinentished her	11 5:00	Date: Time: Relinquished by:



### COVER LETTER

Friday, November 11, 2011

Kelly Robinson
Western Refining Southwest, Inc.
#50 CR 4990
Bloomfield, NM 87413

TEL: (505) 632-4161 FAX (505) 632-3911

RE: Injection Well 4th Qtr

Dear Kelly Robinson:

Order No.: 1110646

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 10/12/2011 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

Please do not hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Laboratory Manager

NM Lab # NM9425 NM0901 AZ license # AZ0682

Date: 11-Nov-11

CLIENT: Project: Lab Order:	Western Refining So Injection Well 4th Q 1110646		Work Order S	er Sample Summary			
Lab Sample ID	Client Sample ID	Batch ID	Test Name	Collection Date			
11 <b>10646-01A</b>	Injection Well	R48569	EPA Method 8260B: VOLATILES	10/11/2011 9:30:00 AM			
1110646-01A	Injection Well	R48569	EPA Method 8260B: VOLATILES	10/11/2011 9:30:00 AM			
1110646-01B	Injection Well	28933	EPA Method 8270C: Semivolatiles	10/11/2011 9:30:00 AM			
1110646-01D	Injection Well	R48584	EPA Method 300.0: Anions	10/11/2011 9:30:00 AM			
1110646-01D	Injection Well	28916	SM2540C MOD: Total Dissolved Solids	10/11/2011 9:30:00 AM			
1110646-01D	Injection Well	R48438	SM 2320B: Alkalinity	10/11/2011 9:30:00 AM			
1110646-01D	Injection Well	R48438	EPA 120.1: Specific Conductance	10/11/2011 9:30:00 AM			
1110646-01D	Injection Well	R48438	SM4500-H+B: pH	10/11/2011 9:30:00 AM			
1110646-01D	Injection Well	R48414	EPA Method 300.0: Anions	10/11/2011 9:30:00 AM			
1110646-01D	Injection Well	R48414	EPA Method 300.0: Anions	10/11/2011 9:30:00 AM			
1110646-01E	Injection Well	29034	EPA Method 7470: Mercury	10/11/2011 9:30:00 AM			
1110646-01E	Injection Well	28889	EPA 6010B: Total Recoverable Metals	10/11/2011 9:30:00 AM			
1110646-01E	Injection Well	28889	EPA 6010B: Total Recoverable Metals	10/11/2011 9:30:00 AM			
1110646-01E	Injection Well	28889	EPA 6010B: Total Recoverable Metals	10/11/2011 9:30:00 AM			
1110646-02A	Trip Blank	R48569	EPA Method 8260B: VOLATILES				

Date: 11-Nov-11
Analytical Report

CLIENT:

Western Refining Southwest, Inc.

.....

Client Sample ID: Injection Well

Lab Order:

1110646

Collection Date: 10/11/2011 9:30:00 AM

Project:

Injection Well 4th Qtr

**Date Received:** 10/12/2011

Lab ID:

1110646-01

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	D <b>F</b>	Date Analyzed
EPA METHOD 300.0: ANIONS		`	·		Analyst: SRM
Chloride	550	. 25	mg/L	50	10/22/2011 7:03:43 PM
Sulfate	69	10	mg/L	20	10/13/2011 12:22:42 PM
EPA METHOD 7470: MERCURY		•			Analyst: BRM
Mercury	ND	0.00020	mg/L	1	10/24/2011 4:11:38 PM
EPA 6010B: TOTAL RECOVERABLE ME	TALS				Analyst: RAGS
Arsenic	ND	0.020	mg/L	. 1	10/21/2011 9:31:39 AM
Barium	0.19	0.020	mg/L	1	10/21/2011 9:31:39 AM
Cadmium	ND	0.0020	mg/L	1	10/21/2011 9:31:39 AM
Calcium	150	5.0	mg/L	5	10/21/2011 9:43:37 AM
Chromium	ND	0.0060	mg/L	. 1	10/21/2011 9:31:39 AM
Lead	ND	0.0050	mg/L	. 1	10/21/2011 9:31:39 AM
Magnesium	24	1.0	mg/L	1	10/21/2011 9:31:39 AM
Potassium	6.8	1.0	mg/L	1	10/21/2011 9:31:39 AM
Selenium	ND	0.050	mg/L	1	10/21/2011 9:31:39 AM
Silver	ND	0.0050	mg/L	1	10/21/2011 9:31:39 AM
Sodium	230	5.0	mg/L	5	10/21/2011 9:43:37 AM
EPA METHOD 8270C: SEMIVOLATILES					Analyst: JDC
Acenaphthene	ND	10	μġ/L	1	10/21/2011 12:42:40.PM
Acenaphthylene	ND	10	μg/L	1	10/21/2011 12:42:40 PM
Aniline	ND	10	μg/L	1	10/21/2011 12:42:40 PM
Anthracene	ND `	10	μg/L	1	10/21/2011 12:42:40 PM
Azobenzene	ND	10	μg/L	1	10/21/2011 12:42:40 PM
Benz(a)anthracene	ND	10	μg/L	1	10/21/2011 12:42:40 PM
Benzo(a)pyrene	ND	10	μg/L	· 1	10/21/2011 12:42:40 PM
Benzo(b)fluoranthene	ND	10	µģ/L	1	10/21/2011 12:42:40 PM
Benzo(g,h,i)perylene	ND	. 10	μġ/L	1	10/21/2011 12:42:40 PM
Benzo(k)fluoranthene	ND	10	μġ/L	1	10/21/2011 12:42:40 PM
Benzoic acid	ND	20	μg/L	1	10/21/2011 12:42:40 PM
Benzyl alcohol	ND	10	μg/Ĺ	1	10/21/2011 12:42:40 PM
Bis(2-chloroethoxy)methane	ND	10	μġ/L	1	10/21/2011 12:42:40 PM
Bis(2-chloroethyl)ether .	ND	10	· μġ/L	1	10/21/2011 12:42:40 PM
Bis(2-chlorolsopropyl)ether	ND	10	µg/L	. 1	10/21/2011 12:42:40 PM
Bis(2-ethylhexyl)phthalate	ND	10	μg/L	1	10/21/2011 12:42:40 PM
4-Bromophenyl phenyl ether	ND	10	μg/L	1 .	10/21/2011 12:42:40 PM
Butyl benzyl phthalate	ND	10	µg/L	1	10/21/2011 12:42:40 PM
Carbazole	ND	10	µg/L	1	10/21/2011 12:42:40 PM
4-Chloro-3-methylphenol	ND	10	μg/L	1	10/21/2011 12:42:40 PM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 1 of 7

Date: 11-Nov-11

Analytical Report

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1110646

Project:

Injection Well 4th Qtr

Lab ID:

1110646-01

Client Sample ID: Injection Well

Collection Date: 10/11/2011 9:30:00 AM

Date Received: 10/12/2011

Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
<b>EPA METHOD 8270C: SEMIVOLATILES</b>						Analyst: JDC
4-Chloroaniline	ND	10		µg/L	1	10/21/2011 12:42:40 PM
2-Chloronaphthalene	ND	10		μg/L	· 1	10/21/2011 12:42:40 PM
2-Chlorophenol	ND	10		μg/L	1	10/21/2011 12:42:40 PM
4-Chlorophenyl phenyl ether	ND	10		μg/L	1	10/21/2011 12:42:40 PM
Chrysene	ND	10		μg/L	1 '	10/21/2011 12:42:40 PM
Di-n-butyl phthalate	ND	10		μg/L	1	10/21/2011 12:42:40 PM
Di-n-octyl phthalate	ND	10		µg/L	1	10/21/2011 12:42:40 PM
Dibenz(a,h)anthracene	ND	· 10		μg/L	1	10/21/2011 12:42:40 PM
Dibenzofuran	ND	10		μg/L	1	10/21/2011 12:42:40 PM
1,2-Dichlorobenzene	ND	10		μg/L	1	10/21/2011 12:42:40 PM
1,3-Dichlorobenzene	ND	. 10		µg/L	1	10/21/2011 12:42:40 PM
1,4-Dichlorobenzene	ND	10		μg/L	1	10/21/2011 12:42:40 PM
3,3'-Dichlorobenzidine	ND	10		μg/L	1	10/21/2011 12:42:40 PM
Diethyl phthalate	ND	10		µg/L	1	10/21/2011 12:42:40 PM
Dimethyl phthalate	ND	10	٠.	µg/L	1	10/21/2011 12:42:40 PM
2,4-Dichlorophenol	ND	20		μg/L	1	10/21/2011 12:42:40 PM
2,4-Dimethylphenol	ND	10		µg/L	1	10/21/2011 12:42:40 PM
4,6-Dinitro-2-methylphenol	ND	20		µg/L	1	10/21/2011 12:42:40 PM
2,4-Dinitrophenol	ND	20		μg/L	1	10/21/2011 12:42:40 PM
2,4-Dinitrotoluene	ND	10		μg/L	1	10/21/2011 12:42:40 PM
2,6-Dinitrotoluene	ND	10		μg/L	1	10/21/2011 12:42:40 PM
Fluoranthene	ND	10		μg/L	1	10/21/2011 12:42:40 PM
Fluorene	ND	10		μg/L	. 1	10/21/2011 12:42:40 PM
Hexachlorobenzene	ND	10		µg/L	1	10/21/2011 12:42:40 PM
Hexachlorobutadiene	ND	10		µg/L	1	10/21/2011 12:42:40 PM
Hexachlorocyclopentadiene	ND	10		µg/L	1	10/21/2011 12:42:40 PM
Hexachloroethane	ND	10		μ <b>g/L</b>	· 1	10/21/2011 12:42:40 PM
Indeno(1,2,3-cd)pyrene	ND	- 10		μg/L	1	10/21/2011 12:42:40 PM
Isophorone	ND	10		µg/L	1	10/21/2011 12:42:40 PM
2-Methylnaphthalene	ND	10		μg/L	1	10/21/2011 12:42:40 PM
1-Methylnaphthalene	ND	10		μg/L	1	10/21/2011 12:42:40 PM
2-Methylphenol	ND	10		µg/L	1	10/21/2011 12:42:40 PM
3+4-Methylphenol	ND	10		μg/L	1	10/21/2011 12:42:40 PM
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	10/21/2011 12:42:40 PM
N-Nitrosodimethylamine	ND	10		µg/L	1	10/21/2011 12:42:40 PM
N-Nitrosodiphenylamine	ND	10		µg/L	1	10/21/2011 12:42:40 PM
Naphthalene	ND	10		µg/L	1	10/21/2011 12:42:40 PM
2-Nitroaniline	ND	10		µg/L	1	10/21/2011 12:42:40 PM
3-Nitroanlline	ND	10		μg/L	1	10/21/2011 12:42:40 PM
4-Nitroaniline	ND	20		µg/L	1	10/21/2011 12:42:40 PM

### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 2 of 7

Date: 11-Nov-11 Analytical Report

CLIENT:

Western Refining Southwest, Inc.

Client Sample ID: Injection Well

Lab Order:

1110646

Collection Date: 10/11/2011 9:30:00 AM

Project:

Injection Well 4th Qtr

Date Received: 10/12/2011

Lab ID:

1110646-01

Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
<b>EPA METHOD 8270C: SEMIVOLATILES</b>						Analyst: JDC
Nitrobenzene	ND	10		µg/L	1	10/21/2011 12:42:40 PM
2-Nitrophenol	ND	10		µg/L	1	10/21/2011 12:42:40 PM
4-Nitrophenol	. ND	10		μg/L	1	10/21/2011 12:42:40 PM
Pentachlorophenol	ND.	20		μg/L	· 1	10/21/2011 12:42:40 PM
Phenanthrene	ND	10		µg/L	1 .	10/21/2011 12:42:40 PM
Phenol	ND	10		µg/L	1	10/21/2011 12:42:40 PM
Pyrene	ND	10		μg/L	1	10/21/2011 12:42:40 PM
Pyridine	ND	. 10		µg/L	1	10/21/2011 12:42:40 PM
1,2,4-Trichlorobenzene	ND	10		μg/L	1 .	10/21/2011 12:42:40 PM
2,4,5-Trichlorophenoi	ND	10		μg/L	. 1	10/21/2011 12:42;40 PM
2,4,6-Trichlorophenol	ND	10		μ <b>g/</b> L	1	10/21/2011 12:42:40 PM
Surr: 2,4,6-Tribromophenol	71.9	18.1-138		%REC	1	10/21/2011 12:42:40 PM
Surr: 2-Fluorobiphenyl	65.6	25.9-101		%REC	1	10/21/2011 12:42:40 PM
Surr: 2-Fluorophenol	43.9	12.5-93.2		%REC	1	10/21/2011 12:42:40 PM
Surr: 4-Terphenyl-d14	70.3	29.5-112	•	%REC	1	10/21/2011 12:42:40 PM
Surr: Nitrobenzene-d5	72.8	20.5-120	1	%REC	1	10/21/2011 12:42:40 PM
Surr: Phenol-d5	32.5	11.3-73.2	1	%REC	1	10/21/2011 12:42:40 PM
				Ì		•
EPA METHOD 8260B: VOLATILES						Analyst: NSB
Benzene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
Toluene	ND	1.0	1	μg/L	. 1	10/20/2011 11:21:18 AM
Ethylbenzene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
Methyl tert-butyl ether (MTBE)	1.3	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,2,4-Trimethylbenzene	ND	1.0	· I	μg/L	1	10/20/2011 11:21:18 AM
1,3,5-Trimethylbenzene	ND	1.0	I	µg/L	<b>`1</b>	10/20/2011 11:21:18 AM
1,2-Dichloroethane (EDC)	ND	1.0	4	µg/L	1	10/20/2011 11:21:18 AM
1,2-Dibromoethane (EDB)	ND	1.0	· i	µg/L	. , <b>1</b>	10/20/2011 11:21:18 AM
Naphthalene .	ND	2.0	ı	μg/L	1	10/20/2011 11:21:18 AM
1-Methylnaphthalene	ND	4.0		µg/L	1	10/20/2011 11:21:18 AM
2-Methylnaphthalene	ND	4.0	1	μg/L	' 1	10/20/2011 11:21:18 AM
Acetone	180		-	µg/L	10	10/20/2011 3:08:33 PM
Bromobenzene	ND	1.0	1	μg/L	1	10/20/2011 11:21:18 AM
Bromodichloromethane	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
Bromoform	ND	1.0	1	µg/L	1	10/20/2011 11:21:18 AM
Bromomethane	ND	3.0		µg/L	1	10/20/2011 11:21:18 AM
2-Butanone	14	. 10		µg/L	1	10/20/2011 11:21:18 AM
Carbon disulfide	ND	10		µg/L	1	10/20/2011 11:21:18 AM
Carbon Tetrachloride	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
Chlorobenzene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
Chloroethane	ND	2.0	1	µg/L	1	10/20/2011 11:21:18 AM

### Qualifiers:

- Value exceeds Maximum Contaminant Level
- Estimated value E
- Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- Analyte detected in the associated Method Blank В
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits

Page 3 of 7

Date: 11-Nov-11
Analytical Report

CLIENT:

Lab ID:

Western Refining Southwest, Inc.

Lab Order:

1110646

Project: Injection Well 4th Qtr

1110646-01

Client Sample ID: Injection Well

Collection Date: 10/11/2011 9:30:00 AM

Date Received: 10/12/2011 Matrix: AQUEOUS

Result PQL Qual Units Analyses DF **Date Analyzed EPA METHOD 8260B: VOLATILES** Analyst: NSB ND Chloroform 1.0 μg/L 1 10/20/2011 11:21:18 AM ND μg/L Chloromethane 3.0 1 10/20/2011 11:21:18 AM ND 2-Chlorotoluene 1.0 µg/L 10/20/2011 11:21:18 AM ND 4-Chlorotoluene -1.0 µg/L 10/20/2011 11:21:18 AM cis-1.2-DCE ND 1.0 µg/L 1 10/20/2011 11:21:18 AM 10/20/2011 11:21:18 AM cis-1,3-Dichloropropene ND 1.0 μg/L 1 ND 1 1,2-Dibromo-3-chloropropane 2.0 μg/L 10/20/2011 11:21:18 AM Dibromochloromethane ND 1.0 μg/L 1 10/20/2011 11:21:18 AM ND Dibromomethane 1.0 1 10/20/2011 11:21:18 AM µg/L 1,2-Dichlorobenzene ND 1.0 10/20/2011 11:21:18 AM µg/L ND 1.0 10/20/2011 11:21:18 AM 1,3-Dichlorobenzene μg/L 1 ND 1,4-Dichlorobenzene 1.0 μg/L 1 10/20/2011 11:21:18 AM Dichlorodifluoromethane ND 1.0 μg/L 1 10/20/2011 11:21:18 AM 1,1-Dichloroethane ND 1.0 μg/L 1 10/20/2011 11:21:18 AM 1.1-Dichloroethene ND 1.0 μg/L 1 10/20/2011 11:21:18 AM ND 1,2-Dichloropropane 1.0 1 10/20/2011 11:21:18 AM µg/L 1,3-Dichloropropane ND 1.0 10/20/2011 11:21:18 AM μg/L 1 ND 2,2-Dichloropropane 20 μg/L 1 10/20/2011 11:21:18 AM ND 1,1-Dichloropropene 1.0 μg/L 1 10/20/2011 11:21:18 AM Hexachlorobutadiene ND 1.0 μg/L 1 10/20/2011 11:21:18 AM 2-Hexanone ND 10 1 10/20/2011 11:21:18 AM µg/L Isopropyibenzene ND 1.0 1 10/20/2011 11:21:18 AM µg/L ND 1.0 4-Isopropyitoluene 1 10/20/2011 11:21:18 AM µg/L 4-Methyl-2-pentanone ND 10 μg/L 1 10/20/2011 11:21:18 AM Methylene Chloride ND 3.0 μg/L 1 10/20/2011 11:21:18 AM ND n-Butylbenzene 1.0 1 10/20/2011 11:21:18 AM μg/L n-Propylbenzene ND 1.0 1 10/20/2011 11:21:18 AM µg/L sec-Butylbenzene ND 1.0 1 10/20/2011 11:21:18 AM µg/L Styrene ND 1.0 μg/L 1 10/20/2011 11:21:18 AM tert-Butylbenzene ND 1.0 μg/L 1 10/20/2011 11:21:18 AM 1.1.1.2-Tetrachloroethane ND 1.0 μg/L 1 10/20/2011 11:21:18 AM 1,1,2,2-Tetrachloroethane ND 2.0 μg/L 1 10/20/2011 11:21:18 AM ND Tetrachioroethene (PCE) 1.0 μg/L 1 10/20/2011 11:21:18 AM trans-1,2-DCE ND 1.0 μg/L 1 10/20/2011 11:21:18 AM ND 1.0 trans-1,3-Dichloropropene 1 μg/L 10/20/2011 11:21:18 AM 1,2,3-Trichlorobenzene ND 1.0 10/20/2011 11:21:18 AM µg/L 1 1,2,4-Trichlorobenzene ND 1.0 µg/L 1 10/20/2011 11:21:18 AM 1,1,1-Trichloroethane ND 1.0 ug/L 1 10/20/2011 11:21:18 AM 1,1,2-Trichloroethane ND 1.0 μg/L 10/20/2011 11:21:18 AM 1 Trichloroethene (TCE) ND 1.0 μg/L 1 10/20/2011 11:21:18 AM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 4 of 7

Date: 11-Nov-11 Analytical Report

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1110646

Client Sample ID: Injection Well

Project:

Injection Well 4th Qtr

Collection Date: 10/11/2011 9:30:00 AM Date Received: 10/12/2011

Lab ID:

1110646-01

Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	<u> </u>				•	Analyst: NSB
Trichlorofluoromethane	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,2,3-Trichioropropane	ND	2.0		µg/L	1	10/20/2011 11:21:18 AM
Vinyl chloride	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
Xylenes, Total	2.2	1.5		µg/L	1	10/20/2011 11:21:18 AM
Sur: 1,2-Dichloroethane-d4	96.9	70-130		%REC	1	10/20/2011 11:21:18 AM
Surr: 4-Bromofluorobenzene	113	73-131		%REC	1	10/20/2011 11:21:18 AM
Surr: Dibromofluoromethane	95.2	70-130		%REC	1	10/20/2011 11:21:18 AM
Surr: Toluene-d8	102	70-130		%REC	1	10/20/2011 11:21:18 AM
SM 2320B: ALKALINITY						Analyst: IC
Alkalinity, Total (As CaCO3)	170	20		mg/L CaCO3	1	10/17/2011 7:16:00 PM
Carbonate	ND	2.0		mg/L CaCO3	1	10/17/2011 7:16:00 PM
Bicarbonate	170	20	-:.	mg/L CaCO3	1	10/17/2011 7:16:00 PM
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: IC
Specific Conductance	2000	0.010		µmhos/cm	1	10/17/2011 7:16:00 PM
SM4500-H+B: PH						Analyst: IC
рН	7.81	0.100	Н	pH units	1	10/17/2011 7:16:00 PM
SM2540C MOD: TOTAL DISSOLVED SC	DLIDS			•		Analyst: KS
Total Dissolved Solids	1190	20.0		mg/L	1	10/18/2011 1:19:00 PM

### Qualifiers:

- Value exceeds Maximum Contaminant Level
- Estimated value E
- Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- ٠В Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded Н
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits

Page 5 of 7

Date: 11-Nov-11
Analytical Report

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1110646

Project:

Injection Well 4th Qtr

Lab ID:

1110646-02

Client Sample ID: Trip Blank

**Collection Date:** 

**Date Received:** 10/12/2011

Matrix: TRIP BLANK

Analyses	Result	PQL Qua	l Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Analyst: NSB
Benzene	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
Toluene	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
Ethylbanzene	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
1,3,5-Trimethylbenzene	ND	1.0	µg/L	1	10/20/2011 12:46:07 PM
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
Naphthalene	ND	2.0	µg/L	1	10/20/2011 12:46:07 PM
1-Methylnaphthalene	ND	4.0	μg/L	1	10/20/2011 12:46:07 PM
2-Methylnaphthalene	ND	4.0	µg/L	1	10/20/2011 12:46:07 PM
Acetone	ND	10	μg/L	1	10/20/2011 12:46:07 PM
Bromobenzene	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
Bromodichloromethane	ND	1.0	µg/L	1	10/20/2011 12:46:07 PM
Bromoform	ND	1.0	μ <b>g/</b> L	1	10/20/2011 12:46:07 PM
Bromomethane	ND	3.0	μ <b>g/L</b>	1	10/20/2011 12:46:07 PM
2-Butanone	ND	10	μg/L	1	10/20/2011 12:46:07 PM
Carbon disulfide	ND	10	μg/L	1	10/20/2011 12:46:07 PM
Carbon Tetrachloride	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
Chlorobenzene	ND	1.0	μg/L	1	10/20/2011 12:48:07 PM
Chloroethane	ND	2.0	μg/L	1	10/20/2011 12:46:07 PM
Chloroform	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
Chloromethane	ND	3.0	μg/L	1	10/20/2011 12:46:07 PM
2-Chlorotoluene	ND	1.0	· µg/L	1	10/20/2011 12:46:07 PM
4-Chiorotoluene	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
cls-1,2-DCE	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
cis-1,3-Dichloropropene	ND	1.0	µg/L	1	10/20/2011 12:46:07 PM
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	10/20/2011 12:46:07 PM
Dibromochloromethane	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
Dibromomethane	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
1,2-Dichlorobenzene	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
1,3-Dichlorobenzene	ND	1.0	µg/L	1	10/20/2011 12:46:07 PM
1,4-Dichlorobenzene	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
Dichlorodifluoromethane	ND	1.0	μg/L	· 1	10/20/2011 12:46:07 PM
1,1-Dichloroethane	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
1,1-Dichloroethene	ND	1.0	μg/L	1	10/20/2011 12:46:07 PM
1,2-Dichloropropane	ND	1.0	hâ/F	1	10/20/2011 12:46:07 PM
1,3-Dichloropropane	ND	1.0	µg/L	. 1	10/20/2011 12:46:07 PM
2,2-Dichloropropane	ND	2.0	µg/L	1	10/20/2011 12:46:07 PM
1,1-Dichloropropene	ND	1.0	µg/L	1	10/20/2011 12:46:07 PM

### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 6 of 7

Date: 11-Nov-11
Analytical Report

CLIENT: Lab Order: Western Refining Southwest, Inc.

.

1110646

Project:

Injection Well 4th Qtr

Lab ID:

1110646-02

Client Sample ID: Trip Blank

**Collection Date:** 

**Date Received:** 10/12/2011

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual (	Jnits	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	<del></del>					Analyst: NSB
Hexachiorobutadiene	, ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PM
2-Hexanone	ND	10	μ	g/L	1	10/20/2011 12:46:07 PM
Isopropylbenzene	ND	1.0	· µ	g/L	1	10/20/2011 12:46:07 PN
4-isopropyitoluene	ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
4-Methyl-2-pentanone	ND	10	μ	g/L	1	10/20/2011 12:48:07 PR
Methylene Chloride	ND	3.0	·μ	g/L	. 1	10/20/2011 12:46:07 PN
n-Butylbenzene	ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
n-Propyibenzene	ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
sec-Butylbenzene	ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
Styrene	ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
tert-Butylbenzene	ND ·	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
1,1,1,2-Tetrachloroethane	ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
1,1,2,2-Tetrachlorcethane	ND	2.0	μ	g/L	1	10/20/2011 12:46:07 PN
Tetrachloroethene (PCE)	ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
trans-1,2-DCE	ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
trans-1,3-Dichloropropene	, ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
1,2,3-Trichlorobenzene	· ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
1,2,4-Trichlorobenzene	ND ·	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
1,1,1-Trichloroethane	ND	1.0	μ	g/L	1 .	10/20/2011 12:46:07 PN
1,1,2-Trichloroethane	ND	1.0	'n	g/L	1	10/20/2011 12:46:07 PM
Trichloroethene (TCE)	ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
Trichlorofluoromethane	. ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PN
1,2,3-Trichloropropane	ND	2.0	μ	g/L	1	10/20/2011 12:46:07 PN
Vinyl chloride	ND	1.0	μ	g/L	1	10/20/2011 12:46:07 PM
Xylenes, Total	ND	1.5		g/L	1	10/20/2011 12:46:07 PN
Surr: 1,2-Dichloroethane-d4	101	70-130	%	REC	1	10/20/2011 12:46:07 PM
Surr. 4-Bromofluorobenzene	111	73-131	%	REC	1	10/20/2011 12:46:07 PN
Surr: Dibromofluoromethane	98.7	70-130	. %	REC	1	10/20/2011 12:46:07 PN
Surr: Toluene-d8	97.9	70-130	%	REC	1	10/20/2011 12:46:07 PN

### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 7 of 7

# Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email mxscow@anateklabs.com 504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

**Client:** 

HALL ENVIRONMENTAL ANALYSIS LAB

Batch #:

111014024

Address:

4901 HAWKINS NE SUITE D

Project Name: 1110646

**ALBUQUERQUE, NM 87109** 

Attn:

**ANDY FREEMAN** 

### **Analytical Results Report**

Sample Number

111014024-001

Sampling Date

10/11/2011 Date/Time Received

10/14/2011 12:40 PM

Client Sample ID

1110646-01C / INJECTION WELL

Sampling Time

9:30 AM

Matrix

Water

Sample Location

Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	1	11/3/2011	CRW	SW846 CH7	
Flashpoint	>200	٩F		10/26/2011	MAH	EPA 1010	
pH	7.15	ph Units		10/17/2011	KFG	EPA 150.1	
Reactive sulfide	ND	mg/L	.1	11/1/2011	JTT	SW846 CH7	

**Authorized Signature** 

John Coddington, Lab Manager

MCL

EPA's Maximum Conteminant Level

ND

Not Detected

PQL

Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.

The results reported relate only to the samples indicated.

Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:I000013; AZ:0701; CO:I000013; FL(NELAP):E87883; ID:I000013; IN:C-ID-01; KY:80142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595 Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

Client:

Western Refining Southwest, Inc.

ect:

Injection Well 4th Qtr

Work Order:

1110646

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec L	owLimit Hi	ghLimit %	RPD	RPDLimit	Qual
Method: EPA Method 300.0:	Anions										· · · · · · · · · · · · · · · · · · ·
Sample ID: MB		MBLK				Batch ID:	R48414	Analysis D	ate:	10/13/2011 10	0:55:38 AI
Chloride	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50				•			•	
Bample ID: MB		MBLK				Batch ID:	R48414	Analysis D	ate:	10/14/2011	5:12:33 A
Chloride	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50					•			
Sample ID: MB		MBLK				Batch ID:	R48584	Analysis D	ate:	10/21/2011	5:31:40 Pf
Chloride	NĐ	mg/L	0.50			: P				•	
Sulfate	ND	mg/L	0.50								
Sample ID: MB		MBLK				Batch ID:	R48584	Analysis D	)ate:	10/22/2011	9:11:50 Al
Chloride	ND	mg/L	0.50			1					
Sulfate	ND	mg/L	0.50							•	
Bample ID: LCS		LCS				Batch ID:	R48414	Analysis D	ate:	10/13/2011 1	1:13:02 AI
Chloride	5.019	mg/L	0.50	5	0	100	90	110			
Sulfate	10.02	mg/L	0.50	10	0	100	90	110			
Sample ID: LCS		LCS				Bátch ID:	R48414	Analysis D	ate:	10/14/2011	5:29:58 At
Chloride	4.812	mg/L	0.50	5	0	96.2	90	110			
Sulfate	9.696	mg/L	0.50	10	Ö	97.0	90	110			
Sample ID: LCS		LCS				Batch ID:	R48584	Analysis D	ate:	10/21/2011	5:49:04 Pf
Chloride	4.786	mg/L	0.50	5	. 0	95.7	90	110		•	
te	9.736	mg/L	0.50	10	0	97.4	90	110			
ple ID: LCS	•	LCS				Batch iD:	R48584	Analysis D	ate:	10/22/2011 9	9:29:15 AF
Chloride	4.875	mg/L	0.50	5.	. 0	97.5	90	110			
Sulfate	9.875	mg/L	0.50	10	0	98.7	90	110			
Method: SM 2320B: Alkalinit	y										
Sample ID: MB-1		MBLK				Batch ID:	R48438	Analysis D	ate:	10/17/2011 10	0:01:00 Af
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20								
Carbonate	ND	mg/L Ca	2.0			1					•
Bicarbonate	ND	mg/L Ca	20								
Sample ID: MB-2		MBLK				Batch ID:	R48438	Analysis D	ate:	10/17/2011 5	5:37:00 PA
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20			- #					
Carbonate	ND	mg/L Ca	2.0				•				
3icarbonate	ND	mg/L Ca	20							, .	
Sample ID: LCS-1		LCS				Batch ID:	R48438	Analysis D	ate:	10/17/2011 10	AA 00:80:0
Alkalinity, Total (As CaCO3)	79.24	mg/L Ca	20	80	6.32	91.2	90	110			
Sample ID: LCS-2		LCS		•		Batch ID:	R48438	Analysis D	ate:	10/17/2011 5	5:43:00 PN
Alkalinity, Total (As CaCO3)	81.48	mg/L Ca	20	80	6.32	94.0	90 .	110			

### Qualifiers:



Analyte detected below quantitation limits Not Detected at the Reporting Limit

Н Holding times for preparation or analysis exceeded NC

Non-Chlorinated R RPD outside accepted recovery limits

Page I

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th Qtr

Work Order:

1110646

Analyte	Result	Units	PQL	SPK Va S	PK ref	%Rec L	owLimit Hi	hLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B:	VOLATILES						***				
Sample ID: 1110646-01a med		MSD				Batch ID:	R48569	Analys	is Date:	10/20/2011 1	2:17:44 PM
Benzene	18.27	µg/L	1.0	20	0	91.4	69.2	127	7.44	18.7	
Toluene	19.92	μg/L	1.0	20	0	99.6	68.2	130	6.08	16.9	
Chlorobenzene	18.67	μg/L	1.0	20	0	93.3	74	122	6.60	13.9	
1,1-Dichloroethene	17.69	μg/L	1.0	20	0	88.4	69.3	123	7.95	16.7	
Trichloroethene (TCE)	18.89	μg/L	1.0	20	0	94.4	61.3	127	10.1	18	
Sample ID: b2		MBLK				Batch ID:	R48569	Analys	is Date:	10/20/2011	9:28:33 AN
Benzene	ND	μg/L	1.0	•							
Toluene	ND	μg/L	1.0								
Ethylbenzene	ND	μg/L	1.0								
Methyl tert-butyl ether (MTBE)	ND	μg/L	1.0								
1,2,4-Trimethylbenzene	ND	μg/L	1.0								
1,3,5-Trimethylbenzene	ND	μg/L	1.0							•	
1,2-Dichloroethane (EDC)	ND	µg/L	1.0	!							
1,2-Dibromoethane (EDB)	ND	µg/L	1.0								
Naphthalene	ND	µg/L	2.0								
1-Methylnaphthalene	ND	µg/L	4.0								
2-Methylnaphthalene	ND	µg/L	4.0								
Acetone	ND	μg/L	10	·							
Bromobenzene	ND	μg/L	1.0								
Bromodichloromethane	ND	µg/L	1.0								
Bromoform	ND	μg/L	1.0								
Bromomethane	ND	µg/L	3.0			•					
2-Butanone	ND	µg/∟ µg/L	10								•
Carbon disulfide	ND	µg/L	10								
Carbon Tetrachloride	ND	μg/L	1.0								
Chlorobenzene	ND	μg/L μg/L	1.0								
Chloroethane	ND	µg/L	2.0								
Chloroform	ND	µg/L	1.0								
Chloromethane	ND	ha\r ha\r	3.0							•	
2-Chlorotoluene	ND	µg/L	1.0								
4-Chlorotoluene	ND	μg/L	1.0								
ds-1,2-DCE	ND	μg/L	1.0								
ds-1,3-Dichloropropene	ND	µg/∟	1.0								
1,2-Dibromo-3-chloropropane	ND	µg/L pg/L	2.0								
Dibromochloromethane	ND	h8/r	1.0								
Dibromomethane	ND	μg/L	1.0							•	
1,2-Dichlorobenzene	ND	μg/L	1.0								
1,3-Dichlorobenzene	ND	h8/r	1.0					,			
1,4-Dichlorobenzene	ND	μg/L	1.0			•					
Dichlorodifluoromethane	ND	μg/L μg/L	1.0								
1,1-Dichloroethane	ND	μg/L	1.0								
1,1-Dichloroethene	ND	µg/L pg/L	1.0								
1,2-Dichloropropane	ND		1.0	•							
• •		µg/L									
1,3-Dichloropropane	ND	µg/L	1.0	1							

Estimated value

Analyte detected below quantitation limits J

Not Detected at the Reporting Limit

Н Holding times for preparation or analysis exceeded

NC Non-Chlorinated

RPD outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

ject:

Injection Well 4th Qtr

Not Detected at the Reporting Limit

Work Order:

1110646

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Analyte	Result	Units	PQL	SPK Va SPK ref	.%Rec Le	owLimit Hi	ghLimit %R	PD RPDLir	nit Qual
Method: EPA Method 8260B	: VOLATILES								
Sample ID: b2		MBLK			Batch ID:	R48569	Analysis Dal	e: 10/20/20	11 9:28:33 AI
2,2-Dichloropropane	ND	μg/L	2.0		2		•		
1,1-Dichloropropene	ND	μg/L	1.0		r i				.*
Hexachlorobutadiene	ND	μg/L	1.0						
2-Hexanone	ND	μg/L	10	•	,		•		
isopropylbenzene	ND	µg/L	1.0						
4-Isopropyitoluene	ND	µg/L	1.0						
4-Methyl-2-pentanone	ND	μg/L	10		:			·	
Methylene Chioride	ND .	µg/L	3.0		'				
n-Butyibenzene	ND	µg/L	1.0	• • •	- · · ·				
n-Propyibenzene	ND	µg/L	1.0	2 * * *					
sec-Butylbenzene	ND	μ <b>g/L</b>	1.0	•					
Styrene	ND	µg/L	1.0						
tert-Butylbenzene	ND	μg/L	1.0		k k				* *
1,1,1,2-Tetrachioroethane	ND	µg/L	1.0						
1,1,2,2-Tetrachioroethane	ND	µg/L	2.0		r				
Tetrachloroethene (PCE)	ND	µg/L	1.0		î r				
trans-1,2-DCE	ND	µg/L	1.0						
trans-1,3-Dichloropropene	ND	μg/L	1.0						
1,2,3-Trichiorobenzene	ND	μg/L	1.0						
1,2,4-Trichlorobenzene	ND	µg/L	1.0	•					
1-Trichloroethane	ND	µg/L	1.0						
2-Trichloroethane	ND	µg/L	1.0						
Trichlomethene (TCE)	ND	μg/L μg/L	1.0						
Trichlorofluoromethane	ND	μg/L μg/L	1.0						
1,2,3-Trichloropropane	ND		2.0			•			
	ND	µg/L							
Vinyl chloride		µg/L	1.0						•
Xylenes, Total	ND	µg/L	1.5					- 40/00/004	
Sample ID: b8		MBLK			Batch ID:	R48569	Analysis Dat	e: 10/20/201	1 10:15:43 Pi
Benzene	ND	μg/L	1.0		!				
Toluane	ND	µg/L	1.0						
Ethylbenzene	ND	μg/L	1.0						
Methyl tert-butyl ether (MTBE)	ND	µg/L	1.0		'				
1,2,4-Trimethylbenzene	ND	µg/L	1.0		à .				
1,3,5-Trimethylbenzene	ND	µg/L	1.0						
1,2-Dichloroethane (EDC)	ND	µg/L	1.0						
1,2-Dibromoethane (EDB)	ND	h <b>g</b> /L	1.0						:
Naphthalene	ND	μg/L	2.0		•				
1-Methylnaphthalene	ND	µg/L	4.0						• .
2-Methylnaphthalene	ND	μg/L	4.0						
Acetone	ND ·	µg/L	10				•		
Bromobenzene	ND	µg/L	1.0						
Bromodichloromethane	ND	μg/L	1.0						
Bromoform	ND	μg/L	1.0						
Bromomethane	ND	hg/L	3.0						
Qualifiers:					-				
E Estimated value				H Holding times	for preparatio	n or analysis	s exceeded		
Analyte detected below quar	titation limits			NC Non-Chlorinate					

RPD outside accepted recovery limits

Client:

. **J** 

Analyte detected below quantitation limits

Not Detected at the Reporting Limit

Western Refining Southwest, Inc.

Project:

Injection Well 4th Qtr

Work Order:

1110646

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Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	owLimit Hig	jhLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B:	VOLATILES								<del></del>	;
Sample ID: b8		MBLK			Batch ID:	R48669	Analysi	s Date:	10/20/2011 1	10:15:43 PN
2-Butanone	ND	μg/L	10							
Carbon disulfide	ND	µg/L	10							
Carbon Tetrachloride	ND	µg/L	1.0							
Chlorobenzene	ND	µg/L	1.0						•	
Chloroethane	ND	μg/L	2.0							
Chloroform	ND	μg/L	1.0							
Chloromethane	ND	µg/L	3.0							
2-Chiorotoluene	ND	µg/L	1.0							
4-Chlorotoluene	ND	μg/L	1.0							
cis-1,2-DCE	ND	μg/L	1.0							
cis-1,3-Dichloropropene	ND	µg/L	1.0							
1,2-Dibromo-3-chloropropane	ND	µg/L	2.0							
Dibromochloromethane	ND	µg/L	1.0							
Dibromomethane	ND	μg/L	1.0							
1.2-Dichlorobenzene	ND	µg/L	1.0							
1,3-Dichlorobenzene	ND	µg/L	1.0							
1,4-Dichlorobenzene	ND	μg/L	1.0		•					
Dichlorodifluoromethane	ND	μg/L	1.0		-					
1,1-Dichloroethane	ND	μg/L	1.0			_				
1,1-Dichloroethene	ND	µg/L	1.0		•	•				
1,2-Dichloropropane	ND	µg/L	1.0							
1,3-Dichloropropane	ND									
	ND	µg/L	1.0							
2,2-Dichloropropane		μg/L	2.0							
1,1-Dichloropropene	ND	μ <b>g/L</b>	1.0							
Hexachlorobutadiene	ND	μg/L	1.0	•						
2-Hexanone	ND	μg/L	10							
Isopropylbenzene	ND	μg/L 	1.0							
4-isopropyltoluene	ND	µg/L	1.0							
4-Methyl-2-pentanone	ND	μg/L	10							
Methylene Chloride	ND	µg/L	3.0							
n-Butylbenzene	ND	μg/L	1.0							
n-Propylbenzene	ND	µg/L	1.0							
sec-Butylbenzene	ND	µg/L	1.0							
Styrene tort Butulhonnan	ND ND	µg/L	1.0							
tert-Butylbenzene	ND	µg/L	1.0				•			
1,1,1,2-Tetrachloroethane	ND	μg/L	1.0						•	
1,1,2,2-Tetrachioroethane	ND	µg/L	2.0							
Tetrachloroethene (PCE)	ND	µg/L	1.0							
trans-1,2-DCE	ND	µg/L	1.0						•	
trans-1;3-Dichloropropene	ND	μg/L	1.0							
1,2,3-Trichlorobenzene	ND	µg/L	1.0							
1,2,4-Trichlorobenzene	ND	µg/L	1.0							
1,1,1-Trichloroethane	ND	µg/L	1.0							
1,1,2-Trichloroethane	ND	µg/L	1.0							
Qualifiers:									·	
E Estimated value			{	H Holding times f	or preparation	n or analysis	exceeded			

Non-Chlorinated

RPD outside accepted recovery limits

NC

Client:

Western Refining Southwest, Inc.

piect:

Injection Well 4th Qtr

Work Order:

1110646

Analyte	Result	Units	PQL	SPK Va 8	SPK ref	%Rec L	owLimit Hip	ghLimit %RPD	O RPDLimit Qual
Method: EPA Method 8260B:	VOLATILES	<del>-</del>				F			
Sample ID: b8		MBLK				Batch ID:	R48569	Analysis Date:	10/20/2011 10:15:43 PM
Trichloroethene (TCE)	ND	μg/L	1.0		•			•	
Trichiorofluoromethane	ND	µg/L	1.0						
1,2,3-Trichloropropane	ND	µg/L	2.0				•		
Vinyl chloride	ND	µg/L	1.0						•
Xylenes, Total	ND	μg/L	1.5						
Sample ID: 100ng Ics		LCS				Batch ID:	R48569	Analysis Date:	10/20/2011 10:25:00 AM
Benzene	19.47	μg/L	1.0	20	0	97.3	81.1	130	
Toluene	20.89	µg/L	1.0	20 .	0 .	104	82.3	122	•
Chlorobenzene	20.13	µg/L	1.0	20	O	101	70	130	
1,1-Dichloroethene	19.44	µg/L	1.0	20	0	97.2	83.1	126	•
Trichloroethene (TCE)	20.06	μg/L	1.0	20	. 0	100	67.4	137	
Sample ID: 100ng lcs-II	•	LCS				Batch ID:	R48569	Analysis Date:	10/20/2011 9:47:10 PM
Benzene	18.47	µg/L	1.0	20	Ó	92.3	81.1	130	
Toluene	20.78	μg/L	1.0	20	0	104	82.3	122	
Chlorobenzene	19.52	μg/Ł	1.0	20	0	97.6	70	130	
1.1-Dichloroethene	18.75	μg/L	1.0	20	0 -	93.7	83.1	126	
Trichloroethene (TCE)	20.29	μg/L	1.0	20	0	101	67.4	137	
Sample ID: 1110646-01a ms		MS				Batch ID:	R48569	Analysis Date:	10/20/2011 11:49:28 AM
Benzene	16.96	µg/L	1.0	20	0	84.8	69.2	127	
Feluene	18.75	µg/L	1.0	20	0	93.7	68.2	130	
robenzene	17.47	µg/L	1.0	20	0	87.4	74	122	
1,1-Dichloroethene	16.33	µg/L	1.0	20	0	81.7	69.3	123	
Trichlorcethene (TCE)	17.07	μg/L	1.0	20	0	85.3	61.3	127	

#### Qualifiers:



Estimated value

Analyte detected below quantitation limits

Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

**Project:** 

Injection Well 4th Qtr

Work Order:

1110646

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	wLimit Hig	ghLimit	%RPD	RPDLimi	t Qual
Method: EPA Method 82700	: Semivolatiles				_					
Sample ID: mb-28933		MBLK			Batch ID:	28933	Analysis	Date:	10/21/2011	11:14:08 AN
Acenaphthene	ND	µg/L	10							
Acenaphthylene	ND	µg/Ľ	10						•	
Aniline	ND	μg/L	10							
Anthracene	ND	µg/L	10							
Azobenzene	ND	µg/L	10							
Benz(a)anthracene	ND	µg/L	10							
Benzo(a)pyrene	. ND	μg/L	10							
Benzo(b)fluoranthene	ND	µg/L	10							
Benzo(g,h,l)perylene	ND	µg/L	10							
Benzo(k)fluoranthene	ND	µg/L	10							
Benzoic acid	ND	μg/L	20							
Benzyl alcohol	ND	μg/L	10							
Bls(2-chloroethoxy)methane	ND	μg/L	10							
Bis(2-chloroethyl)ether	ND	μ <b>g/</b> L	10							
Bls(2-chloroisopropyl)ether	ND	μg/L	10	•						
Bis(2-ethylhexyl)phthalate	ND	µg/L	10							
4-Bromophenyl phenyl ether	ND	µg/L	10							
Butyl benzyl phthalate	ND	µg/L	10							
Carbazole	ND	µg/L	10							
4-Chloro-3-methylphenol	ND	µg/L	10							
4-Chloroaniline	ND	µg/L	10							
2-Chloronaphthalene	ND	μg/L	10							
2-Chlorophenol	ND	µg/L	10		•					
4-Chlorophenyl phenyl ether	ND	μg/L	10							
Chrysene	, ND	μg/L	10							
Di-n-butyl phthalate	ND	μg/L	10						•	
Di-n-octyl phthalate	ND	μg/L	10							
Dibenz(a,h)anthracene	ND.	μg/L	10							
Dibenzofuran	ND	μg/L	10							
1,2-Dichlorobenzene	ND	μg/L	10							
1,3-Dichlorobenzene	ND	μg/L	10							
1,4-Dichlorobenzene	ND	μg/L	10							
3,3'-Dichlorobenzidine	ND	μg/L	10							
Diethyl phthalate	ND	μg/L	10							
Dimethyl phthalate	ND	· μg/L	10							
2,4-Dichlorophenol	ND	μ <b>g/L</b>	20							
2,4-Dimethylphenol	ND	μ <b>g/</b> L	10							
4,6-Dinitro-2-methylphenol	ND	μ <b>g/</b> L	20							
2,4-Dinitrophenol	ND	μg/L	20							
2,4-Dinitrotoluene	ND	μg/L	10			•				
2,6-Dinitrotoluene	ND	μg/L	10							
Fluoranthene	ND	µg/L	10							
Fluorene	ND	µg/L	10							
Hexachlorobenzene	ND	µg/L	10							
Qualifiers:		· · · · · · · · · · · · · · · · · · ·		!						
E Estimated value				H Holding times	for preparatio	n or analvei	s exceeded			
J Analyte detected below qua	ntitation limits			NC Non-Chlorinate		vi waaasjot				
ND Not Detected at the Reporti				R RPD outside a		ages, liveside				Page 6

Client:

Western Refining Southwest, Inc.

ject:

Injection Well 4th Qtr

Work Order:

1110646

Analyte	Result	Units	PQL	SPK Va SPK re	f %Recl	LowLimit Hi	ighLimit 9	%RPD	RPDLimit	Qual
Method: EPA Method 82700	: Semivolatile	3			ı			_		
Sample ID: mb-28933		MBLK			Batch ID:	28933	Analysis	Date:	10/21/2011 1	1:14:08 A
-texachtorobutadiene	ND	µg/L	10		h					
-lexachlorocyclopentadiene	. ND	µg/L	10							
texachloroethane	ND	µg/L	10							
ndeno(1,2,3-cd)pyrene	ND	μg/L	10							
sophorone	ND	μg/L	10							
2-Methylnaphthalene	ND	µg/L	10			•				
I-Methylnaphthalene	ND	μg/L	10			•				
2-Methylphenol	ND	μg/L	10		*. *	-				
3+4-Methylphenol	ND	µg/L	10		Ir		•			
N-Nitrosodi-n-propylamine	ND	μg/L	10				-			
N-Nitrosodimethylamine	ND	µg/L	10				• •	•		
N-Nitrosodiphenylamine	ND	μg/L	10	•	•					
Naphthalene	ND	μg/L	10	. 1						
2-Nitroaniline	ND	μg/L	10							
3-Nitroaniline	ND	μg/L	10				•			
4-Nitroaniline	ND	μg/L	20							
Nitrobenzene	ND	μg/L	10						•	
2-Nitrophenol	ND	μg/L	10							
1-Nitrophenol	ND	μg/L	10			•				
Pentachlorophenol	ND		20			_				
nanthrene	ND	μg/L								
noi	ND	µg/L	. 10							٠.
		µg/L	10							
Pyrene Pyridine	ND	µg/L	10							•
-	ND	µg/L	10							•
1,2,4-Trichlorobenzene	ND	μg/L	10				•			
2,4,5-Trichlorophenol	ND	μg/L	10	1	•				•	
2,4,6-Trichlorophenol	ND	μg/L	10							
Sample ID: lcs-28933		LCS			Batch ID:	28933	Analysis I	Dat <del>e</del> :	10/21/2011 1	1:43:34 AI
Acenaphthene	64.96	µg/L	10	100 0	65.0	37.7	119			
4-Chloro-3-methylphenol	126.9	μg/L	10	200 0	63.4	48.8	104			
2-Chlorophenol	131.8	µg/L	10	200 0	65.9	38.2	109			
1,4-Dichlorobenzene	53.14	· µg/L	10	100 0	53.1	33.7	99.1			
2,4-Dinitrotoluene	62.82	µg/L	10	100 · 0	62.8	39.9	125			
N-Nitrosodi-n-propylamine	59.36	µg/L	10	100 0	59.4	43.8	95.1			
4-Nitrophenol	65.02	μg/L	10	200 0	32.5	21.7	68.6			
Pentachlorophenol	81.78	μg/L	20	200 0	40.9	26.7	107			
Phenol -	73.32	μg/L	10	200 0	36.7	23.9	65.8			
Dyrene	59.74	μg/L -	. 10	100 0	59.7	45.7	107			
1,2,4-Trichlorobenzene	54.34	µg/L	10	100 0	54.3	30.8	104			
Bample ID: lcsd-28933		LCSD			Batch ID:	28933	Analysis I	Date:	10/21/2011 1	2:13:07 PI
Acenaphthene	69.00	μg/L	10	100 0	69.0	37.7	119	6.03	20	
4-Chloro-3-methylphenol	143.3	μg/L	10	200 0	71.7	48.8	104	12.2	20	
2-Chlorophenol	128.1	μg/L	10	200 0	64.1	38.2	109	2.82	20	
1,4-Dichlorobenzene	53.22	μg/L	10	100 0	53.2	33.7	99.1	0.150	20	





Estimated value

Analyte detected below quantitation limits

Not Detected at the Reporting Limit

Holding times for preparation or analysis exceeded : **H** 

Non-Chlorinated NC

RPD outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th Qtr

Work Order:

1110646

Analyte	Result	Units	PQL	SPK Va	a SPK ref	%Rec L	LowLimit Hig	ighLimit	%RPD	O RPDLimit	t Qual
Method: EPA Method 8270C:	: Semivolatiles										,
Sample ID: Icsd-28933		LCSD				Batch ID:	28933	Analys.	sis Date:	10/21/2011 1	12:13:07 Pi
2,4-Dinitrotoluene	71.06	μg/L	10	100	0	71.1	39.9	125	12.3	20	•
N-Nitrosodi-n-propylamine	62.78	μg/L	10	100	. 0	62.8	43.8	95.1	5.60	20	
I-Nitrophenol	74.94	μg/L	10	200	0	37.5	21.7	68.6	14.2	20	
Pentachlorophenol	87.60	µg/L	20 ⁰	200	0	43.8	26.7	107	6.87	20	
Phenol	79.78	μg/L	10	200	0	39.9	23.9	65.8	8.44	20	
Pyrene	66.38	μg/L	10	100	0	66.4	45.7	107	10.5	20	
1,2,4-Trichlorobenzene	52.12	μg/L	10	100	0	52.1	30.8	104	4.17	20	
Method: EPA Method 7470: N	Wercury			_ <del>_</del>	_ <del>_</del>	_ <del>_</del>					<del></del>
Sample ID: MB-29034	•	MBLK	ļ			Batch ID:	29034	Analysi	sis Date:	10/24/2011	3:48:26 Pi
Mercury	ND	mg/L	0.00020	•							
sample ID: LCS-29034	-	LCS				Batch ID:	29034	Analysi	sis Date:	10/24/2011	3:50:12 Pl
lercury	0.004293	mg/L	0.00020	0.005	6E-05	84.6	80	120			

Qualifia	16

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

Holding times for preparation or analysis exceeded

NC Non-Chlorinated

H

R RPD outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

pject:

Injection Well 4th Qtr

Work Order:

1110646

Analyte 	Result	Units ————	PQL	SPK Va	SPK ref	%Rec Lo	owLimit Hig	ghLimit	%RPD	RPDLimit	Qual
Nethod: EPA 6010B: Total											
Sample ID: 1110646-01EMSD	)	MSD				Batch ID:	28889	Analysi	s Date:	10/21/2011	9:41:36 AR
Arsenic	0.5551	mg/L	0.020	0.5	. 0	111	<b>7</b> 5 ′	125	0.386	20	
Barlum	0.6957	mg/L	0.020	0.5	0.1909	/ <b>101</b>	75	125	0.121	20	
Cadmium	0.4991	mg/L	0.0020	0.5	0	99.8	75	125	0.174	20	
Chromium	0.5131	mg/L	0.0060	0.5	0	103	75	125	0.316	20	•
ead	0.5106	mg/L	0.0050	0.5	0	102	75	125	0.409	20	
lagnesium	73.76	mg/L	1.0	50	23.74	100	75	125	1.04	20	
otassium	55.49	mg/L	1.0	50	6.838	97.3	75	125	0.700	20	
elenium	0.4910	mg/L	0.050	0.5	0	98.2	75	125	1.70	20	
ilver	0.08806	mg/L	0.0050	0.1	0	88.1	75	125	0.0529	20	
ample (D: 1110646-01EMSD	,	MSD				Batch ID:	28889	Analysi	s Date:	10/21/2011	9:47:51 AF
alcium	205.2	mg/L	5.0	50	146.5	117	75	125	3.56	20	
odium	276.7	mg/L	5.0	50	226.2	101	75	125	3.04	20	
ample ID: MB-28889	•	MBLK				Batch ID:	28889	Analysi	is Date:	10/17/2011	8:32:28 AI
rsenic	ND	mg/L	0.020								
arium	ND	mg/L	0.020								
admium	ND	mg/L	0.0020								. •
alcium	ND	mg/L	1.0			. '				•	
hromium	ND	mg/L	0.0060	•						Ţ	
ad	NĐ	mg/L	0.0050								
agnesium	ND	mg/L	1.0								
assium	ND	mg/L	1.0								
elenium	ND	mg/L	0.050								
ilver	ND	mg/L	0.0050								
odium	ND	mg/L	1.0								
ample ID: LCS-28889		LCS				Batch ID:	28889	Analys	is Date:	10/17/2011	8:34:26 AN
rsenic	0.5059	mg/L	0.020	0.5	0	101	80	120			
arium	0.4964	mg/L	0.020	0.5	0	99.3	80	120			
admium	0.4971	mg/L	0.0020	0.5	0	99.4	80	120			
alcium	49.78	mg/L	1.0	50	0	99.6	80	120			
hromlum	0.4936	mg/L	0.0060	0.5	0	98.7	80	120			
ead	0.4993	mg/L	0.0050	0.5	0	99.9	80	120			
agnesium	50.09	mg/L	1.0	50	0	100	80	120			
otassium	48.14	mg/L	1.0	50	0	96.3	80 .	120			
eienium	0.4867	mg/L	0.050	0.5	0	97.3	80	120			
lver	0.08537	mg/L	0.0050	0.1	0	85.4	80	120			
odium	48.85	mg/L	1.0	50	0	97.7	80	120			
ample ID: 1110646-01EMS	•	MS				Batch ID:	28889	Analys	is Date:	10/21/2011	9:39:32 AN
rsenic	0.5530	mg/L	0.020	0.5	0	111	75	125			
arium	0.6949	mg/L	0.020	0.5	0.1909	101	75 ·	125			
admium	0.4999	mg/L	0.0020	0.5	. 0	100	75	125			
hromium	0.5147	mg/L	0.0060	0.5	0	103	75	125			
ead	0.5127	mg/L	0.0050	0.5	0	103	75	125			
lagnesium	73.00	mg/L	1.0	50	23.74	98.5	75	125			





Estimated value

Analyte detected below quantitation limits.

Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th Qtr

Work Order:

1110646

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec Lo	wLimit Hi	ghLimit %RPD	RPDLimit Qual
Method: EPA 6010B; Total Re	coverable Me	tals							
Sample ID: 1110646-01EMS		MS				Batch ID:	28889	Analysis Date:	10/21/2011 9:39:32 AM
Potassium	55.10	mg/L	1.0	50	6.838	96.5	75	125	
Selenium	0.4828	mg/L	0.050	0.5	0	96.6	75	125	
Silver	0.08802	mg/L	0.0050	0.1	. 0	88.0	75	125	
Sample ID: 1110646-01EMS		MS				Batch ID:	28889	Analysis Date:	10/21/2011 9:45:42 AN
Calcium	198.0	mg/L	5.0	50	146.5	103	75	125	
Sodium	268.4	mg/L	5.0	50	226.2	84.4	75	125	
Method: SM2540C MOD: Tota	Dissolved S	able							· · · · · · · · · · · · · · · · · · ·
Sample ID: 1110846-01DMSD		MSD				Batch ID:	28916	Analysis Date:	10/18/2011 1:19:00 PM
Total Dissolved Solids	2210	mg/L	20.0	1000	1189	102	80	120 0.406	· 5
Sample ID: MB-28916		MBLK				Batch ID:	28916	Analysis Date:	10/18/2011 1:19:00 PM
Total Dissolved Solids	ND	mg/L	20.0						
Sample ID: LCS-28916		LCS				Batch ID:	28916	Analysis Date:	10/18/2011 1:19:00 PM
Total Dissolved Solids	1023	mg/L	20.0	1000	0	102	80	120	
Sample ID: 1110646-01DMS		MS				Batch ID:	28916	Analysis Date:	10/18/2011 1:19:00 PM
Total Dissolved Solids	2219	mg/L	20.0	1000	1189	103	80	120	

_			
(1	ma	Hill	ers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

# Hall Environmental Analysis Laboratory, Inc.

# Sample Receipt Checklist

Name WESTERN REFINING SOUT		•	Date Receiv	/ed:	10/12/2011
Veerk Order Number 1110848			Received	by: AMG	
	A .	1.1.	Sample ID	labels checked by:	A
Checklist completed by: Signature	~	/ <i>G</i> //2/	//	_	Initials
			<u>,</u>		•
Matrix:	Carrier name:	<u>UPS</u>			
Shipping container/cooler in good condition?	٠.	Yes 🗹	No 🗆	Not Present	
Custody seals intact on shipping container/cooler?	)	Yes 🗹	No 🗆	Not Present	Not Shipped
Custody seals intact on sample bottles?		Yes 🗆	No 🗆	N/A ☑	•
Chain of custody present?		Yes 🗹	No 🗆		
Chain of custody signed when relinquished and re-	ceived?	Yes 🗹	No 🗆		
Chain of custody agrees with sample labels?	•	Yes 🗹	No 🗆		
Samples in proper container/bottle?		Yes 🗹	No 🗆	•	
Sample containers intact?	4	Yes 🗹	No 🗔		
Sufficient sample volume for indicated test?		Yes 🗹	No 🗆		
All samples received within holding time?		Yes 🗹	No 🗀		Number of preserved
Water - VOA vials have zero headspace?	No VOA vials subn	nitted 🗌	Yes, 🗹	No 🗆	bottles checked for pH:
Water - Preservation labels on bottle and cap mate	ch?	Yes 🗹	No 🗆	N/A	2 2
er - pH acceptable upon receipt?		Yes 🗹	No 🗆	N/A □	12 unless noted
Container/Temp Blank temperature?		1.3°	<6° Ci Accepta		D <del>O</del> IOW.
COMMENTS:			If given sufficie	ent time to cool.	• ;
			· 1,		
•			,		
				•	
		· =====			
	=====	· =====		=====	
=======================================	=====	· =====			=
	=====	·====		=====	=======
Client contacted D	ate contacted:	·====	Pé	erson contacted	
	ate contacted:	. = = =	Pe	erson contacted	
Contacted by:		:====	Pe	erson contacted	
			Pe	erson contacted	
Contacted by:			Pe	erson contacted	
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Albuquerque, NM 87109	Tel. 505-345-3975 Fax 505-345-4107	Analysis Request	O ⁴ )  k	(Gas o (Gas o (Gas o	115B (C	reference of 60 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or 10 or	BTEX + MT BTEX + MT TPH Methor TPH (Methor TPH (Methor B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B310 (PNA B	X	X	X		×	×	×	<b>×</b>			Remarks:			lerves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical
Turn-Around Time:	X Standard □ Rush	*	Injection Well 4th QTR	Project #:		Project Manager:		Sampler: Terry Onlow Roles		Container Preservative Preservation Type and # Type	340A HCL -1	1- Liter Amber	1-50m/ 1-50m/	1-500ml - 1m005-1	1-250ml H2504	1-500ml HNO3	1-500 ml Na DH	1-500m1 ZN Acatel			Received by: Date Time	[:]   e  a	Received by: Time	
Chain-of-Custody Record			Mailing Address: 50 Road 4990	(3	Phone #: 505- 632-4135	email or Fax#: \$05-632-3911	QA/QC Package:		□ EDD (Type)	Sample Request ID	10-11-11 9:30 H30 Injection Well	,						1	Trip Blank		Date: Time: Relinguished by:	11 12:3 Votest Kraley	Time: Relinquished by:	If necessary is a subcontracted to the subcontracted to other accredited laboratories.

ή.

# **APPENDIX C**



# **Hall Environmental Analysis Laboratory**

# **QUALITY ASSURANCE PLAN**

Effective Date: July 1st, 2011

**Revision 9.4** 

www.hallenvironmental.com

Control Number: 00000104

Approved By:

Andy Freeman

**Laboratory Manager** 

Date

Approved By:

Carolyn Swanson

4/29/201

Date

Quality Assurance/Quality Control Officer



Approved By:

B. Derek Harmon Date
Organic Manager/Technical Director

Approved By:

lan Cameron

0/29/11

Inorganic Manager/Technical Director

Approved By:

Michael Williams

Microbiology Technical Director

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Appendix C TCEQ Accreditation

Reserved, available upon request

Full list of approved analytes, methods, analytical techniques and fields of testing

Appendix D ADHS Accreditation

Reserved, available upon request

Full list of approved analytes, methods, analytical techniques and fields of testing

Appendix E NMED-DWB Certification

Reserved, available upon request

Appendix F NM DOH Certification

Reserved, available upon request

**Appendix G Terms, Definitions and Acronym List** 

Reserved, available upon request

**Appendix H Chain of Custody Record** 

Reserved, available upon request

Reserved, available upon request

Appendix I HEAL Forms

Analyst Ethics and Data Integrity Agreement

**IDOC** Certificate

**ADOCP Certificate** 

**Training Forms** 

Corrective Action Report

Administrative SOP List

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#### 3.0 Introduction

## **Purpose of Document**

The purpose of this Quality Assurance Plan is to formally document the quality assurance policies and procedures of Hall Environmental Analysis Laboratory, Inc. (HEAL), for the benefit of its employees, clients, and accrediting organizations. HEAL continually implements all aspects of this plan as an essential and integral part of laboratory operations in order to ensure that high quality data is produced in an efficient and effective manner.

## **Objectives**

The objective of HEAL is to achieve and maintain excellence in environmental testing. This is accomplished by developing, incorporating and documenting the procedures and policies specified by each of our accrediting authorities and outlined in this plan. These activities are carried out by a laboratory staff that is analytically competent, well-qualified, and highly trained. An experienced management team, knowledgeable in their area of expertise, monitors them. Finally, a comprehensive quality assurance program governs laboratory practices and ensures that the analytical results are valid, defensible, reproducible, reconstructable and of the highest quality.

HEAL establishes and thoroughly documents its activities to ensure that all data generated and processed will be scientifically valid and of known and documented quality. Routine laboratory activities are detailed in method specific standard operating procedures (SOP). All data reported meets the applicable requirements for the specific method that is referenced, ORELAP, TCEQ, EPA, client specific requirements and/or State Bureaus. In the event that these requirements are ever in contention with each other, it is HEAL's policy to always follow the most prudent requirement available. For specific method requirements refer to HEAL's Standard Operating Procedures (SOP's), EPA methods, Standard Methods 20th edition, ASTM methods or state specific methods.

HEAL management ensures that this document is correct in terms of required accuracy and data reproducibility, and that the procedures contain proper quality control measures. HEAL management additionally ensures that all equipment is reliable, well-maintained and appropriately calibrated. The procedures and practices of the laboratory are geared towards not only strictly following our regulatory requirements but also allowing the flexibility to conform to client specific specifications. Meticulous records are maintained for all samples and their respective analyses so that results are well-documented and defensible in a court of law.

The HEAL Quality Assurance/Quality Control Officer (QA/QCO) and upper management are responsible for supervising and administering this quality assurance program, and ensuring each individual is responsible for its proper implementation. All HEAL management remains committed to the encouragement of excellence in analytical testing and will continue to provide the necessary resources and environment conducive to its achievement.

### **Policies**

Understanding that quality cannot be mandated, it is the policy of this laboratory to provide an environment that encourages all staff members to take pride in the quality of their work. In addition to furnishing proper equipment and supplies, HEAL stresses the importance of continued training and professional development. Further, HEAL recognizes the time required for data interpretation. Therefore, no analyst should feel pressure to sacrifice data quality for data quantity. Each staff member must perform with the highest level of integrity and professional competence, always being alert to problems that could compromise the quality of their technical work.

Management and senior personnel supervise analysts closely in all operations. Under no circumstance is the willful act or fraudulent manipulation of analytical data condoned. Such acts must be reported immediately to HEAL management. Reported acts will be assessed on an individual basis and resulting actions could result in dismissal. The laboratory staff is encouraged to speak with lab managers or senior management if they feel that there are any undo commercial, financial, or other pressures, which might adversely affect the quality of their work; or in the event that they suspect that data quality has been compromised in any way. HEAL's Quality Assurance/Quality Control Officer is available if any analyst and/or manager wishes to anonymously report any suspected or known breaches in data integrity.

Understanding the importance of meeting customer requirements in addition to the requirements set forth in statutory and regulatory requirements, HEAL shall periodically seek feedback from customers and evaluate the feedback in order to initiate improvements.

All proprietary rights and client information at HEAL (including national security concerns) are considered confidential. No information will be given out without the express verbal or written permission of the client. All reports generated will be held in the strictest of confidence.

HEAL shall continually improve the effectiveness of its management system through the use of the policies and procedures outlined in this Quality Assurance Plan. Quality control results, internal and external audit findings, management reviews, new and continual training and corrective and preventive actions are continually evaluated to identify possible improvements and to ensure that appropriate communication processes are taking place regarding the effectiveness of the management system. HEAL shall ensure that the integrity of the quality system is maintained when changes to the system are planned and implemented.

This is a controlled document. Each copy is assigned a unique tracking number and when released to a client or accrediting agency the QA/QCO keeps the tracking number on file. This document is reviewed on an annual basis to ensure that it is valid and representative of current practices at HEAL.

## 4.0 Organization and Responsibility

## Company

HEAL is accredited in accordance with the 2009 TNI standard (see NELAC accredited analysis list in Appendix B and C), through ORELAP and TCEQ and by the Arizona Department of Health Services. Additionally, HEAL is qualified as defined under the State of New Mexico Water Quality Control Commission regulations and the New Mexico State Drinking Water Bureau. HEAL is a locally owned small business that was established in 1991. HEAL is a full service environmental analysis laboratory with analytical capabilities that include both organic and inorganic methodologies and has performed analyses of soil, water, and air as well as various other matrices for many sites in the region. HEAL's client base includes local, state and federal agencies, private consultants, commercial industries as well as individual homeowners. HEAL has performed as a subcontractor to the state of New Mexico and to the New Mexico Department of Transportation. HEAL has been acclaimed by its customers as producing quality results and as being adaptive to client-specific needs.

The laboratory is divided into an organic section and an inorganic section. Each section has a designated manager/technical director. The technical directors report directly to the laboratory manager, who oversees all operations.

#### Certifications

ORELAP - NELAC Oregon Primary accrediting authority.

TCEQ – NELAC Texas Secondary accrediting authority.

The Arizona Department of Health Services

The New Mexico Drinking Water Bureau

The New Mexico Department of Health

See Appendix B-F for copies of current licenses and licensed parameters, or refer to our current list of certifications online at <a href="https://www.hallenvironmental.com">www.hallenvironmental.com</a>.

In the event of a certification being revoked or suspended, HEAL will notify, in writing, those clients that require the affected certification.

#### Personnel

HEAL management ensures the competence of all who operate equipment, perform environmental tests, evaluate results, and sign test reports. Personnel performing specific tasks shall be qualified on the basis of appropriate education, training, experience and /or demonstrated skills.

HEAL ensures that all personnel are aware of the relevance and importance of their activities and how each employee contributes to the achievement of the objectives defined throughout this document.

All personnel shall be responsible for complying with HEAL's quality assurance/quality control requirements that pertain to their technical function. Each technical staff member must have a combination of experience and education to adequately demonstrate specific knowledge of their particular function and a general knowledge of laboratory operations, test methods, quality assurance/quality control procedures, and records management.

All employees' training certificates and diplomas are kept on file with demonstrations of capability for each method they perform. An Organizational Chart can be found at the end of this section and a personnel list is available in Appendix A.

## **Laboratory Director**

The Laboratory Director is responsible for overall technical direction and business leadership of HEAL. The Laboratory Manager, the Project Manager and Quality Assurance/Quality Control Officer report directly to the Laboratory Director. Someone with a minimum of 7 years of directly related experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

## **Laboratory Manager/Lead Technical Director**

The Laboratory Manager shall exercise day—to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results. The Laboratory Manager shall be experienced in the fields of accreditation for which the laboratory is approved or seeking accreditation. The Laboratory Manager shall certify that personnel with appropriate educational and/or technical background perform all tests for which HEAL is accredited. Such certification shall be documented.

The Laboratory Manager shall monitor standards of performance in quality control and quality assurance and monitor the validity of the analyses performed and data generated at HEAL to assure reliable data.

The Laboratory Manager is responsible for the daily operations of the laboratory. The Laboratory Manager is the lead technical director of the laboratory and, in conjunction with the section technical directors, is responsible for coordinating activities within the

laboratory with the overall goal of efficiently producing high quality data within a reasonable time frame.

In events where employee scheduling or current workload is such that new work cannot be incorporated, without missing hold times, the Laboratory Manager has authority to modify employee scheduling, re-schedule projects or, when appropriate, allocate the work to approved subcontracting laboratories.

Additionally, the laboratory manager reviews and approves new analytical procedures and methods, and performs a final review of most analytical results. The Laboratory Manager provides technical support to both customers and HEAL staff.

The Laboratory Manager also observes the performance of supervisors to ensure that good laboratory practices and proper techniques are being taught and utilized, and to assist in overall quality control implementation and strategic planning for the future of the company. Other duties include assisting in establishing laboratory policies that lead to the fulfillment of requirements for various certification programs, assuring that all Quality Assurance and Quality Control documents are reviewed and approved, and assisting in conducting Quality Assurance Audits.

The laboratory manager addresses questions or complaints that cannot be answered by the section managers.

The Laboratory Manager shall have a bachelor's degree in a chemical, environmental, biological sciences, physical sciences or engineering field, and at least five years of experience in the environmental analysis of representative inorganic and organic analytes for which the laboratory seeks or maintains accreditation.

# **Quality Assurance Quality Control Officer**

The Quality Assurance/Quality Control Officer (QA/QCO) serves as the focal point for QA/QC and shall be responsible for the oversight and/or review of quality control data. The QA/QCO functions independently from laboratory operations and shall be empowered to halt unsatisfactory work and/or prevent the reporting of results generated from an out-of-control measurement system. The QA/QCO shall objectively evaluate data and perform assessments without any outside/managerial influence. The QA/QCO shall have direct access to the highest level of management at which decisions are made on laboratory policy and/or resources. The QA/QCO shall notify laboratory management of deficiencies in the quality system in periodic, independent reports.

The QA/QCO shall have general knowledge of the analytical test methods for which data review is performed and have documented training and/or experience in QA/QC procedures and in the laboratory's quality system. The QA/QCO will have a minimum of a BS in a scientific or related field and a minimum of three years of related experience.

The QA/QCO shall schedule and conduct internal audits as per the Internal Audit SOP at least annually, monitor and trend Corrective Action Reports as per the Data Validation

SOP, periodically review control charts for out of control conditions, and initiate any appropriate corrective actions.

The QA/QCO shall oversee the analysis of proficiency testing in accordance with our standards and monitor any corrective actions issued as a result of this testing.

The QA/QCO reviews all standard operating procedures and statements of work in order to assure their accuracy and compliance to method and regulatory requirements.

The QA/QCO shall be responsible for maintaining and updating this quality manual.

# **Project Manager**

The role of the project manager is to act as a liaison between HEAL and our clients. The Project Manager updates clients on the status of projects in-house; prepares quotations for new work, and is responsible for HEAL's marketing effort.

All new work is assessed by the Project Manager and reviewed with the other managers so as to not exceed the laboratory's capacity. In events where employee scheduling or current workload is such that new work cannot be incorporated without missing hold times, the Project Manager has authority to re-schedule projects.

It is also the duty of the project manager to work with the Laboratory Manager and QA/QCO to insure that before new work is undertaken, the resources required and accreditations requested are available to meet the client's specific needs.

Additionally, the Project Manager can initiate the review of the need for new analytical procedures and methods, and perform a final review of some analytical results. The Project Manager provides technical support to customers. Someone with a minimum of 2 years of directly related experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

#### **Technical Directors**

Technical Directors are full-time members of the staff at HEAL who exercise day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results for their department within HEAL. A Technical Director's duties shall include, but not be limited to, monitoring standards of performance in quality control and quality assurance, monitoring the validity of the analyses performed and the data generated in their sections to ensure reliable data, overseeing training and supervising departmental staff, scheduling incoming work for their sections, and monitoring laboratory personnel to ensure that proper procedures and techniques are being utilized. They supervise and implement new Quality Control procedures as directed by the QA/QCO, update and maintain quality control records including, but not limited to, training forms, IDOCs, ADOCPs, and MDLs, and evaluate laboratory personnel in their Quality Control activities.

In addition, technical directors are responsible for upholding the spirit and intent of HEAL's data integrity procedures.

As Technical Directors of their associated section, they review analytical data to acknowledge that data meets all criteria set forth for good Quality Assurance practices. Someone with a minimum of 2 years of experience in the environmental analysis of representative analytes for which HEAL seeks or maintains accreditation and a bachelor's degree in a scientific or related discipline should fill this position.

## **Section Supervisors**

Section Supervisors are full time members of staff at HEAL who exercise day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results for their department within HEAL. Section Supervisors report directly to their technical director. A Section Supervisor's duties shall include, but not be limited to, monitoring standards of performance in quality control and quality assurance, monitoring the validity of the analyses performed and the data generated in their sections to ensure reliable data, overseeing training and supervising departmental staff, scheduling incoming work for their sections, and monitoring laboratory personnel to ensure that proper procedures and techniques are being utilized. They supervise and implement new Quality Control procedures as directed by the QA/QCO, update and maintain quality control records including, but not limited to, training forms, IDOCs, ADOCPs, and MDLs, and evaluate laboratory personnel in their Quality Control activities. In addition, Section Supervisors are responsible for upholding the spirit and intent of HEAL's data integrity procedures. Section Supervisors update their Technical Director on the status and needs of their departments and submit all Quality Control documents to their technical director for their review, approval and signature.

As section supervisors, they review analytical data to acknowledge that data meets all criteria set forth for good Quality Assurance practices. Someone with a minimum of 2 years of experience in the environmental analysis of representative analytes for which HEAL seeks or maintains accreditation and a bachelor's degree, or equivalent experience in a scientific or related discipline should fill this position.

## Health and Safety / Chemical Hygiene Officer

Refer to the most recent version of the Health and Safety and Chemical Hygiene Plans for the roles, responsibilities, and basic requirements of the Health and Safety Officer (H&SO) and the Chemical Hygiene Officer (CHO). These jobs can be executed by the same employee.

### Analyst I, II and III

Analysts are responsible for the analysis of various sample matrices including, but not limited to, solid, aqueous, and air, as well as the generation of high quality data in

accordance with the HEAL SOPs and QA/QC guidelines in a reasonable time as prescribed by standard turnaround schedules or as directed by the Section Manager or Laboratory Manager.

Analysts are responsible for making sure all data generated is entered in the database in the correct manner and the raw data is reviewed, signed and delivered to the appropriate peer for review. An analyst reports daily to the section manager and will inform them as to material needs of the section specifically pertaining to the analyses performed by the analyst. Additional duties may include preparation of samples for analysis, maintenance of lab instruments or equipment, and cleaning and providing technical assistance to lower level laboratory staff.

The senior analyst in the section may be asked to perform supervisory duties as related to operational aspects of the section. The analyst may perform all duties of a lab technician.

The position of Analyst is a full or part time hourly position and is divided into three levels, Analyst I, II, and III. All employees hired into an Analyst position at HEAL must begin as an Analyst I and remain there at a minimum of three months regardless of their education and experience. Analyst I must have a minimum of an AA in a related field or equivalent experience (equivalent experience means years of related experience can be substituted for the education requirement). An Analyst I is responsible for analysis, instrument operation, including calibration and data reduction. Analyst II must have a minimum of an AA in a related field or equivalent experience and must have documented and demonstrated aptitude to perform all functions of an Analyst II. An Analyst II is responsible for the full analysis of their test methods, routine instrument maintenance, purchase of consumables as dictated by their Technical Director, advanced data reduction, and basic data review. Analyst II may also assist Analyst III in method development and, as dictated by their Technical Director, may be responsible for the review and/or revision of their method specific SOPs. Analyst III must have Bachelors degree or equivalent experience and must have documented and demonstrated aptitude to perform all functions of an Analyst III. An Analyst III is responsible for all tasks completed by an Analyst I and II as well as advanced data review, non-routine instrument maintenance, assisting their technical director in basic supervisory duties and method development.

### **Laboratory Technician**

A laboratory technician is responsible for providing support to analysts in the organics, inorganics and disposal departments. Laboratory Technicians can assist analysts in basic sample preparation, general laboratory maintenance, glassware washing, chemical inventories, sample disposal and sample kit preparation. This position can be filled by someone without the education and experience necessary to obtain a position as an analyst.

## Sample Control Manager

The sample control manager is responsible for receiving samples and reviewing the sample login information after it has been entered into the computer. The sample control manager also checks the samples against the chain-of-custody for any sample and/or labeling discrepancies prior to distribution.

The sample control manager is responsible for sending out samples to the sub-contractors along with the review and shipping of field sampling bottle kits. The sample control manager acts as a liaison between the laboratory and field sampling crew to ensure that the appropriate analytical test is assigned. If a discrepancy is noted, the sample control manager or sample custodian will contact the customer to resolve any questions or problems. The sample control manager is an integral part of the customer service team.

This position should be filled by someone with a high school diploma and a minimum of 2 years of related experience and can also be filled by a senior manager.

# Sample Custodians

Sample Custodians work directly under the Sample Control Manager. They are responsible for sample intake into the laboratory and into the LIMS. Sample Custodians take orders from our clients and prepare appropriate bottle kits to meet the clients' needs. Sample Custodians work directly with the clients in properly labeling and identifying samples as well as properly filling out legal COCs. When necessary, Sample Custodians contact clients to resolve any questions or problems associated with their samples. Sample Custodians are responsible for distributing samples throughout the laboratory and are responsible for notifying analysts of special circumstances such as short holding times or improper sample preservation upon receipt.

# Sample Disposal Custodian

The sample disposal custodian is responsible for characterizing and disposing of samples in accordance to the most recent version of the sample disposal SOP. The sample disposal custodian collects waste from the laboratory and transports it to the disposal warehouse for storage and eventual disposal. The sample disposal custodian is responsible for maintaining the disposal warehouse and following the requirements for documentation, integrity, chemical hygiene and health and safety as set forth in the various HEAL administrative SOPs. The sample disposal custodian is responsible for overseeing any laboratory technicians employed at the disposal warehouse.

This position should be filled by someone with a high school diploma and a minimum of 1 year of related experience.

## **Delegations in the Absence of Key Personnel**

Planned absences shall be preceded by notification to the Laboratory Manager. The appropriate staff members shall be informed of the absence. In the case of unplanned absences, the superior shall either assume the responsibilities and duties or delegate the responsibilities and duties to another appropriately qualified employee.

In the event that the Laboratory Manager is absent for a period of time exceeding fifteen consecutive calendar days, another full-time staff member meeting the basic qualifications and competent to temporarily perform this function will be designated. If this absence exceeds thirty-five consecutive calendar days, HEAL will notify ORELAP in writing of the absence and the pertinent qualifications of the temporary laboratory manager.

# **Laboratory Personnel Qualification and Training**

All personnel joining HEAL shall undergo orientation and training. During this period the new personnel shall be introduced to the organization and their responsibilities, as well as the policies and procedures of the company. They shall also undergo on-the-job training and shall work with trained staff. They will be shown required tasks and be observed while performing them.

When utilizing staff undergoing training, appropriate supervision shall be dictated and overseen by the appropriate section technical director. Prior to analyzing client samples, a new employee, or an employee new to a procedure, must meet the following basic requirements. The SOP and Method for the analysis must be read and signed by the employee indicating that they read, understand, and intend to comply with the requirements of the documents. The employee must undergo documented training. Training is conducted by a senior analyst familiar with the procedure and overseen by the This training is documented by any means deemed section Technical Director. appropriate by the trainer and section Technical Director, and kept on file in the employees file located in the QA/QCO's office. The employee must perform a successful Initial Demonstration of Proficiency (IDOC). See Appendix I for the training documents and checklists utilized at HEAL to ensure that all of these requirements are met. Once all of the above requirements are met it is incumbent upon the section Technical Director to determine at which point the employee can begin to perform the test unsupervised. Certification to Complete Work Unsupervised (see Appendix I) is then filled out by the employee and technical director.

IDOCs are required for all new analysts and methods prior to sample analysis. IDOCs are also required any time there is a change in the instrument, analyte list or method. If more than twelve months have passed since an analyst performed an IDOC and they have not performed the method and/or have not met the continuing DOC requirements, the analyst must perform an IDOC prior to resuming the test.

All IDOCs shall be documented through the use of the certification form which can be found in Appendix I . IDOCs are performed by analyzing four Laboratory Control Spikes (LCSs). Using the results of the LCSs the mean recovery is calculated in the appropriate

reporting units and the standard deviations of the population sample (n-1) (in the same units) as well as the relative percent difference for each parameter of interest. When it is not possible or pertinent to determine mean and standard deviations HEAL assesses performance against establish and documented criteria dictated in the method SOP. The mean and standard deviation are compared to the corresponding acceptance criteria for precision and accuracy in the test method (if applicable) or in laboratory-generated acceptance criteria. In the event that the HEAL SOP or test method fail to establish the pass/fail criteria the default limits of +/- 20% for calculated recovery and <20% relative percent difference based on the standard deviation will be utilized. If all parameters meet the acceptance criteria, the IDOC is successfully completed. If any one of the parameters do not meet the acceptance criteria, the performance is unacceptable for that parameter and the analyst must either locate and correct the source of the problem and repeat the test for all parameters of interest or repeat the test for all parameters that failed to meet Repeat failure, however, confirms a general problem with the measurement system. If this occurs the source of the problem must be identified and the test repeated for all parameters of interest.

New employees that do not have prior analysis experience will not be allowed to perform analysis until they have demonstrated attention to detail with minimal errors in the assigned tasks. To ensure a sustained level of quality performance among staff members, continuing demonstration of capability shall be performed at least once a year. These are as an Annual Documentation of Continued Proficiency (ADOCP).

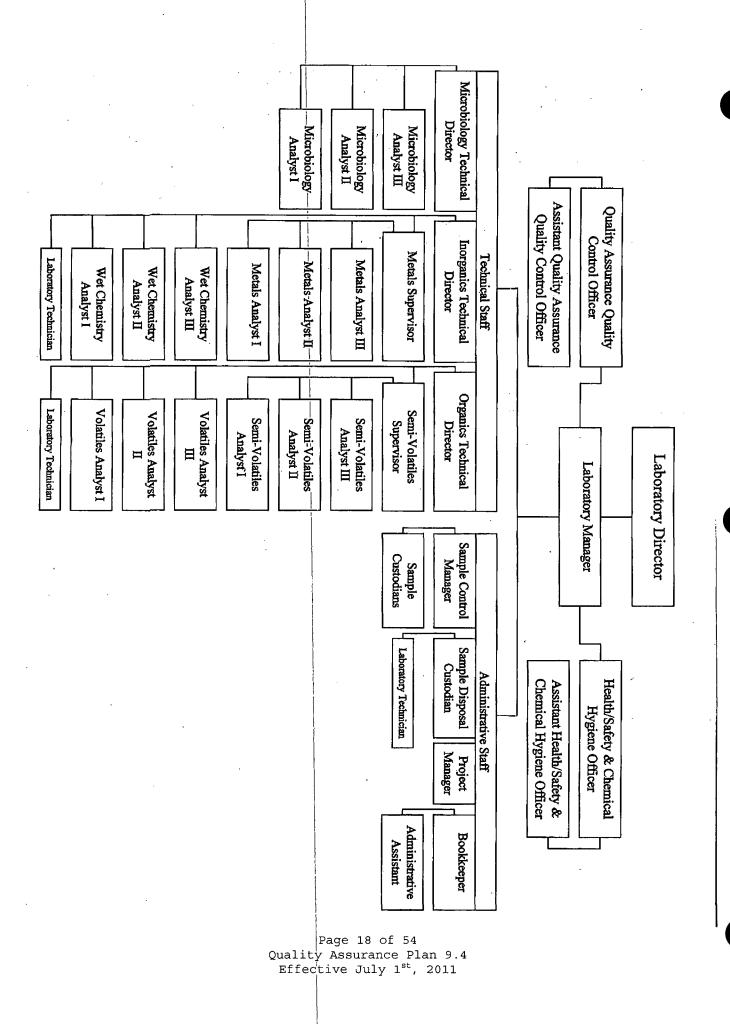
At least once per year an ADOCP must be completed. This is achieved by the acceptable performance of a blind sample (typically by using a PT sample, but can be a single blind (to the analyst) sample), by performing another IDOC, or by summarizing the data of four consecutive laboratory control samples with acceptable levels of precision and accuracy (these limits are those currently listed in the LIMS for an LCS using the indicated test method.) ADOCPs are documented using a standard form and are kept on file in each analyst's employee folder.

Each new employee shall be provided with data integrity training as a formal part of their new employee orientation. Each new employee will sign an ethics and data integrity agreement to ensure that they understand that data quality is our main objective. Every HEAL employee recognizes that although turn around time is important, quality is put above any pressure to complete the task expediently. Analysts are not compensated for passing QC parameters nor are incentives given for the quantity of work produced. Data Integrity and Ethics training are performed on an annual basis in order to remind all employees of HEAL's policy on data quality. Employees are required to understand that any infractions of the laboratory data integrity procedures will result in a detailed investigation that could lead to very serious consequences including immediate termination, debarment, or civil/criminal prosecution.

Training for each member of HEAL's technical staff is further established and maintained through documentation that each employee has read, understood, and is using the latest version of this Quality Assurance Manual. Training courses or workshops on specific equipment, analytical techniques, or laboratory procedures are documented through attendance sheets, certificates of attendance, training forms, or quizzes. This training

documentation is located in analyst specific employee folders in the QA/QCO Office. On the front of all methods, SOPs, and procedures for HEAL, there is a signoff sheet that is signed by all pertinent employees, indicating that they have read, understand, and agree to perform the most recent version of the document.

The effectiveness of training will be evaluated during routine data review, annual employee reviews, and internal and external audits. Repetitive errors, complaints and audit findings serve as indicators that training has been ineffective. When training is deemed to have been ineffective a brief review of the training process will be completed and a re-training conducted as soon as possible.



## 5.0 Receipt and Handling of Samples

## Sampling

#### **Procedures**

HEAL does not provide field sampling for any projects. Sample kits are prepared and provided for clients upon request. The sample kits contain the appropriate sampling containers (with a preservative when necessary), labels, blue ice (The use of "blue ice" by anyone except HEAL personnel is discouraged because it generally does not maintain the appropriate temperature of the sample. If blue ice is used, it should be completely frozen at the time of use, the sample should be chilled before packing, and special notice taken at sample receipt to be certain the required temperature has been maintained.), a cooler, chain-of-custody forms, plastic bags, bubble wrap, and any special sampling instructions. Sample kits are reviewed prior to shipment for accuracy and completeness.

#### **Containers**

Containers which are sent out for sampling are purchased by HEAL from a commercial source. Glass containers are certified "EPA Cleaned" QA level 1. Plastic containers are certified clean when required. These containers are received with a Certificate of Analysis verifying that the containers have been cleaned according to the EPA wash procedure. Containers are used once and discarded. If the samples are collected and stored in inappropriate containers the laboratory may not be able to accurately quantify the amount of the desired components. In this case, re-sampling may be required.

#### Preservation

If sampling for analyte(s) requires preservation, the sample custodians fortify the containers prior to shipment to the field, or provide the preservative for the sampler to add in the field. The required preservative is introduced into the vials in uniform amounts and done so rapidly to minimize the risk of contamination. Vials that contain a preservative are labeled appropriately. If the samples are stored with inappropriate preservatives, the laboratory may not be able to accurately quantify the amount of the desired components. In this case re-sampling may be required.

Refer to the current Login SOP and/or the current price book for detailed sample receipt and handling procedures, appropriate preservation and holding time requirements.

# **Sample Custody**

## **Chain-of-Custody Form**

A Chain-of-Custody (COC) form is used to provide a record of sample chronology from the field to receipt at the laboratory. HEAL's COC contains the client's name, address, phone and fax numbers, the project name and number, the project manager's name, and the field sampler's name. It also identifies the date and time of sample collection, sample matrix, field sample ID number, number/volume of sample containers, sample temperature upon receipt, and any sample preservative information.

There is also a space to record the HEAL ID number assigned to samples after they are received. Next to the sample information is a space for the client to indicate the desired analyses to be performed. There is a section for the client to indicate the data package level as well as any accreditation requirements. Finally, there is a section to track the actual custody of the samples. The custody section contains lines for signatures, dates and times when samples are relinquished and received. The COC form also includes a space to record special sample related instructions, sampling anomalies, time constraints, and any sample disposal considerations.

It is paramount that all COCs arrive at HEAL complete and accurate so that the samples can be processed and allocated for testing in a timely and efficient manner. A sample chain-of-custody form can be found in Appendix H or on line at www.hallenvironmental.com.

### **Receiving Samples**

Samples are received by authorized HEAL personnel. Upon arrival, the COC is compared to the respective samples. After the samples and COC have been determined to be complete and accurate, the sampler signs over the COC. The HEAL staff member in turn signs the chain-of-custody, also noting the current date, time, and sample temperature. This relinquishes custody of the samples from the sampler and delegates sample custody to HEAL. The first (white) copy of the COC form is filed in the appropriate sample folder. The second (yellow) copy of the COC form is filed in the COC file in the sample control manger's office. The third (pink) copy of the COC form is given to the person who has relinquished custody of the samples.

# Logging in Samples and Storage

Standard Operating Procedures have been established for the receiving and tracking of all samples (refer to the current HEAL Login SOP). These procedures ensure that samples are received and properly logged into the laboratory and that all associated documentation, including chain of custody forms, is complete and consistent with the samples received. Each sample set is given a unique HEAL tracking ID number.

Individual sample locations within a defined sample set are given a unique sample ID suffix-number. Labels with the HEAL numbers, and tests requested, are generated and placed on their respective containers. The pH of preserved, non-volatile samples is checked and noted if out of compliance. Due to the nature of the samples, the pHs of volatiles samples are checked after analysis. Samples are reviewed prior to being distributed for analysis.

Samples are distributed for analysis based upon the requested tests. In the event that sample volume is limited and different departments at HEAL are required to share the sample, volatile work takes precedence and will always be analyzed first before the sample is sent to any other department for analysis.

All samples that require thermal preservation shall be acceptably stored at a temperature range just above freezing to 6°C.

Each project (sample set) is entered into the Laboratory Information Management System (LIMS) with a unique ID that will be identified on every container. The ID tag includes the Lab ID, Client ID, date and time of collection, and the analysis/analyses to be performed. The LIMS continually updates throughout the lab. Therefore, at any time, an analyst or manager may inquire about a project and/or samples status. For more information about the login procedures, refer to the Sample Login SOP.

## **Disposal of Samples**

Samples are held at HEAL for a minimum of thirty days and then transferred to the HEAL warehouse for disposal. Analytical results are used to characterize their respective sample contamination level(s) so that the proper disposal can be performed. These wastes will be disposed of according to their hazard as well as their type and level of contamination. Refer to the Hall Environmental Analysis Laboratory Chemical Hygiene Plan and current Sample Disposal SOP for details regarding waste disposal.

Waste drums are provided by an outside agency. These drums are removed by the outside agency and disposed of in a proper manner.

The wastes that are determined to be non-hazardous are disposed of as non-hazardous waste in accordance with the Chemical Hygiene Plan and Sample Disposal SOP.

## 6.0 Analytical Procedures

All analytical methods used at HEAL incorporate necessary and sufficient Quality Assurance and Quality Control practices. A Standard Operating Procedure (SOP) is used for each method to provide the necessary criteria to yield acceptable results. These procedures are reviewed at least annually and revised as necessary and are attached as a pdf file in the Laboratory Information Management System (LIMS) for easy access by each analyst. The sample is often consumed or altered during the analytical process. Therefore, it is important that each step in the analytical process be correctly followed in order to yield valid data.

When unforeseen problems arise, the analyst, technical director, and, when necessary, laboratory manager meet to discuss the factors involved. The analytical requirements are evaluated and a suitable corrective action or resolution is established. The client is notified in the case narrative with the final report or before, if the validity of their result is in question.

### **List of Procedures Used**

Typically, the procedures used by HEAL are EPA approved methodologies or 20th edition Standard Methods. However, proprietary methods for client specific samples are sometimes used. The following tables list EPA and Standard Methods Method numbers with their corresponding analytes and/or instrument classification.

#### Methods Utilized at HEAL

Drinking Water(DW) Non-Potable Water (NPW) Solids (S)

Methodology	Matrix	Title of Method
120.1	DW NPW	"Conductance(Specific Conductance, <i>u</i> ohms at 25 ° C)"
180.1	DW NPW	"Turbidity (Nephelometric)"
200.2	DW NPW	"Sample Preparation Procedure For Spectrochemical Determination of Total Recoverable Elements"
200.7	DW NPW	"Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry"
200.8	DW NPW	"Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry."
245.1	DW NPW	"Mercury (Manual Cold Vapor Technique)"
300	DW NPW S	"Determination of Inorganic Anions by Ion Chromatography"

413.2	NPW	"Oil and Grease"
418.1	NPW S	"Petroleum Hydrocarbons (Spectrophotometric, Infrared)"
504.1	DW	"EDB, DBCP and 123TCP in Water by Microextraction and Gas Chromatography"
505	DW	"Analysis of Organohalide Pesticides and Commercial Polychlorinated Biphenyl (PCB) Products in Water by Microextraction and Gas Chromatography"
515.1	DW	"Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron Capture Detector"
524.2	DW	"Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry"
531.1	DW	"Measurement of N-Methylcarbomoyloximes and N-Methylcarbamates in Water by Direct Aqueous Injection HPLC with Post Column Dervivatization"
547	DW	"Determination of Glyphosate in Drinking Water by Direct- Aqueous Injection HPLC, Post-Column Derivatization, and Fluorescence Detection"
552.1	DW	"Determination of Haloacetic Acids and Dalapon in Drinking Water by Ion-Exchange Liquid-Solid Extraction and Gas Chromatography with an Electron Capture Detector"
624	DW	Appendix A to Part 136 Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater Method 624-Purgeables"
625	DW	Appendix A to Part 136 Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater Method 625-Base/Neutrals and Acids"
1311	s	"Toxicity Characteristic Leaching Procedure"
1311ZHE	s	"Toxicity Characteristic Leaching Procedure"
1164A	NPW	"N-Hexane Extractable Material (HEM; Oil and Grease) and Silica Gel Treated N-Hexane Extractable Material) by Extraction and Gravimetry"
3005A	NPW	"Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by FLAA or ICP Spectroscopy"
3010A	S	"Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by FLAA or ICP Spectroscopy"
3050B	S	"Acid Digestion of Sediment, Sludge, and Soils"
3510C	DW NPW	"Separatory Funnel Liquid-Liquid Extraction"
1311ZHE 1164A 3005A 3010A 3050B	S NPW NPW S S DW	"Toxicity Characteristic Leaching Procedure"  "N-Hexane Extractable Material (HEM; Oil and Grease) ar Silica Gel Treated N-Hexane Extractable Material) by Extraction and Gravimetry"  "Acid Digestion of Waters for Total Recoverable or Dissolv Metals for Analysis by FLAA or ICP Spectroscopy"  "Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by FLAA or ICP Spectroscopy"  "Acid Digestion of Sediment, Sludge, and Soils"

3540	S	"Soxhlet Extraction"
3545	S	"Pressurized Fluid Extraction(PFE)"
3665	NPW S	"Sulfuric Acid/Permanganate Cleanup"
5030B	NPW	"Purge-and-Trap for Aqueous Samples"
5035	s	"Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples"
6010B	NPW S	"Inductively Coupled Plasma-Atomic Emission Spectrometry"
6020	NPW S	"Inductively Coupled Plasma-Mass Spectrometry"
7470A	NPW	"Mercury in Liquid Waste (Manual Cold-Vapor Technique)"
7471A	s	"Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)"
8021B	NPW S	"Aromatic and Halogenated Volatiles By Gas Chromatography Using Photoionization and/or Electrolytic Conductivity Detectors"
8015B	NPW	"Nonhalogenated Volatile Organics by Gas Chromatography"
00100	s	(Gasoline Range and Diesel Range Organics)
8015AZ	s	"C10-C32 Hydrocarbons in Soil-8015AZ"
8081A	NPW S	"Organochlorine Pesticides by Gas Chromatography"
8082	NPW S	"Polychlorinated Biphenyls (PCBs) by Gas Chromatography"
8260B	NPW S	"Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)"
8270C	NPW S	"Semivolatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)"
8310	NPW S	"Polynuclear Aromatic Hydrocarbons"
9045C	S	"Soil and Waste pH"
9060	NPW	"Total Organic Carbon"
9067	NPW S	"Phenolics (Spectrophotometric, MBTH With Distillation)"
9095	s	Paint Filter
Walkley/Black	s	FOC/TOC WB
SM2320 B	DW NPW	"Alkalinity"
SM2540 B	NPW	"Total Solids Dried at 103-105° C"

SM2540 C	DW	"Total Dissolved Solids Dried at 180° C"				
	NPW	Total Biocolvou Collad Bilou de 100				
SM2540 D	NPW	"Total Suspended Solids Dried at 103-105° C"				
SM4500-CL G	DW	"Chlorine (Residual) 4500-CL G. DPD Colorimetric Method"				
SM4500-H+B	DW	"pH Value"				
3W4300-H+B	NPW	pri value				
SM4500-NH3	NPW	"4500-NH3" Ammonia				
С	s	4500-NIIS AMMONIA				
SM4500-Norg	NPW	"4500 Norg" Total Kieldehl Nitrogen (TKN)				
C	s	"4500-Norg" Total Kjeldahl Nitrogen (TKN)				
SM5210 B	NPW	"5210 B. 5-day BOD Test"				
SM5310 B	DW	"5310" Total Organic Carbon (TOC)				
8000B	NPW	"Determinative Chromatographic Separations"				
	s	Determinative Chromatographic Separations				
8000C	NPW	"Data was in a time Channel and his Consulting "				
00000	s	"Determinative Chromatographic Separations"				

## **Criteria for Standard Operating Procedures**

HEAL has Standard Operating Procedures (SOPs) for each of the test methods listed above. These SOPs are based upon the listed methods and detail the specific procedure and equipment utilized as well as the quality requirements necessary to prove the integrity of the data. SOPs are reviewed or revised every twelve months or sooner if necessary. The review/revision is documented in the Master SOP Logbook filed in the QA/QC Office. All SOPs are available in the LIMS linked under the specific test method. Administrative SOPs, which are not linked in the LIMS, are available on desktops throughout the laboratory in the link to administrative SOPs folder.

Hand written corrections or alterations to SOPs are not permitted. In the event that a correction is needed and a revision is not immediately possible, a corrective action report will be generated documenting the correction or alteration, signed by the section Technical Director and the QA/QC Officer and will be scanned into the current SOP and will document the change until a new revision is possible.

Each HEAL test method SOP shall include or reference the following topics where applicable:

Identification of the test method;

Applicable matrix or matrices;

Limits of detection and quantitation;

Scope and application, including parameters to be analyzed;

Summary of the test method;

Definitions:

Interferences;

Safety:

Equipment and supplies;

Reagents and standards;

Sample collection, preservation, shipment and storage;

Quality control parameters:

Calibration and standardization;

Procedure;

Data analysis and calculations;

Method performance:

Pollution prevention;

Data assessment and acceptance criteria for quality control measures;

Corrective actions for out-of-control data:

Contingencies for handling out-of-control or unacceptable data;

Waste management;

References; and

Any tables, diagrams, flowcharts and validation data.

#### 7.0 Calibration

All equipment and instrumentation used at HEAL are operated, maintained and calibrated according to manufacturers' guidelines, as well as criteria set forth in applicable analytical methodology. Personnel who have been properly trained in their procedures perform the operation and calibration. Brief descriptions of the calibration processes for our major laboratory equipment and instruments are found below.

#### **Thermometers**

The thermometers in the laboratory are used to measure the temperatures of the refrigerators/freezers, ovens, water baths, hot blocks, ambient laboratory conditions, TCLP Extractions, digestion blocks, and samples at the time of log-in. All NIST traceable thermometers are either removed from use upon their documented expiration date or they are checked annually with a NIST-certified thermometer and a correction factor is noted on each thermometer log. See the most current Login SOP for detailed procedures on this calibration procedure.

Dickson Data Loggers are used to record sample and standard storage refrigerators over the weekend when the appropriate staff is not available to record the temperatures. These data loggers are shipped back to the manufacturer once a year to be re-calibrated.

# Refrigerators/Freezers

Each laboratory refrigerator or freezer contains a thermometer capable of measuring to a minimum precision of 0.1°C. The thermometers are kept with the bulb immersed in liquid. Each day of use, the temperatures of the refrigerators are recorded to insure that the refrigerators are within the required designated range. Samples are stored separately from the standards to reduce the risk of contamination.

See the current Catastrophic Failure SOP for the procedure regarding how to handle failed refrigerators or freezers.

#### **Ovens**

The ovens contain thermometers graduated by 1° C. The ovens are calibrated quarterly against NIST thermometers and checked each day of use as required and in whatever way is dictated by or appropriate for the method in use.

## **Analytical and Table Top Balances**

The table top balances are capable of weighing to a minimum precision of 0.01 grams. The analytical balances are capable of weighing to a minimum precision of 0.0001 grams. Records are kept of daily calibration checks for the balances in use. Working weights are used in these checks. The balances are annually certified by an outside source and the certifications are on file with the QA/QCO.

Balances, unless otherwise indicated by method specific SOPs, will be checked each day of use with at least two weights that will bracket the working range of the balance for the day. Daily balance checks will be done using working weights that are calibrated annually against Class S weights. Class S weights are calibrated by an external provider as required. The Class S weights are used once a year, or more frequently if required, to assign values to the Working Weights. During the daily balance checks, the working weights are compared to their assigned values and must pass in order to validate the calibration of the balance. The assigned values, as well as the daily checks, for the working weights are recorded in the balance logbook for each balance.

#### Instrument Calibration

An instrument calibration is the relationship between the known concentrations of a set of calibration standards introduced into an analytical instrument and the measured response they produce. Calibration curve standards are a prepared series of aliquots at various known concentration levels from a primary source reference standard. Specific mathematical types of calibration techniques are outlined in SW-846 8000B and/or 8000C. The entire initial calibration must be performed prior to sample analyses.

The lowest standard in the calibration curve must be at or below the required reporting limit.

Refer to the current SOP to determine the minimum requirement for calibration points.

Most compounds tend to be linear and a linear approach should be favored when linearity is suggested by the calibration data. Non-linear calibration should be considered only when a linear approach cannot be applied. It is not acceptable to use an alternate calibration procedure when a compound fails to perform in the usual manner. When this occurs, it is indicative of instrument issues or operator error.

If a non-linear calibration curve fit is employed, a minimum of six calibration levels must be used for second-order (quadratic) curves.

When more than 5 levels of standards are analyzed in anticipation of using second-order calibration curves, all calibration points MUST be used regardless of the calibration option employed. The highest or lowest calibration point may be excluded for the purpose of

narrowing the calibration range and meeting the requirements for a specific calibration option. Otherwise, unjustified exclusion of calibration data is expressly forbidden.

Analytical methods vary in QC acceptance criteria. HEAL follows the method specific guidelines for QC acceptance. The specific acceptance criteria are outlined in the analytical methods and their corresponding SOPs.

## pH Meter

The pH meter measures to a precision of 0.01 pH units. The pH calibration logbook contains the calibration before each use, or each day of use, if used more than once per day. It is calibrated using a minimum of 3 certified buffers. Also available with the pH meter is a magnetic stirrer with a temperature sensor. See the current pH SOP (SM4500 H+ B) for specific details regarding calibration of the pH probe.

## Other Analytical Instrumentation and Equipment

The conductivity probe is calibrated as needed and checked daily when in use.

Eppendorf (or equivalent brands) pipettes are checked gravimetrically prior to use.

#### **Standards**

All of the source reference standards used are ordered from a reliable commercial vendor. A Certificate of Analysis (CoA), which verifies the quality of the standard, accompanies the standards from the vendor. The Certificates of Analysis are dated and stored on file by the Technical Directors or their designee. These standards are traceable to the National Institute of Standards (NIST). When salts are purchased and used as standards the certificate of purity must be obtained from the vendor and filed with the CoAs.

All standard solutions, calibration curve preparations, and all other quality control solutions are labeled in a manner that can be traced back to the original source reference standard. All source reference standards are entered into the LIMS with an appropriate description of the standard. Dilutions of the source reference standard (or any mixes of the source standards) are fully tracked in the LIMS. Standards are labeled with the date opened for use and with an expiration date.

As part of the quality assurance procedures at HEAL, analysts strictly adhere to manufacturer recommendations for storage times/expiration dates and policies of analytical standards and quality control solutions.

## Reagents

HEAL ensures that the reagents used are of acceptable quality for their intended purpose. This is accomplished by ordering high quality reagents and adhering to good laboratory practices so as to minimize contamination or chemical degradation. All reagents must meet any specifications noted in the analytical method. Refer to the current Purchase of Consumables SOP for details on how this is accomplished and documented.

Upon receipt, all reagents are assigned a separate ID number, and logged into the LIMS. All reagents shall be labeled with the date received into the laboratory and again with the date opened for use. Recommended shelf life, as defined by the manufacturer, shall be documented and controlled. Dilutions or solutions prepared shall be clearly labeled, dated, and initialed. These solutions are traceable back to their primary reagents and do not extend beyond the expiration date listed for the primary reagent.

All gases used with an instrument shall meet specifications of the manufacturer. All safety requirements that relate to maximum and/or minimum allowed pressure, fitting types, and leak test frequency, shall be followed. When a new tank of gas is placed in use, it shall be checked for leaks and the date put in use will be written in the instrument maintenance logbook.

HEAL continuously monitors the quality of the reagent water and provides the necessary indicators for maintenance of the purification systems in order to assure that the quality of laboratory reagent water meets established criteria for all analytical methods.

Reagent blank samples are also analyzed to ensure that no contamination is present at detectable levels. The frequency of reagent blank analysis is typically the same as calibration verification samples. Refrigerator storage blanks are stored in the volatiles refrigerator for a period of one week and analyzed and replaced once a week.

# 8.0 Maintenance

Maintenance logbooks are kept for each major instrument and all support equipment in order to document all repair and maintenance. In the front of the logbook, the following information is included:

Unique Name of the Item or Equipment
Manufacturer
Type of Instrument
Model Number
Serial Number
Date Received and Date Placed into Service
Location of Instrument
Condition of Instrument Upon Receipt

For routine maintenance, the following information shall be included in the log:

Maintenance Date
Maintenance Description
Maintenance Performed by Initials

A manufacturer service agreement (or equivalent) covers most major instrumentation to assure prompt and reliable response to maintenance needs beyond HEAL instrument operator capabilities.

Refer to the current Maintenance and Troubleshooting SOP for each section in the laboratory for further information.

## 9.0 Data Integrity

For HEAL's policy on ethics and data integrity, see section 3.0 of this document. Upon being hired, and annually there after, all employees at HEAL undergo documented data integrity training. All new employees sign an Ethics and Data Integrity Agreement, documenting their understanding of the high standards of integrity required at HEAL and outlining their responsibilities in regards to ethics and data integrity. See Appendix I for a copy of this agreement.

In instances of ethical concern, analysts are required to report the known or suspected concern to their Technical Director, the Laboratory Manager, or the QA/QCO. This will be done in a confidential and receptive environment, allowing all employees to privately discuss ethical issues or report items of ethical concern.

Once reported and documented, the ethical concern will be immediately elevated to the Laboratory Manager and the need for an investigation, analyst remediation, or termination will be determined on a case-by-case basis.

All reported instances of ethical concern will be thoroughly documented and handled in a manner sufficient to rectify any breaches in data integrity with an emphasis on preventing similar incidences from happening in the future.

## 10.0 Quality Control

## **Internal Quality Control Checks**

HEAL utilizes various internal quality control checks, including duplicates, matrix spikes, matrix spike duplicates, method blanks, laboratory control spikes, laboratory control spike duplicates, surrogates, internal standards, calibration standards, quality control charts, proficiency tests and calculated measurement uncertainty.

Refer to the current method SOP to determine the frequency and requirements of all quality controls. In the event that the frequency of analysis is not indicated in the method specific SOP, duplicate samples, laboratory control spikes (LCS), Method Blanks (MB), and matrix spikes and matrix spike duplicates (MS/MSD) are analyzed for every batch of twenty samples.

When sample volume is limited on a test that requires an MS/MSD an LCSD shall be analyzed to demonstrate precision and accuracy and when possible a sample duplicate will be analyzed.

Duplicates are identical tests repeated for the same sample or matrix spike in order to determine the precision of the test method. A Relative Percent Difference (RPD) is calculated as a measure of this precision. Unless indicated in the SOP, the default acceptance limit is </= 20%.

Matrix Spikes and Matrix Spike Duplicates are spiked samples (MS/MSD) that are evaluated with a known added quantity of a target compound. This is to help determine the accuracy of the analyses and to determine the matrix affects on analyte recovery. A percent recovery is calculated to assess the quality of the accuracy. In the event that the acceptance criteria is not outlined in the SOP, a default limits of 70-130% will be utilized. When an MSD is employed an RPD is calculated and when not indicated in the SOP shall be acceptable at </= 20%.

When appropriate for the method, a Method Blank should be analyzed with each batch of samples processed to assess contamination levels in the laboratory. MBs consist of all the reagents measured and treated as they are with samples, except without the samples. This enables the laboratory to ensure clean reagents and procedures. Guidelines should be in place for accepting or rejecting data based on the level of contamination in the blank. In the event that these guidelines are not dictated by the SOP or in client specific work plans, the MB should be less than the MDL reported for the analyte being reported. Blanks shall be no more negative than the negative of the PQL for that test and instrument unless otherwise stated in the SOP/method. Corrective action must be initiated if negative blanks are out of control.

A Laboratory Control Spike and Laboratory Control Spike Duplicate (LCS/LCSD) are reagent blanks, free from the analytes of interest, spiked with verified known amounts of

analytes or a material containing known and verified amounts of analytes. It is generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system. Guidelines are outlined in each SOP for the frequency and pass fail requirements for LCS and LCSDs. These limits can be set utilizing control charts as discussed below.

Surrogates are utilized when dictated by method and are substances with properties that mimic the analytes of interest. The surrogate is an analyte that is unlikely to be found in environmental samples. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for surrogates.

Internal Standards are utilized when dictated by the method and are known amounts of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for Internal Standards.

Proficiency Test (PT) Samples are samples provided by an unbiased third party. They are typically analyzed twice a year, between five and seven months apart, or at any other interval as defined in the method SOP. They contain a pre-determined concentration of the target compound, which is unknown to HEAL. HEAL's management and all analysts shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates and other procedures as used when analyzing routine samples. PT results are reported as normal samples, within the working range of the associated calibration curve. In the event an analyte concentration is less than the PQL, the result shall be reported as less than the PQL.

With regards to analyzing PT Samples HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seek accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall not attempt to obtain the assigned value of any PT sample from the PT Provider.

Upon receiving a Not Acceptable PT result for any analyte, a root cause analysis is conducted and the cause of the failure determined and corrected. As defined by TNI, two out of the past three PTs must be acceptable to maintain accreditation for any given analyte. If this requirement is not met a successful history will be reestablished by the analysis of an additional PT sample. For accredited tests, the PT provider will be notified, when the PT is for corrective action purposes. The analysis dates of successive PT samples for the same accredited analyte shall be at least fifteen days apart.

Calibration standards are standards run to calibrate. Once the calibration is established the same standards can be analyzed as Continuing Calibration Verifications (CCV), used to confirm the consistency of the instrumentation. Calibration standards can be utilized at the beginning and end of each batch, or more frequently as required. Typically Continuing Calibration Blanks (CCB) are run in conjunction with CCVs. Refer to the current method SOP for frequency and pass/fail requirements of CCVs and CCBs.

Control Limits are limits of acceptable ranges of the values of quality control checks. The control limits approximate a 99% confidence interval around the mean recovery. Any matrix spike, surrogate, or LCS results outside of the control limits require further evaluation and assessment. This should begin with the comparison of the results from the samples or matrix spike with the LCS results. If the recoveries of the analytes in the LCS are outside of the control limits, then the problem may lie with the application of the extraction, with cleanup procedures, or with the chromatographic procedure. Once the problem has been identified and addressed, corrective action may include reanalysis of samples or reextraction followed by reanalysis. When the LCS results are within the control limits, the issue may be related to the sample matrix or to the use of an inappropriate extraction, cleanup, and/or determinative method for the matrix. If the results are to be used for regulatory compliance monitoring, then steps must be taken to demonstrate that the analytes of concern can be determined in the sample matrix at the levels of interest. Data generated with laboratory control samples that fall outside of the established control limits are judged to be generated during an "out-of-control" situation. These data are considered suspect and shall be repeated or reported with qualifiers.

Control limits are to be updated only by Technical Directors, Section Supervisors or the Quality Assurance Officer. Control limits should be established and updated according to the requirements of the method being utilized. When the method does not specify, and control limits are to be generated or updated for a test, the following guidelines shall be utilized.

Limits should typically be generated utilizing the most recent 20-40 data values. In order to obtain an even distribution across multiple instruments and to include more than a single day's worth of data, surrogate limits should be generated using around 100 data values. The data values used shall not reuse values that were included in the previous Control Limit update. The data values shall also be reviewed by the LIMS for any Grubbs Outliers, and if identified, the outliers must be removed prior to generating new limits. The results used to update control limits should meet all other QC criteria associated with the determinative method. For example, MS/MSD recoveries from a GC/MS procedure should be generated from samples analyzed after a valid tune and a valid initial calibration that includes all analytes of interest. Additionally, no analyte should be reported when it is beyond the working range of the calibration currently in use. MS/MSD and surrogate limits should be generated using the same set of extraction, cleanup, and analysis procedures.

All generated limits should be evaluated for appropriateness. Where limits have been established for MS/MSD samples, the LCS/LCSD limits should fall within those limits, as the LCS/LCSD are prepared in a clean matrix. Surrogate limits should be updated using all

sample types and should be evaluated to ensure that all instruments as well as a reasonable dispersion across days are represented by the data. LCS/LCSD recovery limits should be evaluated to verify that they are neither inappropriately wide nor unreasonably tight. The default LCS/LCSD acceptance limits of 70-130% and RPD of 20% (or those limits specified by the method for LCS/LCSD and/or CCV acceptability), should be used to help make this evaluation. Technical directors may choose to use warning limits when they feel their generated limits are too wide, or default LCS limits when they feel their limits have become arbitrarily tight.

Once new Control Limits have been established and updated in the LIMS, the Control Charts shall be printed and reviewed by the appropriate section supervisor and primary analyst performing the analysis for possible trends and compared to the previous Control Charts. The technical director initials the control charts, indicating that they have been reviewed and that the updated Limits have been determined to be accurate and appropriate. Any manual alterations to the limits will be documented and justified on the printed control chart. These initialed charts are then filed in the QA/QCO office.

Once established, control limits should be reviewed after every 20-30 data values and updated at least every six months, provided that there are sufficient points to do so. The limits used to evaluate results shall be those in place at the time that the sample was analyzed. Once limits are updated, those limits apply to all subsequent analyses.

When updating surrogate control limits, all data, regardless of sample/QC type, shall be updated together and assigned one set of limits for the same method/matrix.

In the event that there are insufficient data points to update limits that are over a year old, the default limits, as established in the method or SOP, shall be re-instated. Refer to the requirements in SW-846 method 8000B and 8000C for further guidance on generating control limits.

Calculated Measurement Uncertainty is calculated annually using LCSs in order to determine the laboratory specific uncertainty associated with each test method. These uncertainty values are available to our clients upon request and are utilized as a trending tool internally to determine the effectiveness of new variables introduced into the procedure over time.

# Precision, Accuracy, Detection Levels

#### Precision

The laboratory uses sample duplicates, laboratory control spike duplicates, and matrix spike duplicates to assess precision in terms of relative percent difference (RPD). HEAL requires the RPD to fall within the 99% confidence interval of established control charts or an RPD of less than 30% if control charts are not

available. RPD's greater than these limits are considered out-of-control and require an appropriate response.

RPD = 2 x (Sample Result – Duplicate Result) X 100 (Sample Result + Duplicate Result)

#### Accuracy

The accuracy of an analysis refers to the difference between the calculated value and the actual value of a measurement. The accuracy of a laboratory result is evaluated by comparing the measured amount of QC reference material recovered from a sample and the known amount added. Control limits can be established for each analytical method and sample matrix. Recoveries are assessed to determine the method efficiency and/or the matrix effect.

Analytical accuracy is expressed as the Percent Recovery (%R) of an analyte or parameter. A known amount of analyte is added to an environmental sample before the sample is prepared and subsequently analyzed. The equation used to calculate percent recovery is:

%Recovery = {(concentration* recovered)/(concentration* added)} X 100

*or amount

HEAL requires that the Percent Recovery to fall within the 99 % confidence interval of established control limits. A value that falls outside of the confidence interval requires a warning and process evaluation. The confidence intervals are calculated by determining the mean and sample standard deviation. If control limits are not available, the range of 80 to 120% is used unless the specific method dictates otherwise. Percent Recoveries outside of this range mandate additional action such as analyses by Method of Standard Additions, additional sample preparation(s) where applicable, method changes, and out-of-control action or data qualification.

#### **Detection Limit**

Current practices at HEAL define the Detection Limit (DL) as the smallest amount that can be detected above the baseline noise in a procedure within a stated confidence level.

HEAL presently utilizes an Instrument Detection Limit (IDL), a Method Detection Limit (MDL), and a Practical Quantitation Limit (PQL). The relationship between these levels is approximately

IDL: MDL: PQL = 1:5:5.

The IDL is a measure of the sensitivity of an analytical instrument. The IDL is the amount which, when injected, produces a detectable signal in 99% of the analyses at that concentration. An IDL can be considered the minimum level of analyte concentration that is detectable above random baseline noise.

The MDL is a measure of the sensitivity of an analytical method. MDL studies are required annually for each quality system matrix, technology and analyte, unless indicated otherwise in the referenced method. An MDL determination (as required in 40CFR part 136 Appendix B) consists of replicate spiked samples carried through all necessary preparation steps. The spike concentration is three times the standard deviation of three replicates of spikes. At least seven replicates are spiked and analyzed and their standard deviation(s) calculated. Routine variability is critical in passing the 10 times rule and is best achieved by running the MDLs over different days and when possible over several calibration events. The Manual for the Certification of Laboratories Analyzing Drinking Water, 5th edition Chapter IV section 7.2.11 recommends that MDLs be performed over a period of at least three days in order to include the day to day variations. The method detection limit (MDL) can be calculated using the standard deviation according to the formula:

where t (99%) is the Student's t-value for the 99% confidence interval. The t-value depends on the number of trials used in calculating the sample standard deviation, so choose the appropriate value according to the number of trials.

Number of Trials	t(99%)
6	3.36
7	3.14
8	3.00
9	2.90

The calculated MDL must not be less than 10 times the spiked amount or the study must be performed again with a lower concentration.

Where there are multiple MDL values for the same test method in the LIMS the highest MDL value is utilized.

The PQL is significant because different laboratories can produce different MDLs although they may employ the same analytical procedures, instruments and sample matrices. The PQL is about two to five times the MDL and represents a practical, and routinely achievable, reporting level with a good certainty that the reported value is reliable. It is often determined by regulatory limits. The reported PQL for a sample is dependent on the dilution factor utilized during sample analysis.

In the event that an analyte will not be reported less than the PQL, an MDL study is not required and a PQL check shall be done, at least annually, in place of the MDL

Page 38 of 54 Quality Assurance Plan 9.4 Effective July 1st, 2010 study. The PQL check shall consist of a QC sample spiked at or below the PQL. All sample-processing and analysis steps of the analytical method shall be included in the PQL check and shall be done for each quality system matrix, technology, and analyte. A successful check is one where the recovery of each analyte is within the established method acceptance criteria. When this criterion is not defined by the method or SOP, a default limit of +/-50% shall be utilized.

#### **Quality Control Parameter Calculations**

#### Mean

The sample mean is also known as the arithmetic average. It can be calculated by adding all of the appropriate values together, and dividing this sum by the number of values.

Average = 
$$(\Sigma x_l) / n$$

 $x_l$  = the value x in the  $l^{th}$  trial n = the number of trials

#### Standard Deviation

The sample standard deviation, represented by s, is a measure of dispersion. The dispersion is considered to be the difference between the average and each of the values  $x_i$ . The variance,  $s^2$ , can be calculated by summing the squares of the differences and dividing by the number of differences. The sample standard deviation, s, can be found by taking the square root of the variance.

Standard deviation = s =  $\left[\sum (x_{\parallel} - average)^{2}/(n-1)\right]^{\frac{1}{2}}$ 

# Percent Recovery (LCS and LCSD)

Percent Recovery = (Spike Sample Result) X100 (Spike Added)

#### Percent Recovery (MS, MSD)

Percent Recovery = (Spike Sample Result – Sample Result) X100 (Spike Added)

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#### **Control Limits**

Control Limits are calculated by the LIMS using the average percent recovery (x), and the standard deviation (s).

Upper Control Limit = x + 3sLower Control Limit = x - 3s

These control limits approximate a 99% confidence interval around the mean recovery.

## **RPD (Relative Percent Difference)**

Analytical precision is expressed as a percentage of the difference between the results of duplicate samples for a given analyst. Relative percent difference (RPD) is calculated as follows:

RPD = 2 x (Sample Result + Duplicate Result) X 100 (Sample Result + Duplicate Result)

## **Uncertainty Measurements**

Uncertainty, as defined by ISO, is the parameter associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurement. Ultimately, uncertainty measurements are used to state how good a test result is and to allow the end user of the data to properly interpret their reported data. All procedures allow for some uncertainty. For most analyses, the components and estimates of uncertainty are reduced by following well-established test methods. To further reduce uncertainty, results generally are not reported below the lowest calibration point (PQL) or above the highest calibration point (UQL). Understanding that there are many influential quantities affecting a measurement result, so many in fact that it is impossible to identify all of them, HEAL calculates measurement uncertainty at least annually using LCSs. These estimations of measurement uncertainty are kept on file in the method folders in the QA/QC office.

Measurement Uncertainty contributors are those that may be determined statistically. These shall be generated by estimating the overall uncertainty in the entire analytical process by measuring the dispersion of values obtained from laboratory control samples over time. At least 20 of the most recent LCS data points are gathered.

Page 40 of 54 Quality Assurance Plan 9.4 Effective July 1st, 2010 The standard deviation(s) is calculated using these LCS data points. Since it can be assumed that the possible estimated values of the spikes are approximately normally distributed with approximate standard deviation(s), the unknown value of the spike is believed to lie in 95% confidence interval, corresponding to an uncertainty range of +/- 2(s).

Calculate standard deviation (s) and 95% confidence interval according to the following formulae:

$$s = \sqrt{\frac{\sum (x - \overline{x})^2}{(n-1)}}$$

Where: s = standard deviation

x = number in series

 $\bar{x}$  = calculated mean of series n = number of samples taken

95%  $confidence = 2 \times s$ 

Example: Assuming that after gathering 20 of the most recent LCS results for Bromide, we have calculated the standard deviations of the values and achieved a result of 0.0326, our measurement uncertainty for Bromide (at 95% confidence =  $2 \times s$ ) is 0.0652.

#### **Total Nitrogen**

Total nitrogen is calculated as follows:

#### **Calibration Calculations**

1. Response Factor or Calibration Factor:

$$RF = ((A_x)(C_{is}))/((A_{is})(C_x))$$
  $CF = (A_x)/(C_x)$ 

a. Average RF or CF

$$RF_{AVF} = \Sigma RF_i / n$$

b. Standard Deviation  $s = SQRT \{ [ \Sigma (RF_i - RF_{AVE})^2 ] / (n-1) \}$ 

#### c. Relative Standard Deviation

Where:

 $A_x$  = Area of the compound

 $C_x$  = Concentration of the compound

A_{is} = Area of the internal standard

C_{is} = Concentration of the internal standard

n = number of pairs of data

RF_i = Response Factor (or other determined value)

RF_{AVE} = Average of all the response factors

 $\Sigma$  = the sum of all the individual values

# 2. Linear Regression

a. Slope (m)

$$\mathbf{m} = (\mathbf{n} \Sigma \mathbf{x}_i \mathbf{y}_i - (\mathbf{n} \Sigma \mathbf{x}_i)^* (\mathbf{n} \Sigma \mathbf{y}_i)) / (\mathbf{n} \Sigma \mathbf{x}_i^2 - (\Sigma \mathbf{x}_i)^2)$$

b. Intercept (b)

$$b = y_{AVE} - m^*(x_{AVE})$$

c. Correlation Coefficient (cc)

$$\begin{array}{l} \text{CC (r) =} \{ \ \Sigma((x_i - x_{ave})^*(y_i - y_{ave})) \ \} \ / \ \{ \ \text{SQRT}((\Sigma(x_i - x_{ave})^2)^*(\Sigma(y_i - y_{ave})^2)) \ \} \\ \text{Or} \\ \text{CC (r) =} [(\Sigma w \ ^* \Sigma wxy) \ ^+ (\Sigma wx \ ^* \Sigma wy)] \ / \ (\text{sqrt}(\ (\ [(\Sigma w \ ^* \Sigma wx^2) \ - (\Sigma wx \ ^* \Sigma wx)] \ ^* \ [(\Sigma w \ ^* \Sigma wy^2) \ - (\Sigma wy \ ^* \Sigma wy)])))] \\ \end{array}$$

d. Coefficient of Determination

$$COD(r^2) = CC*CC$$

Where:

y = Response (Area) Ratio  $A_x/A_{is}$ 

 $x = Concentration Ratio C_x/C_{is}$ 

m = slope

b = intercept

n = number of replicate x,y pairs

 $x_i$  = individual values for independent variable

y_i = individual values for dependent variable

 $\Sigma$  = the sum of all the individual values

 $x_{ave}$  = average of the x values

yave = average of the y values

w = weighting factor, for equal weighting w=1

## 3. Quadratic Regression

$$y = ax^2 + bx + c$$

#### a. Coefficient of Determination

COD (r²) =( 
$$\Sigma(y_i-y_{ave})^2 - \{[(n-1)/(n-p)] * [\Sigma(y_i-Y_i)^2]\} ) / \Sigma(y_i-y_{ave})^2$$

#### Where:

y = Response (Area) Ratio  $A_x/A_{is}$ 

 $x = Concentration Ratio C_x/C_{is}$ 

 $a = x^2$  coefficient

b = x coefficient

c = intercept

y_i = individual values for each dependent variable

 $x_i$  = individual values for each independent variable

 $y_{ave}$  = average of the y values

n = number of pairs of data

p = number of parameters in the polynomial equation (I.e., 3 for third order, 2 for second order)

$$Yi = ((2*a*(C_x/C_{is})^2)-b^2+b+(4*a*c))/(4a)$$

# b. Coefficients (a,b,c) of a Quadratic Regression

$$a = S_{(x2y)}S_{(xx)}-S_{(xy)}S_{(xx2)} / S_{(xx)}S_{(x2x2)}-[S_{(xx2)}]^2$$

$$b = S_{(xy)}S_{(x2x2)} - S_{(x2y)}S_{(xx2)} / S_{(xx)}S_{(x2x2)} - [S_{(xx2)}]^2$$

$$c = [(\Sigma yw)/n] - b^*[(\Sigma xw)/n] - a^*[\Sigma(x^2w)/n]$$

#### Where:

n = number of replicate x,y pairs

x = x values

y = y values

 $w = S^{-2} / (\Sigma S^{-2}/n)$ 

$$S_{(xx)} = (\Sigma x^2 w) - [(\Sigma x w)^2 / n]$$

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 $S_{(xy)} = (\Sigma xyw) - [(\Sigma xw)^*(\Sigma yw) / n]$   $S_{(xx2)} = (\Sigma x^3w) - [(\Sigma xw)^*(\Sigma x^2w) / n]$   $S_{(x2y)} = (\Sigma x^2yw) - [(\Sigma x_1^2w)^*(\Sigma yw) / n]$   $S_{(x2x2)} = (\Sigma x^4w) - [(\Sigma x_1^2w)^2 / n]$ Or If unweighted calibration, w=1  $S(xx) = (Sx2) - [(Sx)^2 / n]$   $S(xy) = (Sxy) - [(Sx)^*(Sy) / n]$   $S(xx2) = (Sx3) - [(Sx)^*(Sx2) / n]$   $S(x2y) = (Sx2y) - [(Sx2)^*(Sy) / n]$   $S(x2x2) = (Sx4) - [(Sx2)^2 / n]$ 

#### **Concentration Calculations**

#### On-Column Concentration for Average RRF Calibration using Internal Standard

On-Column Concentration  $C_x = ((A_x)(C_{is}))/((A_{is})(RF_{AVE}))$ 

#### On-Column Concentration for Average CF Calibration using External Standard

On-Column Concentration  $C_x = (A_x)/(CF_{AVE})$ 

#### **On-Column Concentration for Linear Calibration**

If determining an external standard, then exclude the  $A_{is}$  and  $C_{is}$  for internal standards On-Column Concentration  $C_x = ((Absolute\{[(A_x)/(A_{is})] - b\})/m) * C_{is}$ 

Where: m = slope b = intercept

 $A_x$  = Area of the Sample

C_{is} = Concentration of the Internal Standard

Ais = Area of the Internal Standard

#### On-Column Concentration for Quadratic Calibration

If determining an external standard, then exclude the A_{is} and C_{is} for internal standards On-Column Concentration =[(+SQRT(b²-(4*a*(c-y)))-b)/(2*a)] * C_{is}

Where:  $a = x^2$  coefficient

b = x coefficient

c = intercept

 $y = Area Ratio = A_x/A_{is}$ 

C_{is} = Concentration of the Internal Standard

#### **Final Concentration (Wet Weight)**

Concentration for Extracted Samples = (On-Column Conc)(Dilution)(Final Volume)

(Initial Amount)(Injection Volume)

Concentration for Purged Samples = (On-Column Conc)(Purged Amount)(Dilution)
(Purged Amount)

#### **Dry Weight Concentration**

Dry Weight Concentration Final Concentration Wet Weight

**Total Solids** 

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#### **Percent Difference**

% Difference= Absolute(Continuing Calibration RRF - Average RRF) * 100
Average RRF

#### **Percent Drift**

% Drift= Absolute(Calculated Concentration - Theoretical Concentration) * 100
Theoretical Concentration

#### **Dilution Factor**

Dilution Factor =(Volume of Solvent + Solute) / Volume of Solute

#### **Relative Retention Time**

RRT =RT of Compound / RT of ISTD

#### **Breakdown Percent**

Breakdown = <u>Area of DDD + Area of DDE</u> Average (DDT, DDE and DDD)

-or-

<u>Area of Endrin Ketone + Area of Endrin Aldehyde</u> Average (Endrin, Endrin Ketone, Endrin Aldehyde)

### 11.0 Data Reduction, Validation, Reporting, and Record Keeping

All data reported must be of the highest possible accuracy and quality. During the processes of data reduction, validation, and report generation, all work is thoroughly checked to insure that error is minimized.

#### **Data Reduction**

The analyst who generated the data usually performs the data reduction. The calculations include evaluation of surrogate recoveries (where applicable), and other miscellaneous calculations related to the sample quantitation.

If the results are computer generated, then the formulas must be confirmed by hand calculations, at minimum, one per batch.

See the current Data Validation SOP for details regarding data reduction.

#### **Validation**

A senior analyst, most often the section supervisor, validates the data. All data undergoes peer review. If an error is detected, it is brought to the analyst's attention so that he or she can rectify the error, and perform further checks to ensure that all data for that batch is sound. Previous and/or common mistakes are stringently monitored throughout the validation process. Data is reported using appropriate significant figure criteria. In most cases, two significant digits are utilized, but three significant digits can be used in QC calculations. Significant digits are not rounded until after the last step of a sample calculation. All final reports undergo a review by the laboratory manager, the project manager, or their designee, to provide a logical review of all results before they are released to the client.

If data is to be manually transferred between media, the transcribed data is checked by a peer. This includes data typing, computer data entry, chromatographic data transfer, data table inclusion to a cover letter, or when data results are combined with other data fields.

All hand-written data from run logs, analytical standard logbooks, hand-entered data logbooks, or on instrument-generated chromatograms, are systematically archived should the need for future retrieval arise.

See the current Data Validation SOP for details regarding data validation.

#### **Reports and Records**

All records at HEAL are retained and maintained through the procedures outlined in the most recent version of the Records Control SOP.

The reports are compiled by the Laboratory Information Management System (LIMS). Most data is transferred directly from the instruments to the LIMS. After being processed by the analyst and reviewed by a data reviewer, final reports are approved and signed by the senior laboratory management. A comparative analysis of the data is performed at this point. For example, if TKN and NH3 are analyzed on the same sample, the NH3 result should never be greater than the TKN result. Lab results and reports are released only to appropriately designated individuals. Release of the data can be by fax, email, electronic deliverables, or mailed hard copy.

When a project is completed, the final report, chain of custody, any relevant supporting data, and the quality assurance/control worksheets are scanned as a .pdf file onto the main server. Original client folders are kept on file and are arranged by project number. Additionally, all electronic data is backed up routinely on the HEAL main server. The backup includes raw data, chromatograms, and report documents. Hard copies of chromatograms are stored separately according to the instrument and the analysis date. All records and analytical data reports are retained in a secure location as permanent records for a minimum period of five years (unless specified otherwise in a client contract). Access to archived information shall be documented with an access log. Access to archived electronic reports and data will be password protected. In the event that HEAL transfers ownership or terminates business practices, complete records will be maintained or transferred according to the client's instructions.

After issuance, the original report shall remain unchanged. If a correction to the report is necessary, then an additional document shall be issued. This document shall have a title of "Addendum to Test Report or Correction to Original Report", or equivalent. Demonstration of original report integrity comes in two forms. First, the report date is included on each page of the final report. Second, each page is numbered in sequential order, making the addition or omission of any data page(s) readily detectable.

#### 12.0 Corrective Action

Refer to the most recent version of the Data Validation SOP for the procedure utilized in filling out a Corrective Action Report. A blank copy of the corrective action report is available in Appendix I.

The limits that have been defined for data acceptability also form the basis for corrective action initiation. Initiation of corrective action occurs when the data generated from continuing calibration standard, sample surrogate recovery, laboratory control spike, matrix spike, or sample duplicates exceed acceptance criteria. If corrective action is necessary, the analyst or the section supervisor will coordinate to take the following guidelines into consideration in order to determine and correct the measurement system deficiency:

Check all calculations and data measurements systems (Calibrations, reagents, instrument performance checks, etc.).

Assure that proper procedures were followed.

Unforeseen problems that arise during sample preparation and/or sample analysis that lead to treating a sample differently from documented procedures shall be documented with a corrective action report. The section supervisor and laboratory manager shall be made aware of the problem at the time of the occurrence. See the appropriate SOP regarding departures from documented procedures.

Continuing calibration standards below acceptance criteria can not be used for reporting analytical data unless method specific criteria states otherwise.

Continuing calibration standards above acceptance criteria can be used to report data as long as the failure is isolated to a single standard and the corresponding samples are non-detect for the failing analyte.

Samples with non-compliant surrogate recoveries should be reanalyzed, unless deemed unnecessary by the supervisor for matrix, historical data, or other analysis-related anomalies.

Laboratory and Matrix Spike acceptance criteria vary significantly depending on method and matrix. Analysts and supervisors meet and discuss appropriate corrective action measures as spike failures occur.

Sample duplicates with RPD values outside control limits require supervisor evaluation and possible reanalysis.

A second mechanism for initiation of corrective action is that resulting from Quality Assurance performance audits, system audits, inter- and intra-laboratory comparison studies. Corrective Actions initiated through this mechanism will be monitored and coordinated by the laboratory QA/QCO.

All corrective action forms are entered in the LIMS and included with the raw data for peer review, signed by the technical director of the section and included in the case narrative to the client whose samples were affected. All Corrective action forms in the LIMS are reviewed by the QA/QCO.

# 13.0 Quality Assurance Audits, Reports and Complaints

#### Internal/External Systems' Audits, Performance Evaluations, and Complaints

Several procedures are used to assess the effectiveness of the quality control system. One of these methods includes internal performance evaluations, which are conducted by the use of control samples, replicate measurements, and control charts. External performance audits, which are conducted by the use of inter-laboratory checks, such as participation in laboratory evaluation programs and performance evaluation samples available from a NELAC-accredited Proficiency Standard Vendor, are another method.

Proficiency samples will be obtained twice per year from an appropriate vendor for all tests and matrices for which we are accredited and for which PTs are available. HEAL participates in soil, waste water, drinking water, and underground storage tank PT studies. Copies of results are available upon request. HEAL's management and all analysts shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities, and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates, and other procedures as used when analyzing routine samples.

With regards to analyzing PT Samples, HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seek accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall not attempt to obtain the assigned value of any PT sample from the PT Provider.

Internal Audits are performed annually by the QA/QCO in accordance with the current Internal Audit SOP. The system audit consists of a qualitative inspection of the QA system in the laboratory and an assessment of the adequacy of the physical facilities for sampling, calibration, and measurement. This audit includes a careful evaluation and review of laboratory quality control procedures. Internal audits are performed using the guidelines outlined below, which include, but are not limited to:

- 1. Review of staff qualifications, demonstration of capability, and personnel training programs
- 2. Storage and handling of reagents, standards, and samples
- 3. Standard preparation logbook and LIMS procedures
- 4. Extraction logbooks
- 5. Raw data logbooks
- 6. Analytical logbooks or batch printouts and instrument maintenance logbooks
- 7. Data review procedures .

- 8. Corrective action procedures
- Review of data packages, which is performed regularly by the lab manager/QA Officer.

The QA/QCO will conduct these audits on an annual basis.

#### **Management Reviews**

HEAL management shall periodically, and at least annually, conduct a review of the laboratory's quality system and environmental testing activities to ensure their continuing suitability and effectiveness, and to introduce necessary changes or improvements. The review shall take account of:

- 1. the suitability and implementation of policies and procedures
- 2. reports from managerial and supervisory personnel
- 3. the outcome of recent internal audits
- 4. corrective and preventive actions
- 5. assessments by external bodies
- 6. the results of inter-laboratory comparisons or proficiency tests
- 7. changes in volume and type of work
- 8. client feed back
- 9. complaints
- 10. other relevant factors, such as laboratory health and safety, QC activities, resources, and staff training.

Findings from management reviews and the actions that arise from them shall be recorded and any corrective actions that arise shall be completed in an appropriate and agreed upon timescale.

#### **Complaints**

Complaints from clients are documented and given to the laboratory manager. The lab manager shall review the information and contact the client. If doubt is raised concerning the laboratory's policies or procedures, then an audit of the section or sections may be performed. All records of complaints and subsequent actions shall be maintained in the client compliant logbook for five years unless otherwise stated.

#### Internal and External Reports

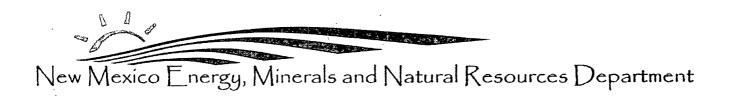
The QA/QCO is responsible for preparation and submission of quality assurance reports to the appropriate management personnel as problems and issues arise. These reports include the assessment of measurement systems, data precision and accuracy, and the results of performance and system audits. Additionally, they include significant QA problems, corrective actions, and recommended resolution measures. Reports of these Quality Assurance Audits describe the particular activities audited, procedures utilized in the examination and evaluation of laboratory records, and data validation procedures. Finally, there are procedures for evaluating the performance of Quality Control and Quality Assurance activities, and laboratory deficiencies and the implementation of corrective actions with the review requirements.

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Quality Assurance Plan 9.4
Effective July 1st, 2010

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Susana Wartinez Governor

John H. Bemis
Cabinet Secretary-Designate

Brett F. Woods, Ph.D. Deputy Cabinet Secretary **Daniel Sanchez**Acting Division Director
Oil Conservation Division



March 22, 2011

Mr. Randy Schmaltz Environmental Manager Western Refining Southwest, Inc. - Bloomfield Refinery P.O. Box 159 Bloomfield, New Mexico 87413

Re: Termination of Discharge Permit UICI-009

Disposal Well No. 1 (API# 30-045-29002) 2010 Fall-Off Test Report and Annual Class I Well Waste Report (UICI-009) January 2011 Western Refining Southwest, Inc. - Bloomfield Refinery

Dear Mr. Schmaltz:

Staff of the Oil Conservation Division's (OCD) Environmental Bureau (EB) and the Engineering and Geological Services Bureau have completed a review of the "2010 Annual Bottom hole Pressure Surveys and Pressure Fall-Off Test (FOT) for the Western Refining Southwest, Inc. (Western) Waste Disposal Well #1" (Report) at the Bloomfield Refinery dated October 12, 2010. In addition, OCD reviewed Western's Annual Report.

The Annual Report indicates that Western believes the disposal well has about 10 more years of life subsequent to two well stimulations and the recent installation of a filtration system. OCD has documented its concerns about Western's Class I Injection Well in discussions with Western. Water Quality Control Commission (WQCC) regulations specify the operating requirements for UIC Class I Non-Hazardous Waste Injection Wells (see 20.6.2.5206(A)(1) NMAC and 20.6.2.5206(B)(1) NMAC). Western's recent FOT Report did not resolve OCD's concerns; therefore, OCD is now considering requiring Western to terminate its discharge permit pursuant to 20.6.2.3109 NMAC and/or 20.6.2.5101(I) NMAC. This letter is to inform Western of OCD's tentative decision and to allow it one final opportunity to resolve OCD's concerns in a technical meeting.



Mr. Schmaltz Western Refining Southwest, Inc. UICI-009 March 22, 2011 Page 2 of 3

One of OCD's primary responsibilities under the Underground Injection Control (UIC) Program is to ensure that the well fractures are not continuing to grow in the injection zone(s) under permitted operating conditions. OCD's letter of April 9, 2010 (see attachment) documented OCD's reasons for requiring a reduction in the maximum surface injection pressure (MSIP) specified in Western's discharge permit, which is pending renewal.

OCD issued a draft discharge permit to Western on February 25, 2010. However, Western objected to the reduced MSIP of 600 psig from 1150 psi. Subsequently, Western requested a hearing in its April 19, 2010 letter to OCD Division Director Mark Fesmire. Director Fesmire was unable to act on Western's hearing request before leaving OCD.

Western conducted another FOT in 2010 which documents, as did the 2008 and 2009 FOTs, that the injection zones are over-pressured. In fact, the formations appear to have achieved maximum capacity with formation(s) pressure build-up observed even at reduced injection rates.

OCD has determined that the 2010 FOT was unsuccessful, as were the 2008 and 2009 FOTs because the minimum pressure differential of 100 psig were not achieved (see FOT Figure 3 "Pressure vs. Time" Chart) as required under the "New Mexico Oil Conservation Division UIC Class I Fall Off Test Guidance" dated December 3, 2007. The requirement to achieve a minimum pressure differential of 100 psig is specified in Western's UIC Class I (non-hazardous) Test Plan, which was approved on June 11, 2008. Also, there has been a steady deterioration of differential pressure, since 2007 that indicates that the reservoir has reached maximum capacity. Consequently, the calculations in the FOT do not reflect the true characteristics of the injection zone(s) or formation(s). OCD hereby concludes that any existing formation fractures will continue to grow as the over-pressured injection intervals continue to propagate or grow even at the current reduced injection rate (see FOT Figure 11 Average Injection Pressure vs. Total Flow).

OCD also has two other issues concerning the Bloomfield Refinery Discharge Permit (GW-001); the nature of the remediation wastes that are disposed of in this Class I (NH) well and whether contaminated and/or treated ground water meets the UIC oilfield disposal criteria now that the facility is idle.

Therefore, in order to evaluate these issues, the OCD requests that Western provide the following information:

- 1. Western should identify the source(s) of fluids (i.e., waste stream, daily injection volumes for each waste type, and percentage of total daily injection volume) injected into the Class I injection well. Please specify the volume from the refinery operations; oilfield "exempt vs. non-exempt" or neither; and the volume from "ground water remediation" in barrels per day.
- 2. Western should identify other RCRA remediation derived waste water treatment and disposition options, i.e., surface treatment of waste water followed by Class V Injection, land



# Bill Richardson

Governor

Jon Goldstein Cabinet Secretary Jim Noel Deputy Cabinet Secretary Mark Fesmire
Division Director
Oil Conservation Division



April 9, 2010

EDMUND H. KENDRICK
Montgomery & Andrews PA
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Santa Fe, NM 87504-2307
Also via email: <a href="mailto:gkendrick@montand.com">gkendrick@montand.com</a>

Re: WESTERN REFINING SOUTHWEST, INC. - (OGRID 037218)

Class I Waste Disposal Well No. 1, API No. 30-045-29002

Discharge Plan Permit Renewal Application for UIC-I-9

Dear Mr. Kendrick.

This is in response to your correspondence dated March 25, 2010 regarding the request made by your client, Western Refining Southwest Inc. (WRSW), that the OCD withdraw public notice issued relating to the proposed Discharge Plan Permit Renewal of UIC-I-9.

In the OCD's view, there are two separate issues raised by the March 25, 2010 letter: the procedural issue of WRSW's notice obligations pursuant to WQCC Rules, and the substantive issue relating to what the appropriate maximum surface injection pressure is for this well should the permit be renewed by the OCD under WQCC Regulations. Vague reference was made to "other" substantive issues with the permit, but these were not specifically identified and are therefore not being addressed at this time. Each of the two issues specified in the March 25th letter is addressed in further detail, below.

#### **PUBLIC NOTICE ISSUE:**

As WRSW notes in its March 25th letter, WQCC Regulations require operators to provide public notice within 30 days of the OCD deeming an application for discharge permit renewal "administratively complete." 20.6.2.3108(C) NMAC. As you are aware, the OCD deemed WRSW's application for renewal of UIC-I-9 "administratively complete" on February 25, 2010, meaning WRSW's deadline to provide public notice was March 27, 2010. The OCD notes that WRSW waited until two days prior to its deadline to raise concerns regarding the notice.

WRSW's statement that it would be "impossible" to provide public notice in this case is incorrect. Despite WRSR's assertion to the contrary, WRSW is not required to specify a maximum surface injection pressure in the public notice made pursuant to WQCC Rules 20.6.2.3108(C) and (F). The Rules require only that it include the following:

- (1) the name and address of the proposed discharger;
- (2) the location of the discharge, including a street address, if available, and sufficient information to locate the facility with respect to surrounding landmarks;



Mr. Schmaltz Western Refining Southwest, Inc. UICI-009 March 22, 2011 Page 3 of 3

discharge, and/or other proposed remedial processes need to be considered and proposed by the operator.

OCD has discussed the possibility of Western installing a new well since 2008 when the Environmental Protection Agency reviewed the 2008 FOT and also determined that the injection zones were over-pressured. Western may wish to consider the feasibility of a replacement Class I Injection Well? Western should also consider the two other issues specified above to ensure that its RCRA corrective action program is not disrupted by an alternative disposition than use of the Class I well at the facility.

To schedule a meeting (Tuesdays/Wednesdays), please contact Carl Chavez by COB April 1, 2011. If Western chooses not to meet with OCD, then OCD will move forward with the termination of Western's Class I Injection Well discharge permit. Please contact Mr. Carl Chavez of my staff at (505) 476-3490 or <u>Carl J. Chavez@state.nm.us</u> to schedule a meeting or if you have questions.

Sincerely,

Daniel Sanchez

UIC Director & Acting OCD Division Director

DJS/cjc

Attachment: OCD Letter of April 9, 2010

xc: Carl Chavez, UIC Quality Assurance Officer

Richard Ezeanyim, Engineering and Geological Services Bureau Chief

Will Jones, Engineering and Geological Services Bureau Glenn von Gonten, Acting Environmental Bureau Chief

Charlie Perrin, Aztec District Supervisor

David Cobrain, NMED- Hazardous Waste Bureau

- (3) a brief description of the activities that produce the discharge described in the application;
- (4) a brief description of the expected quality and volume of the discharge;
- (5) the depth to and total dissolved solids concentration of the ground water most likely to be affected by the discharge;
- (6) the address and phone number within the department by which interested persons may obtain information, submit comments, and request to be placed on a facility-specific mailing list for future notices; and
- (7) a statement that the department will accept comments and statements of interest regarding the application and will create a facility-specific mailing list for persons who wish to receive future notices.

See 20.6.2.3108(F) NMAC. Public notice made by the applicant does not need to "match" that made by the department. Indeed, the notice provided by the department is required by the WQCC Regulations to be more detailed as, when it is made in the way it was in this case, it constitutes *combined public notice* for purposes of Subsections "E" and "H" as provided by 20.6.2.3108(J) NMAC. While Subsection "E" only requires the department to provide the same above-enumerated information that the applicant is required to provide in its notice (as set out in Subsection "F"), Subsection "H" imposes an additional obligation on the department to provide more detailed and technically specific public notice than that required by Subsection "E" (or that which is required of the applicant) because the department must also make available a draft of the proposed permit. In this context, the department chooses to make the substance of its notice more technically detailed and specific than the minimum required by Subsection "F," and therefore, the public notice provided in this case by the department for WRSW's waste disposal well was technically detailed and included specifications such as the maximum surface injection pressure. In contrast, WRSW can (and could have) issue(d) public notice in this case without specifying the maximum surface injection pressure and will still meet the requirements of 20.6.2.3108(C) and (F) NMAC.

#### **SUBSTANTIVE PERMIT ISSUES:**

The March 25, 2010 correspondence goes into great detail regarding WRSW's objection to the reduction of the pressure limit for this well. As you know, the increased pressure of the reservoir is an issue of which WRSW has been aware since before the 2007 fall-off test (FOT), and which was specifically brought to the attention of WRSW by the OCD after the 2007 FOT. The OCD was assisted in the FOT data software evaluation by the EPA at the OCD's request in October of 2008. Further discussions continued into 2009 between the WRSW and OCD with the OCD discussing with WRSW the concerns of the OCD and the EPA regarding propagation of existing fractures and potential for new fractures at the current discharge permit limit. WRSW will recall that in June of 2009 a telephone conference call was conducted between WRSW and the OCD at which time this issue was specifically discussed. At that time WRSW informed the OCD that it felt that the pressure increase was due to a well bore "skin effect" problem and that it would like an opportunity to attempt stimulation of the well to address and overcome the "skin effect." The OCD advised WRSW at that time that neither it nor the EPA felt the problem was attributable to a wellbore "skin effect" as the FOT results were representative of the formation outward, away from the wellbore. However, the OCD agreed to give WRSW an opportunity to at least try the acid stimulation approach to see if it would be successful in remedying the situation. Also, during the June 2009 conference call with the OCD, WRSW acknowledged that if the acid stimulation was not successful it would then have to consider drilling another well for disposal.

In an email on June 18, 2009, the OCD further informed WRSW regarding additional concerns it had discussed with the EPA, and options for addressing those concerns. Also at that time the OCD informed WRSW that it appeared that WRSW was operating in violation of the conditions of its permit because, by continuing to inject at 1150 psig, <u>WRSW was causing existing fractures to increase or actively inducing new fractures</u> to grow or develop (a violation of the permit).

It appears that WRSW first attempted an acid stimulation in July 2009, which WRSW deemed unsuccessful, and that a second acid stimulation was then performed in September 2009. Our understanding is that the acid stimulation(s) yielded at best a short-lived and/or marginal improvement in the reduction of pressure and increase in injection rate, and that as of early February 2010, even at a reduced 50% rate of injection due to what WRSW has referred to as "idling of the facility," (which occurred in December of 2009) the well was again operating at a pressure approaching the maximum discharge permit limit. In fact, OCD reviewed the pressure, flow rate v. time chart from 1995 to 2010 and noticed that the operating pressure was approaching the 1150 psig discharge permit limit regardless of what the injection rate into the well was, indicating the formation was over-pressured or filled up. The radioactive survey and fall-off testing were conducted in September and October, 2009 with the FOT report being completed on November 18, 2009. An annual report was provided to the OCD by WRSW on January 29, 2010.

The OCD reviewed the FOT report results and annual report and concluded that the concerns regarding pressure were not assuaged by the data presented therein. On February 3, 2010 the OCD advised WRSW by email that it would be calculating the maximum allowable surface injection pressure for this well for purposes of the permit renewal by using the *pressure*, *flow rate v. time chart* from 1995 to 2010 for the history of the well operations and the FOT data completed in 2009, and requested some additional data from WRSW for purposes of performing these calculations. At that time, the OCD specifically informed WRSW that the new limit was likely to be significantly less than the current assigned limit. WRSW responded to the email by providing some of the requested materials for the calculations (the OCD was able to obtain the rest from OCD files), but at no time did WRSW comment regarding either the OCD's means for calculating the new maximum surface injection pressure limit or the fact that it was anticipated to be significantly less than before.

On February 22, 2010 the OCD informed WRSW via email that the OCD anticipated having a draft permit ready for dissemination later in the week and that it had completed the calculations for the maximum allowable surface injection pressure. The OCD advised that the new injection pressure limit for the UIC-I-9 renewal "...has been reduced to 600 psig in the discharge permit in order to prevent the half-fractures from growing in the present injection formation." On February 23, 2010, the OCD spoke with WRSW by telephone to further discuss the reduction in maximum surface injection pressure limit. The OCD advised WRSW regarding how the OCD arrived at the 600 psig figure and referred to and discussed a previously issued order under which WRSW was required to monitor and report fracturing, a step-rate test and a historical flow-rate, pressure v. time chart for the well, as well as the OCD's persisting concerns (including the concerns regarding fracturing). The OCD advised WRSW that the 600 psig was a final determination and that if WRSW disagreed, it could request a hearing on the matter.

Discharge permits for Class I nonhazardous waste disposal wells are issued and, when appropriate, renewed pursuant to Sections 20.6.2.3000-3999 (addressing discharge permits, generally) as well as

Sections 20.6.2.5000-5299 (addressing underground injection wells, specifically) of the WQCC Regulations, and must comply with both. Section 20.6.2.3109 NMAC sets out the basic framework for the approval, disapproval, renewal, modification and termination of discharge permits, and provides that "[t]he secretary shall, within 30 days after the administrative record is complete and all required information is available, approve, approve with conditions or disapprove the proposed discharge permit, modification or renewal based on the administrative record." Emphasis added. In order to be approved, in addition to meeting all other requirements, an operator seeking renewal of a Class I permit must establish in its application for renewal that "neither a hazard to public health nor undue risk to property will result" if approved. Id. at (C). Emphasis added. Subsection "H" specifically prohibits the approval of a discharge plan renewal which "may result in a hazard to public health." Id. at (H).

Indeed, even where an operator's permit is not on review for renewal, the department has the authority – and the duty – to require a modification of the permit (or if that is not adequate, to *terminate* that permit), where data submitted to the department reveals that the WQCC discharge permit regulations are being violated, or that continued operation under the current permit conditions may result in a hazard to public health or undue risk to property. Subsection "E" of Section 20.6.2.3109 NMAC provides in relevant part:

If data submitted pursuant to any monitoring requirements specified in the discharge permit or other information available to the secretary <u>indicates that this part is being or may be violated</u> ....

(3) The secretary may require modification, or may terminate a discharge permit for a class I non-hazardous waste injection well, ...pursuant to the requirements of Subsection I of 20.6.2.5101 NMAC.

20.6.2.3109(E) NMAC. Emphasis added.

Subsection I of 20.6.2.5101, referenced above, provides in relevant part:

If data submitted pursuant to any monitoring requirements specified in the discharge permit or other information available to the secretary <u>indicate that this Part are being or may be violated</u>, the secretary may require modification or, if it is determined by the secretary that the modification may not be adequate, may terminate a discharge permit for a Class I non-hazardous waste injection Well, or Class III well or well field, that was approved pursuant to the requirements of this under Sections 20.6.2.5000 through 20.6.2.5299 NMAC for the following causes:

- (1) Noncompliance by the discharger with any condition of the discharge permit; or
- (2) The discharger's failure in the discharge permit application or during the discharge permit review process to disclose fully all relevant facts, or the discharger's misrepresentation of any relevant facts at any time; or
- (3) A determination that the permitted activity may cause a hazard to public health or undue risk to property and can only be regulated to acceptable levels by discharge permit modification or termination.

20.6.2.5101(I) NMAC. Emphasis added. Section 20.6.2.5206(A)(1) provides that "the maximum injection pressure at the wellhead shall not initiate new fractures or propagate existing fractures in the confining zone...," and Section 20.6.2.5206(B)(1) provides that "[e]xcept during well stimulation, the maximum

injection pressure shall not initiate new fractures or propagate existing fractures in the injection zone." Section 20.6.2.5206(A)(1) and (B)(1) NMAC.

The regulatory duties of the department include ensuring that any discharge permit issued or renewed meets the specific requirements set out in the WQCC regulations. This includes ensuring that any permit issued or renewed will not create a hazard to public health or an undue risk to property. If such circumstances exist with regard to a currently in-force permit, these duties include the duty to impose modifications – or if appropriate, to terminate the permitted activity - in order to "regulate the risk to acceptable levels." *Id.* 

In this case, with regard to the application for renewal of UIC-I-9, the record reflects that WRSW is in fact violating Part 2 of the WQCC regulations. Specifically, the maximum injection pressure being used at the wellhead at this well (the 1150 psig for which it is currently permitted) is initiating new fractures and/or propagating existing fractures in the confining and/or injection zones at this location. Further, this poses a concern to all wells within one mile of the injection well that lack cement in the injection zone(s). WRSW was advised long ago that this was an issue and of concern for both the EPA and the OCD, and WRSW was given an opportunity to see if could remedy the pressure issue through well stimulation. The OCD has reviewed the most recent FOT data and has concluded that continued surface injection pressure greater than 637 psig may create a hazard to public health and/or an undue risk to property because continued injection at a rate above this parameter will result in continued fracturing, fracture growth, and possibly vertical fracturing to occur upward into regional aquifer systems, protectable ground water, and possibly even surface water discharges along the San Juan River. This continued fracturing will also constitute an ongoing violation of WQCC Section 20.6.2.5206 NMAC, as well as of the conditions of the discharge permit (which also prohibit injection at a rate that results in fracture creation or propagation).

The OCD has reviewed the current and historical data for this well and, applying a reasonable safety factor range to the upper-threshold determination of 637 psig as noted above, has determined that a safe surface injection pressure for this well would 600 psig or less, such that the risk of fracture propagation/creation would be cease if maintained at or below this level, but would be unacceptable above this pressure limit. This modification to the permit draft was made pursuant to the OCD's regulatory obligations and authority, and WRSW's request for a renewal of its permit was approved with conditions pursuant to Section 20.6.2.3109 NMAC. The OCD notes that based upon the most recent data for this well and the fact that WRSW is currently operating in violation of Section 20.6.2.5206 NMAC, even if the permit were not on review for renewal at this time, the department would be requiring a permit modification or termination pursuant to Sections 20.6.2.3109(E) and 20.6.2.5101(I) for the purpose of regulating this well to acceptable levels (such that the growth/creation of new fractures has ceased and the potential for a hazard to public health and/or undue risk to property has been minimized).

WRSW has proposed that the OCD withdraw the notice issued on February 25, 2010 so that it and the OCD can "meet and discuss any issues concerning an appropriate maximum injection pressure." However, it is important to recognize that, as discussed above, discharge permits are issued pursuant to this agency's regulatory authority and obligations. Permits are not contractual agreements between operators and the department, and do not represent the memorialization of a compromise between two parties. Rather, the OCD is obliged to review data and information submitted by parties within very specifically defined

parameters, to apply specific standards to that information, and to issue, decline to issue or issue modified versions of permits or even terminate the permit accordingly. Thus we respectfully decline WRSW's suggestion to meet to further discuss this matter.

That being said, the OCD feels that the matter has already been discussed in full between it and WRSW over the course of the past year, that it understands WRSW's position with regard to its perception that a higher injection pressure is justified, and, as the OCD has already advised WRSW, the OCD disagrees with the findings and conclusions of WRSW regarding this well. As you know, the OCD issued public notice regarding the draft permit. The public notice not only invited comments from interested parties, but also included a statement that interested parties could request a hearing regarding the proposed permit, and specification that such requests should be submitted in writing and should specify the basis for the request.

At this time, if WRSW feels that it would like to further address the contents of the proposed permit renewal for UIC-I-9, the appropriate course of action would be for WRSW to submit a written request for hearing as provided in the OCD's public notice. If WRSW has data or expert testimony it feels that the OCD has not considered or has failed to consider adequately in its review of the application for permit renewal, it can present such evidence at the hearing. WRSW also mentioned in the 3/25/10 letter, although not with any specificity, that there are "other" issues of concern with the permit draft. A hearing would also allow WRSW to address those concerns. Of course, WRSW will be required to take immediate steps to provide the public notice for which it has already technically missed the deadline.

If upon further reflection WRSW opts not to request a hearing, and prefers to simply allow the permit renewal process to proceed, if WRSW immediately remedies the applicant notice issue, the OCD will recalculate the public notice time period accordingly and proceed with issuance of the final permit thereafter. Conversely, if WRSW does not request a hearing and continues to refuse to fulfill its obligations for public notice, and if no public notice has been provided by WRSW by Friday April 16, 2010, the OCD will consider the application for renewal withdrawn, and the current permit, UIC-I-9, expired.

If WRSW is still concerned regarding meeting its obligations under the notice regulations and would like the OCD to review its public notice prior to publication, the OCD would be happy to review a draft and provide feedback regarding whether it appears to meet the requirements of the WQCC regulations. Please let us know if this is something with which WRSW would like assistance.

Sincerely,

Mikal Altomare OCD Attorney

40 C

EC:

Carl Chavez, <u>carl.chavez@state.nm.us</u>
William Jones, <u>William.v.jones@state.nm.us</u>
Gail MacQuesten, <u>Gail.macquesten@state.nm.us</u>
Glenn von Gonten, <u>glenn.vongonten@state.nm.us</u>
Charlie Perrin, Charlie perrin@state.nm.us

#### Chavez, Carl J, EMNRD

From:

Chavez, Carl J, EMNRD

Sent:

Tuesday, January 25, 2011 2:44 PM

To:

Schmaltz, Randy

Subject:

API# 30-45-29002 (UICI-009) Annual Class I Well Report

Randy:

The OCD is in receipt of Western Refining SW, Inc.'s Waste Disposal Well #1 Annual Well Report.

OCD will contact you if we have questions or need additional information.

Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: <u>CarlJ.Chavez@state.nm.us</u>

Website: <a href="http://www.emnrd.state.nm.us/ocd/">http://www.emnrd.state.nm.us/ocd/</a> index.htm (Pollution Prevention Guidance is under "Publications")

Carl Chavez
New Mexico Oil Conservation Division
Environmental Bureau
1220 South St. Francis Dr
Santa Fe, NM 87505

Certified Mail: 7010 1870 0000 0709 4549

January 24, 2011

RE: Western Refining Southwest, Inc. - Bloomfield Refinery 2010 Annual Class I Well Report Non-Hazardous Injection Well Permit # - UIC-CL-009 API # - 30- 45-29002

Mr. Chavez,

Bloomfield Refinery submits the *Annual Class I Well Report January – December 2010* as requested in the September 25, 2009 e-mail from NMOCD – Santa Fe. The well is located in the NE/4, SE/4 of Section 27, Township 29 North, Range 11West, NMPM, San Juan County, New Mexico and is operated by Western Refining Southwest, Inc.

If you need more information, please contact me at (505) 632-4171.

Sincerely,

James R. Schmaltz

**Environmental Manager** 

Western Refining Southwest, Inc. - Bloomfield Refinery

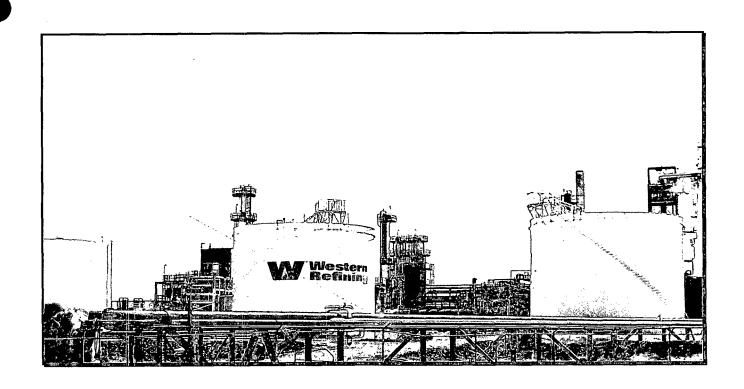
Cc: Kelly G. Roberts – NMOCD Aztec District Office V.R. McDaniel – Bloomfield Refinery Site Manager Allen Hains – Western Refining – El Paso

# ANNUAL CLASS I WELL REPORT

# **Waste Disposal Well #1**January – December 2010

Western Refining Southwest, Inc. Bloomfield Refinery Bloomfield, New Mexico Permit # - UIC-CL1-009 API # - 30-45-29002

January 2011



# ANNUAL CLASS I WELL REPORT

# Waste Disposal Well #1 January – December 2010

Western Refining Southwest, Inc. Bloomfield Refinery Bloomfield, New Mexico Permit # - UIC-CL1-009 API # - 30-45-29002

January 24, 2011

Prepared by:

Cindy Hurtado

**Environmental Coordinator** 

Reviewed by:

James R. Schmaltz

Environmental Manager

# Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Site Manager

# **Executive Summary**

This report provides a summary of activities conducted throughout 2010 on Waste Disposal Well #1 (WDW-#1) at the Bloomfield Refinery. The following is a summary of conclusions and recommendations developed from well activities performed in 2010.

# Conclusions

**Injection Volume** - The volume injected into the disposal well during 2010 was 18,857,947 gallons. Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation. Due to the reduced water usage caused by this suspension, average injection flow rates have decreased to less than 50% or 60 gpm or less throughout 2010.

**Sampling and Chemical Analyses -** Injection fluid samples were collected on a quarterly basis for chemical analysis. Analytical results did not exhibit characteristics of hazardous waste.

**Maintenance Operations -** During 2010, maintenance operations included a major re-build of the injection pump and fabrication and replacement of discharge piping.

**Mechanical Integrity Tests -** The 2010 well testing program included a high-pressure shutdown test, Bradenhead Test, Mechanical Integrity Test, bottom hole pressure survey and pressure Falloff Test. All tests were successfully completed and results indicate no problems with the mechanical integrity of the well.

**Well Evaluation -** Bloomfield Refinery retained William M. Cobb & Associates, Inc. to evaluate available well information. Fracture treatment of the lower interval is not being considered at this time due to the results of the high-pressure shutdown test, Bradenhead Test, Mechanical Integrity Test, bottom hole pressure survey and pressure Falloff Test.

**Area of Review (AOR) -** No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of Disposal Well #1.

# **Recommendations**

In 2011, Western will continue the routine operating, monitoring, maintenance and testing programs which will include quarterly chemical analysis of injection fluids, annual MIT, Bradenhead testing, and the annual pressure Falloff Test. Western will continue to utilize the maximum operating injection pressure at the wellhead as allowed in the amended Administrative Order SWD-528 in order to optimize potential fluctuations in the dewatering activities associated with groundwater remediation and to accommodate any changes in operation of the facility.

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Figure 2: Well Schematic

Figure 3: Disposal Well and Area Wells

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Table 1: Monthly Injection Well Report Table 2: Area of Review

#### 1.0 Introduction

This report provides a summary of activities conducted during 2010 on Waste Disposal Well #1 (WDW #1). The disposal well is part of the Bloomfield Refinery operations. The refinery is located immediately south of Bloomfield, New Mexico in San Juan County. The well location is depicted in Figure 1. The physical address is #50 Road 4990, Bloomfield, New Mexico 87413.

The Bloomfield Refinery is located on approximately 263 acres. Bordering the facility is a combination of federal and private properties. Public property managed by the Bureau of Land Management lies to the south. The majority of undeveloped land in the vicinity of the facility is used extensively for oil and gas production and, in some instances, grazing. U.S. Highway 44 is located approximately one-half mile west of the facility. The topography of the main portion of the site is generally flat with steep bluffs to the north where the San Juan River intersects Tertiary terrace deposits.

The Waste Disposal Well #1 is owned by San Juan Refining Company, a New Mexico corporation. It is operated by Western Refining Southwest, Inc. formerly known as Giant Industries Arizona, Inc., an Arizona corporation.

#### 1.1 Well Information

Well Name & Number: Waste Disposal Well #1

OCD UIC: UIC-CL1-009

OCD Discharge Plan Permit Number: GW-130

Well Classification: Class I Non-hazardous

API Number: 30-045-29002

Legal Location: 1250 FEL, 2442FSL, I Sec 27 T29S

R11E

Physical Address: #50 Road 4990, Bloomfield, NM 87413

# 2.0 Summary of Activities

The following list of activities was conducted throughout 2010 on Disposal Well #1 at Western's Bloomfield Refinery.

•	01/14/10	1 st Quarterly Sampling Event
•	04/22/10	2 nd Quarterly Sampling Event
•	05/19/10	Mechanical Integrity Test
		(See Form C-103 in Appendix A)
•	07/21/10	3 rd Quarterly Sampling Event
•	08/29/10	Pressure Fall-Off Test
		(See Form C-103 in Appendix A)
•	10/25/10	4 th Quarterly Sampling Event

# 3.0 Injection Volume

The Monthly Injection Well Report summarizing injection volumes and well performance parameters is presented as Table 1.

#### 3.1 Injection Volume

The volume injected into the disposal well during 2010 was 18,857,947 gallons. Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation. Due to the reduced water usage caused by this suspension, average injection flow rates have decreased to less than 50% or 60 gpm or less throughout 2010.

#### 3.2 Injection Well Down-Time

The Injection Well was down a total of 1320 hours in 2010. The down-times are correlated with performing the Annual Falloff Test and maintenance events. The maintenance procedures that contributed to the bulk of the downtime were a major re-build of the pump and fabrication and replacement of discharge piping.

# 4.0 Sampling and Chemical Analyses

Injection fluids samples were collected on a quarterly basis and analyzed for the constituents listed per Item #9 of the *Bloomfield Refinery Class I (Non-Hazardous) Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal* dated March 23, 2004. First quarter samples were collected on January 14, 2010, second quarter samples were collected April 22, 2010, third quarter samples were obtained July 21, 2010, and fourth quarter samples were taken October 25, 2010. Laboratory Analytical Reports and Laboratory Quality Assurance Plan are presented in Appendices B and C, respectively.

Analytical results did not exhibit characteristics of hazardous waste.

# 5.0 Maintenance Operations

During 2010, maintenance operations included a major re-build (crank end, plungers, packings, O-rings, bearings, belts, and gaskets) of the injection pump, fabrication and replacement of discharge piping, replacing a cracked plunger in the pump, and filter cartridge change out.

# 6.0 Mechanical Integrity Tests

The 2010 well testing program included a high-pressure shutdown test, Bradenhead test, mechanical integrity test, bottom hole pressure survey and pressure falloff test. The testing is discussed below.

#### 6.1 Annual Mechanical Integrity Test

Bloomfield Refinery performed the annual High Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test (MIT) on May 19, 2010. All tests were witnessed by Monica Kuehling of NMOCD-Aztec. The MIT held at 580 psi for 30 minutes, therefore confirming the integrity of the well.

#### 6.2 Annual Pressure Fall-Off Test

Bloomfield Refinery retained William M. Cobb & Associates, Inc. to perform the annual bottom hole pressure survey and pressure Falloff Test on WDW #1. The well tests were conducted in accordance with United States Environmental Protection Agency (USEPA) 40 CFR 146.13 and the State of New Mexico Falloff Test Guidelines, December 3, 2007. The 2010 pressure falloff test procedure was conducted in accordance with the USEPA's Region 6 "Pressure Falloff Testing Guidelines, Third Revision", dated August 8, 2002, and required by the State of New Mexico as of December 3, 2007. The pressure falloff test and bottom hole pressure survey performed on Waste Disposal Well No. 1 also met the NMOCD requirements for such testing.

The falloff testing for Western's Waste Disposal Well # 1 (WDW #1) was conducted with tandem bottom hole pressure memory gauges with a pre-flow period beginning at 9:28 AM on August 29, 2010 and ending at 8:52 AM on September 9, 2010. The average flow rate for the 72-hour period prior to the beginning of the falloff test was 29.5 GPM with a final flowing rate of 21.5 GPM. On the morning of August 29, 2010, tandem bottom hole pressure memory gauges were lowered into the well and allowed to stabilize. The well was shut-in for 191 hours ending at 8:02 AM on September 9, 2010. Field data and charts are included in Appendix E of the 2010 Annual Bottomhole Pressure Surveys

and Pressure Falloff Tests for Waste Disposal Well #1Report (Cobb and Associates, 2010) that was submitted to NMOCD – Santa Fe on October 14, 2010.

Geologic assessment indicates the WDW #1 is in a confined low permeability sand interval and historically is not capable of producing a bottom hole 100 psi pressure drop. Records show that WDW #1 was hydraulically fractured after it was drilled. The 2006, 2008 and 2009 falloff test data confirm this with a linear flow regime observed after the end of storage effects.

The 2010 Falloff Test data showed no unexpected pressure changes. The pressure dropped quickly during the first few minutes of the test due to wellbore storage effects and then continued to decline as the pressure in the reservoir adjusted to the no-flow period. The Falloff Test data show linear flow for the duration of the test with no indication of end of linear flow or reservoir boundary effects. There does not appear to be any reservoir response to injection other than that which would be expected from normal growth of the injected volume.

All test data and conclusions are presented in the 2010 Annual Bottomhole Pressure Surveys and Pressure Falloff Tests for Waste Disposal Well #1Report (Cobb and Associates, 2010) that was submitted to NMOCD – Santa Fe on October 14, 2010.

#### 7.0 Well Evaluations

#### 7.1 Well Evaluation

Bloomfield Refinery retained William M. Cobb & Associates, Inc. to evaluate available well information and present recommendations to improve the injectivity of the injection well. A report, *Evaluation of Disposal Well #1 Bloomfield Refinery* (Cobb and Associates, 2009a), was prepared by William M. Cobb & Associates, Inc. for Bloomfield Refinery and submitted to NMOCD – Santa Fe on October 7, 2009. In the report, William M Cobb & Associates, Inc stated "with the current injection pressure limit of 1,150 psig at the wellhead and at rates of under 100 gpm, the well should serve for an additional ten years."

In 2009, Bloomfield Refinery followed the recommendations to clean out/stimulate/acidize the well and to filter the injection fluids. Western believes that the well stimulation procedures were successful as indicated by the results of the 2009 Radioactive Tracer Test and the 2009 and 2010 Falloff Test; therefore fracture treatment of the lower interval is not being considered at this time.

Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. Due to the reduced water usage caused by this suspension, injection flow rates have decreased to less than 60 gpm. With proper

operation of the filtration system and with the decreased flow rates, WDW #1 should operate for more than ten years.

#### 7.2 Area of Review (AOR)

The Area of Review data from the 2009 Falloff test report was reviewed and updated in 2010 Annual Bottomhole Pressure Surveys and Pressure Falloff Tests for Waste Disposal Well #1Report (Cobb & Associates, 2010) that was submitted to NMOCD – Santa Fe on October 14, 2010.

Fifty-eight wells were found within a one-mile radius of WDW #1, which injects water into the Mesaverde formation. The wells and status are spotted on an area map, Figure 3, with a well number listed with the well data in Table 2. Of these wells, 15 have been plugged and abandoned. Four wells are classified as dry holes and believed to be plugged and abandoned. Twenty-four wells produce petroleum from shallow zones. One well is an Entrada injection well. Fourteen wells produce petroleum from the Dakota and Gallup zones, which are deeper than the Mesaverde interval used for injection purposes.

Twenty-four of the 59 wells have penetrated the injection zone. Of these, three have been plugged. Five wells are currently producing from shallow zones and 14 wells produce from deep zones. There are two injection wells including WDW #1 and Ashcroft SWD #1 well.

No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of Disposal Well #1.

### 8.0 Conclusions and Recommendations

The following is a summary of conclusions and recommendations developed from well activities in 2010.

#### 8.1 Conclusions

**Injection Volume** - The volume injected into the disposal well during 2010 was 18,857,947 gallons. Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation. Due to the reduced water usage caused by this suspension, average injection flow rates have decreased by 50% 60 gpm or less throughout 2010.

**Sampling and Chemical Analyses -** Injection fluids samples were collected on a quarterly basis for chemical analysis. Analytical results did not exhibit characteristics of hazardous waste.

**Maintenance Operations -** During 2010, maintenance operations included a major re-build of the injection pump and fabrication and replacement of discharge piping.

**Mechanical Integrity Tests -** The 2010 well testing program included a high-pressure shutdown test, Bradenhead Test, Mechanical Integrity Test, bottom hole pressure survey and pressure Falloff Test. Results of these tests prove that the operational integrity of the well is sound.

**Well Evaluation** – In 2009, Bloomfield Refinery followed the recommendations of William M. Cobb & Associates, Inc. to clean out/stimulate/acidize the well and to filter the injection fluids in order to improve the injectivity of the injection well. Western believes that the well stimulation procedures were successful as indicated by the results of the 2009 Radioactive Tracer Test and the 2009 and 2010 Falloff Tesst; therefore fracture treatment of the lower interval is not being considered at this time.

**Area of Review (AOR) -** No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

#### 8.2 Recommendations

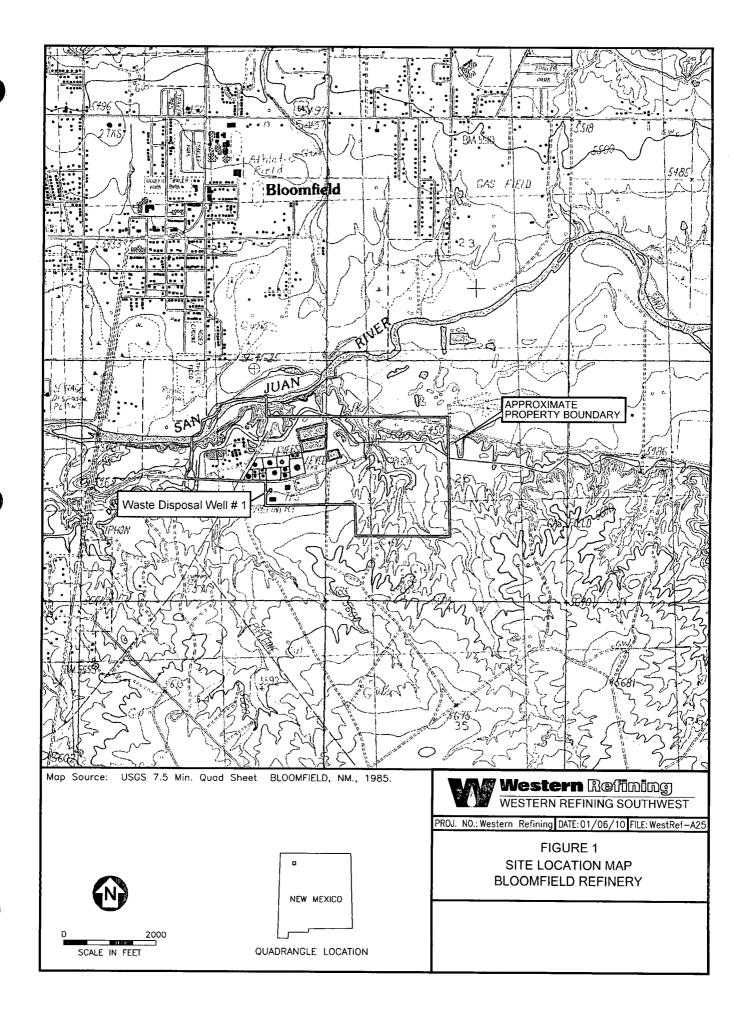
In 2011, Western will continue the routine operating, monitoring, maintenance and testing programs which include quarterly chemical analysis of injection fluids, annual MIT, Bradenhead testing, and the annual pressure Falloff Test. Western will continue to utilize the maximum operating injection pressure at the wellhead as allowed in the amended Administrative Order SWD-528 in order to optimize potential fluctuations in the dewatering activities associated with groundwater remediation and to accommodate any changes in operation of the facility.

# 9.0 References

Cobb & Associates, 2009a, Evaluation of Disposal Well #1 Bloomfield Refinery, August 26, 2009.

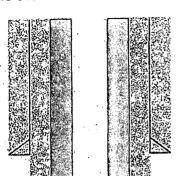
Cobb & Associates, 2010, 2010 Annual Bottomhole Pressure Surveys and Pressure Falloff Tests for Waste Disposal Well #1Report October 12, 2010.

Bloomfield Refinery Class I (Non-Hazardous) Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal dated March 23, 2004.



# WESTERN REFINING DISPOSAL WELL #1 V. SW SECTION 26, T29N, R11W

NO.: 30-045-29002





# FIGURE 2 DISPOSAL WELL #1 WELL SCHEMATIC Western Refining Inc. Bloomfield, NM

1	Date:	4/26/2006	Approved By:	rte	Job No.:	70F5830
-	Drawn'By:	ria	Checked By:		Scale:	N/A

8-5/8", 48#/ft, Surface Casing @ 830'

TOC: Surface Hole Size: 11.0"

Tubing: 2-7/8", Acid Resistant Fluoroline Cement Lined

Wt of Tubing: 6.5 #/ft

Wt of Tubing Lined: 7.55 #/ft

Tubing ID: 2.128"
Tubing Drift ID: 2.000"

Minimum ID @ Packer: ~1.87" estimated

Packer: Unknown Packer Type @ 3221'
Could be a Guiberson or similar model Uni-6

Perforations: 3276' - 3408' 4JSPF 0.5 EHD Top of the Cliff House Formation: 3276'

Fill was cleaned out of well on 4/20/06 Fill was orginally tagged at 3325'

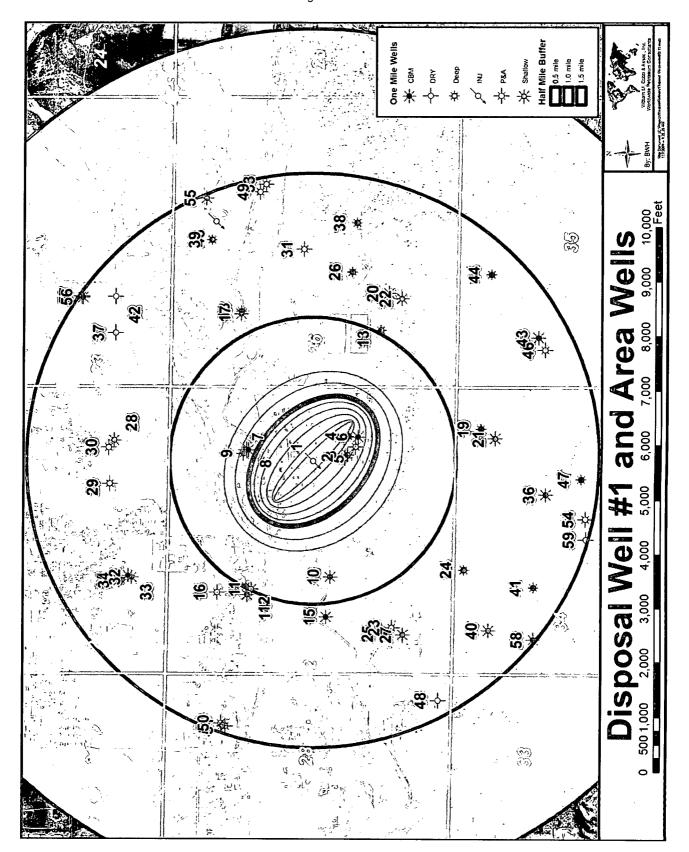
Perforations: 3435' - 3460' 4JSPF 0.5 EHD Top of the Menefee Formation: 3400'

RBP: 3520'

5-1/2", 15.5#/ft, Production Casing @3600'

TOC: Surface Hole Size: 7-7/8"

Figure 3





									AVG	(GPM)		55	55	63	09	40	41	43	42	32	34	28	29			
							NE	RATES	MIN	(GPM)	l l	19	58	51	22	20	19	12	11	17	20	19	17			
							ON-LINE	FLOW RATES	MAX	(GPM)		72	65	0.69	89	98	89	80	55	45	55	53	90			
IERY									AVG	(PSIA)		123	133	138	125	138	169	177	153	140	141	120	158			
LD REFINERY								RESSURE	NIM	(PSIA)		85	131	118	7.1	29_	151	151	124	95	93	88	136			
BLOOMFIELD		87413	J	PORT	211W	MEXICO		ANNULAR PRESSURE	MAX	(PSIA)		148	136	168	168	201	210	209	208	196	199	163	179			
INC BL	159	MEXICO		WELL REIN GW-130	27, T29N, F	M, SAN JUAN COUNTY, NEW MEXICO			AVG	(PSIA)		1066	1126	1117	1093	066	1066	972	991	926	951	921	944			
G SOUTHWEST,	P.O. BOX 159	LD, NEW		THLY INJECTION WELL RE DISCHARGE PLAN GW-130	SECTION	UAN COUN		RESSURE	NIM	(PSIA)		915	1114	1043.0	982	864	900	912	891	902	897	892	900			
		BLOOMFIELD, NEW MEXICO		MONTHLY INJECTION WELL REPORT DISCHARGE PLAN GW-130	NE1/4 SE1/4 SECTION 27, T29N, R11W	IPM, SAN J		INJECTION PRESSURE	MAX	(PSIA)		1141	1137	1141	1140	1080	1097	1130	1087	994	1065	1023	1054			
N REFINI		18				NMP		-NWOQ	TIME	(HRS)		0	0	0	36	144	0	0	240	624	192	84	0			
<b>WESTERN REFININ</b>							TOTALIZER	AMOUNT	INJECTED	(GALLONS)		2,373,484	2,566,818	2,815,393	2,196,140	1,220,962	1,709,684	1,477,024	900,337	210,489	1,078,275	1,024,311	1,285,030	-	7 gallons	
							AMOUNT	TO SOLAR	EVAP PONDS	(GALLONS)		2,404,000	2,288,000	2,183,000	1,721,000	1,700,000	2,307,000	3,376,000	4,778,000	2,361,000	1,867,000	1,238,000	1,274,000		Total Amount Injected in 2010 - 18,857,947 gallons	
							AMOUNT	OF WATER	FROM RIVER	(GALLONS)		1,395,000	2,002,000		1,447,286	1,440,000	2,597,000	2,307,000	3,256,000	1,974,000	971,000	2,174,000	1,242,000		nt Injected in 2	
									PERIOD	2010		JAN	FEB	MAR	APR	MAY	NOL	JUL	AUG	SEP	ОСТ	NOV	DEC		Total Amour	

Pen. Inj. Zone	Yes	Yes	Š	Yes	8 S	Š	8 S	9 2	Yes	Yes	8	Yes	Yes	S S	Yes	S S	Yes	Yes	Yes	8	9 2	o Z	°N N	Yes
Status	2	P&A	Shallow	Deep	P&A	CBM	CBM	P&A	Shallow	Shallow	Shallow	Deep	Deep	Shallow	CBM	P&A	CBM	Deep	Deep	CBM	Shallow	Shallow	P&A	Deep
RESERVOIR	MESAVERDE	DAKOTA	CHACRA	GALLUP	PICTURED CLIFFS	FRUITLAND COAL	FRUITLAND COAL		CHACRA	PICTURED CLIFFS	FRUITLAND SAND	DAKOTA	DAKOTA	CHACRA	FRUITLAND COAL		FRUITLAND COAL	DAKOTA	GALLUP	FRUITLAND COAL	CHACRA	CHACRA	PICTURED CLIFFS	GALLUP
<u>OPERATOR</u>	WESTERN REFINING	BP AMERICA	XTO ENERGY, INC	XTO ENERGY, INC	Pre-Ongard	HOLCOMB O&G	H-27-29N-11W HOLCOMB O&G	Pre-Ongard	H-27-29N-11W XTO ENERGY, INC	Burlington	F-27-29N-11W MANANA GAS INC	Burlington	Burlington	F-27-29N-11W MANANA GAS INC	Burlington	Pre-Ongard	F-26-29N-11W HOLCOMB O&G	F-26-29N-11W XTO ENERGY, INC	Burlington	Burlington	Burlington	ENERGEN	Pre-Ongard	ENERGEN
ULSTR	I-27-29N-11W	I-27-29N-11W	I-27-29N-11W	I-27-29N-11W	I-27-29N-11W	I-27-29N-11W	H-27-29N-11W	H-27-29N-11W Pre-Ongard	H-27-29N-11W	K-27-29N-11W	F-27-29N-11W	F-27-29N-11W Burlington	M-26-29N-11W Burlington	F-27-29N-11W	L-27-29N-11W	C-27-29N-11W Pre-Ongard	F-26-29N-11W	F-26-29N-11W	A-34-29N-11W Burlington	N-26-29N-11W Burlington	A-34-29N-11W	N-26-29N-11W	M-27-29N-11W Pre-Ongard	C-34-29N-11W ENERGEN
P&A Date		19-Jan-94			18-Oct-82			18-Aug-55								09-Nov-78							27-Jun-75	
Total Depth	3514	6298	2839	6177	1717	1714	1689	1800	6262	5808	1354	6160	6348	2710	6214	800	4030	6242	6148	1760	2857	2869	1747	5970
Perf Bottom	3514	6298	2839	5646		1714	1689		2810	1770	1354	6160	6348	2710	1661		1645	6242	6148	1760	2857	2869	1747	9269
Perf	3276	6157	2827	5314		1543	1483		2701	1680	1326	6024	6176	2578	1388		1462	9809	6086	1468	2747	2746	1664	5326
APINO	30-045-29002	30-045-07825	30-045-23554	30-045-30833	30-045-07812	30-045-34463	30-045-34409	30-045-07883	30-045-24084	30-045-25673	30-045-27361	30-045-24673	30-045-12003	30-045-27365	30-045-07835	30-045-07896	30-045-25329	30-045-24083	30-045-25657	30-045-31118	30-045-24574	30-045-24572	30-045-07903	30-045-25707
#1	-	-	-	#	-	₹	7	. 5	五	18	-	Ή	-	~	-	-	-	11	16	100	6	တ	-	15
WELLNAME	DISPOSAL	DAVIS GAS COM F	DAVIS GAS COM G	DAVIS GAS COM F	Davis Pooled Unit	JACQUE	JACQUE	Davis PU/FB Umbarger	DAVIS GAS COM F	CONGRESS	LAUREN KELLY	MANGUM	CALVIN	MARIAN S	MANGUM	Black Diamond	DAVIS GAS COM J	SULLIVAN GAS COM D	CONGRESS	CALVIN	SUMMIT	CONGRESS	Garland "B"	SUMMIT
Miles to	0.00	0.11	0.12	0.15	0.16	0.18	0.23	0.23	0.24	0.41	0.49	0.49	0.51	0.52	0.55	0.56	0.57	0.58	09.0	0.64	0.64	0.64	0.64	0.65
Map Seq.	<b>←</b>	2	က	4	5	9	7	ø	6	10	-	12	5	4	15	16	17	18	19	20	21	22	23	24

Pen. Ini. Zone	8 S	Yes	°Z	°N	o N	Yes	_o	°N	9 2	Yes	8 8	0 N	°Z	Yes	Yes	§	Yes	S S	Yes	Yes	Yes	o N	Yes	8
Status	Shallow	Deep	Shallow	Shallow	P&A	P&A	P&A	Shallow	CBM	Deep	Shallow	Shallow	DRY	Deep	Deep	Shallow	Deep	DRY	Shallow	Deep	<u>N</u>	P&A	Deep	DRY
RESERVOIR	CHACRA	GALLUP	PICTURED CLIFFS	CHACRA	FRUITLAND SAND	DAKOTA	(N/A)	CHACRA	FRUITLAND COAL	DAKOTA	FRUITLAND SAND	PICTURED CLIFFS	FARMINGTON	DAKOTA	DAKOTA	FARMINGTON, NORTH Shallow	DAKOTA	FARMINGTON	CHACRA	GALLUP	MORRISON BLUFF EN	PICTURED CLIFFS	DAKOTA	
IR <u>OPERATOR</u>	M-27-29N-11W ENERGEN	I-11W Burlington	4-11W Burlington	P-22-29N-11W MANANA GAS INC	O-22-29N-11W JOHN C PICKETT	P-22-29N-11W MANANA GAS INC	M-26-29N-11W Pre-Ongard	N-22-29N-11W MANANA GAS INC	N-22-29N-11W MANANA GAS INC	N-22-29N-11W MANANA GAS INC	N-22-29N-11W MANANA GAS INC	G-34-29N-11W CHAPARRAL O&G	M-23-29N-11W Pre-Ongard	-11W Burlington	1-11W XTO ENERGY, INC	D-34-29N-11W MCELVAIN O&G	F-34-29N-11W Burlington	O-23-29N-11W Pre-Ongard	I-11W Burlington	J-11W Burlington	I-11W XTO ENERGY, INC	E-35-29N-11W CHAPARRAL O&G	G-34-29N-11W Burlington	P-28-29N-11W Pre-Ongard
ULSTR	M-27-29N	K-26-29N-11W	M-27-29N-11W	P-22-29N	O-22-29N	P-22-29N	M-26-29N	N-22-29N	N-22-29N	N-22-29N	N-22-29N	G-34-29N	M-23-29N	J-26-29N-11W	B-26-29N-11W	D-34-29N	F-34-29N	O-23-29N	E-35-29N-11W	C-35-29N-11W	B-26-29N-11W	E-35-29N	G-34-29N	P-28-29N
P&A Date					02-Mar-00	14-Jun-99	11-Nov-58															18-Dec-99		
Total Depth	2790	5870	1678	2754	1466	6274	1917	2732	1608	6226	1410	1736	2335	6430	6160	1525	6347	2015	6328	5943	7382	1790	6340	870
Perf Bottom	2790	5870	1678	2754	1466	6274		2732	1608	6226	1410	1736		6430	6160	1064	6347		2906	5943	7070	1790	6340	
Perf	2668	5295	1648	2627	1380	6072		2622	1440	6052	1390	1726		6172	6047	1060	6202		2784	5369	6952	1776	6171	
APINO	30-045-24573	30-045-25612	30-045-21732	30-045-26721	30-045-07959	30-045-07961	30-045-07776	30-045-26731	30-045-34312	30-045-07940	30-045-13089	30-045-20755	30-545-02123	30-045-33093	30-045-07733	30-045-24834	30-045-24835	30-545-02124	30-045-24837	30-045-25675	30-045-30788	30-045-20752	30-045-07672	30-045-07751
#1	က	က	₹	2	~	-	-	-	-	₩.	2	2	က	1	-	11	7E	4	4E	15	Ψ-	-	2	<del></del>
WELLNAME	GARLAND	CALVIN	GARLAND B	NANCY HARTMAN	GRACE PEARCE	HARTMAN	Davis	MARY JANE	ROYAL FLUSH	COOK	COOK	SHELLY	HARE	CALVIN	SULLIVAN GAS COM D	ELLEDGE FEDERAL 34	CONGRESS	HARE	CONGRESS	CONGRESS	ASHCROFT SWD	LEA ANN	CONGRESS	Viles EE
Miles to	0.65	0.67	0.68	0.70	0.71	0.72	0.73	0.75	92.0	0.79	0.79	0.82	0.82	0.84	0.85	0.85	0.89	06.0	06.0	06.0	06.0	06.0	0.94	0.94
Map Seq.	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	4	42	43	44	45	46	47	<b>4</b> 8

8	Š	8	Yes	8	8 N	S S	8 N	Yes	8	8 N
P&A	P&A	P&A	Deep	P&A	P&A	Shallow	CBM	P&A	Shallow	DRY
PICTURED CLIFFS	PICTURED CLIFFS		DAKOTA	PICTURED CLIFFS	PICTURED CLIFFS	CHACRA	FRUITLAND COAL	DAKOTA	PICTURED CLIFFS	FRUITLAND SAND
Pre-Ongard	Pre-Ongard	Pre-Ongard	XTO ENERGY, INC	Pre-Ongard	Pre-Ongard	XTO ENERGY, INC	HOLCOMB O&G	BP AMERICA	CHAPARRAL O&G	Pre-Ongard
G-26-29N-11W	A-28-29N-11W	A-28-29N-11W	A-28-29N-11W	G-26-29N-11W	J-34-29N-11W	B-26-29N-11W	K-23-29N-11W	K-23-29N-11W	E-34-29N-11W	-34-29N-11W
23-Jun-55	05-May-78	05-Jun-78		31-Aug-53	30-Oct-53			10-Mar-97		
006	1600	009	6125	1420	PC	2761	2761	6182	1731	Frtind
			6125			2761	1648	6182	1731	
			6023			2750	1470	6154	1712	
30-045-29107	30-045-07895	30-045-07762	30-045-07894	30-045-07870	30-045-07674	30-045-23163	30-045-23550	30-045-07985	30-045-20609	30-545-02151
×	7	က	-	-	-	-	-	-	-	7
Sullivan	1adsen Selby Pooled Unit	/asden-Selby	AASDEN GAS COM	Sullivan	ONGRESS	ARL B SULLIVAN	STATE GAS COM BS	'EARCE GAS COM	HAPARRAL	CONGRESS
0.95	0.97 N	0.97 N	0.97 N	0.97 S	0.98 C	0.98 E	0.99 S	0.99 P	O.99 C	0.99 C
49	20	51	52	53	54	55	56	25	58	59
	0.95 Sullivan 1X 30-045-29107 900 23-Jun-55 G-26-29N-11W Pre-Ongard PICTURED CLIFFS P&A	0.95         Sullivan         1X         30-045-29107         900         23-Jun-55         G-26-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Madsen Selby Pooled Unit         2         30-045-07895         1600         05-May-78         A-28-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A	0.95         Sullivan         1X         30-045-29107         900         23-Jun-55         G-26-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Madsen Selby Pooled Unit         2         30-045-07895         1600         05-May-78         A-28-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Masclen-Selby         3         30-045-07762         600         05-Jun-78         A-28-29N-11W         Pre-Ongard         PRA         P&A	0.95         Sullivan         1X         30-045-28107         900         23-Jun-55         G-26-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Madsen Selby Pooled Unit         2         30-045-07895         1600         05-Jun-78         A-28-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Masden-Selby         3         30-045-07762         5         600         05-Jun-78         A-28-29N-11W         Pre-Ongard         PAKOTA         P&A           0.97         MASDEN GAS COM         1         30-045-07894         6023         6125         6125         A-28-29N-11W         XTO ENERGY, INC         DAKOTA         Deep	0.95         Sullivan         1X         30-045-29107         900         23-Jun-55         G-26-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Madsen Selby Pooled Unit         2         30-045-07895         4.28-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Masclen-Selby         3         30-045-07762         6.05         5-Jun-78         A-28-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Masclen-Selby         1         30-045-07894         6125         6125         A-28-29N-11W         Pre-Ongard         PICTURED CLIFFS         Deep           0.97         Sullivan         1         30-045-07870         1420         31-Aug-53         G-26-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A	0.95         Sullivan         1X         30-045-29107         900         23-Jun-55         G-26-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Madsen Selby Pooled Unit         2         30-045-07762         1600         05-May-78         A-28-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Masden-Selby         3         30-045-07762         5         6125         A-28-29N-11W         Pre-Ongard         PA         PA           0.97         MasDEN GAS COM         1         30-045-07870         6125         6125         A-28-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Sullivan         1         30-045-07870         PC         7420         31-Aug-53         G-26-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.98         CONGRESS         1         30-045-07674         PC         30-04-29/14W         Pre-Ongard         PICTURED CLIFFS         P&A	0.95         Sullivan         1X         30-045-29107         300         23-Jun-55         G-26-29N-11W         Fre-Ongard         PICTURED CLIFFS         P&A           0.97         Madsen Selby Pooled Unit         2         30-045-07762         5         1600         05-May-78         A-28-29N-11W         Fre-Ongard         PICTURED CLIFFS         P&A           0.97         Maschen-Selby         3         30-045-07762         5         6125         6125         A-28-29N-11W         Fre-Ongard         PACTURED CLIFFS         P&A           0.97         MASDEN GAS COM         1         30-045-07894         6023         6125         6125         A-28-29N-11W         Fre-Ongard         PICTURED CLIFFS         P&A           0.97         Sullivan         1         30-045-07874         A-28         31-Aug-53         G-26-29N-11W         Fre-Ongard         PICTURED CLIFFS         P&A           0.98         CONGRESS         1         30-045-07874         FC         30-0ct-53         3-34-29N-11W         Fre-Ongard         PICTURED CLIFFS         P&A           0.98         CONGRESS         1         30-045-23163         2761         2761         2761         A-28-29N-11W         Fre-Ongard         PICTURED CLIFFS         PACTURED CLIFFS  <	0.95         Sullivan         1X         30-045-29107         3.0         23-Jun-55         G-26-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Massen Selby Pooled Unit         2         30-045-07862         3.5         1600         05-Jun-78         4-28-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Maschen-Selby Pooled Unit         3         30-045-07762         3.5         6125         4-28-29N-11W         Pre-Ongard         PAKOTA         P&A           0.97         Maschen-Selby         1         30-045-07897         6125         4-28-29N-11W         Pre-Ongard         PAKOTA         P&A           0.97         Sullivan         1         30-045-07897         1         420         31-Aug-53         6-26-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.98         CONGRESS         1         30-045-0787         7         7         7         1-3-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.98         CONGRESS         1         30-045-07867         7         7         1-3         1-3-29N-11W         Pre-Ongard         PICTURED CLIFFS         PA           0.98         STATE GAS COM BS	0.95         Sullivan         1X         30-045-29107         3-2-Jun-56         6-26-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Madsen Selby Pooled Unit         2         3-045-07895         7-1600         05-May-78         A-28-29N-11W         Pre-Ongard         PICTURED CLIFFS         P&A           0.97         Masden-Selby Dooled Unit         3         3-045-07862         6.25         6.25         A-28-29N-11W         Pre-Ongard         PictureD CLIFFS         P&A           0.97         Masden-Selby         1         3-045-07870         A-2         1420         A-28-29N-11W         A-28-29N-11W         Pre-Ongard         PictureD CLIFFS         P&A           0.98         Sullivan         1         3-045-07874         A-2         1420         3-24-29N-11W         A-28-29N-11W         Pre-Ongard         PictureD CLIFFS         P&A           0.98         CONGRESS         1         3-045-07674         A-2         1-29N-11W         A-28-29N-11W         A-28-29N-11W	0.95         Sullivanh         1X         30-045-29107         3.2-Jun-55         6.2-BN-11W         Pre-Ongard         Pre-Ongard         PictURED CLIFFS         P&A           0.97         Madsen Selby Pooled Unit         2         30-045-07895         3.2-Jun-78         4-28-29N-11W         Pre-Ongard         PictURED CLIFFS         P&A           0.97         Masden-Selby         3         30-045-07762         7.2         60.9         5-Jun-78         A-28-29N-11W         Pre-Ongard         PACA         P&A           0.97         Masden-Selby         3         30-045-07784         6.02         6.25-Jun-78         A-28-29N-11W         Pre-Ongard         PACA         P&A           0.97         Sullivan         1         30-045-07894         6.12         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2         1.2

Pen Ini. Zone	<u>N</u>	12	4	0	5	14	0	35
Pen In	Yes	ო	0	2	2	က	4	24
Total	Wells	15	4	2	7	17	4	29
	Status	P&A	Dry	Z	CBM	Shallow	Deep	Total

#### Chavez, Carl J, EMNRD

From: Hurtado, Cindy [Cindy.Hurtado@wnr.com]

Sent: Wednesday, May 12, 2010 9:30 AM

To: Chavez, Carl J, ÉMNRD; Roberts, Kelly G, EMNRD; Kuehling, Monica, EMNRD

Cc: Schmaltz, Randy; Robinson, Kelly

Attachments: C103-MIT-2010.pdf

#### Good Morning,

Please find attached Bloomfield Refinery's C103 requesting permission to conduct the annual MIT, Bradenhead Test, and the High Pressure Shut Down Test on our Class I injection well (UICI-009) on May 19, 2010. I have coordinated with Monica Kuehling with Aztec OCD and she is available to witness the event between 8-8:30 AM. Monica is current on her safety training at Bloomfield Refinery. However, any other observers will need to contact me in order to arrange for safety orientation before the testing begins.

Thank You, Cindy

Cindy Hurtado
Environmental Coordinator
Western Refining Southwest, Inc. - Bloomfield Refinery
cindy.hurtado@wnr.com
505-632-4161

Submit 3 Copies To Appropriate District Office	State of New Me	xico		Form C-103
District 1	Energy, Minerals and Natu	ral Resources		May 27, 2004
1625 N. French Dr., Hobbs, NM 88240	•		WELL API NO.	
District II 1301 W. Grand Ave., Artesia, NM 88210	OIL CONSERVATION	DIVISION	30-045-29002-00	
District III	1220 South St. Fran		5. Indicate Type of Lease STATE F	EE X
1000 Rio Brazos Rd., Aztec, NM 87410 District IV	Santa Fe, NM 87		6. State Oil & Gas Lease	
1220 S. St. Francis Dr., Santa Fe, NM 87505			N/A	
The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	CES AND REPORTS ON WELLS		7. Lease Name or Unit Ag	reement Name
(DO NOT USE THIS FORM FOR PROPOSE DIFFERENT RESERVOIR. USE "APPLICATION OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PROPOSE OF THE PR	SALS TO DRILL OR TO DEEPEN OR PLU	JG BACK TO A	Disposal	
PROPOSALS.)  1. Type of Well: Oil Well	Gas Well OtherX (Disposal)		8. Well Number #001	
2. Name of Operator Western Refining Southwest, Inc	- Bloomfeld Retinery		9. OGRID Number 037218	
3. Address of Operator	Bloomera Reimery		10. Pool name or Wildcat	
#50 Road 4990 Bloomfield, NM	87413		Blanco/Mesa Verde	
4. Well Location				
Unit Letter_1: 2442f	eet from the South I	ine and1250_fee	et from theEastline	en e
Section 27	Township 29 Range	II NMPN	A County San Jua	ın
	11. Elevation (Show whether DR.	RKB, RT, GR, etc.		
Pit or Below-grade Tank Application 🔲 o	r Closure [			
	aterDistance from nearest fresh w	ater well Dis	tance from neurest surface water	
Pit Liner Thickness: mil	Below-Grade Tank: Volume			
	Appropriate Box to Indicate N			
	• • •	•	•	
NOTICE OF IN			SEQUENT REPORT	
PERFORM REMEDIAL WORK	PLUG AND ABANDON	REMEDIAL WOR		NG CASING 🗆
TEMPORARILY ABANDON	CHANGE PLANS	COMMENCE DR		٩ ـــا
PULL OR ALTER CASING	MULTIPLE COMPL	CASING/CEMEN	T JOB	
OTHER: MIT/BradenheadTest		OTHER:		
	leted operations. (Clearly state all p	pertinent details, an	d give pertinent dates, includ	ing estimated date
of starting any proposed wo	ork). SEE RULE 1103. For Multip			
or recompletion.				
Bloomfield Refinery requests permis				echanical Integrity
Test on the Class I injection well ref	erenced above on May 19, 2010.			
I hereby certify that the information grade tank has been/yill be constructed or				
SIGNATURE ( 1/2 A)	L /0 TITLE I		1'	
SIGNATURE Condy Ju	Tago IIILE E	aivironmental Coo	rdinatorDATE5/12/201	U
Type or print name Cindy Hurtado	E-mail address: cindy.hu	tado@wnr.com	Telephone No. (505)632	4161
For State Use Only				
APPROVED BY: Carl,	1 11/	r . +	Engr DATE	
Conditions of Approval (if any):	Merry TITLE	Emmonmenter	DATE	5/12/20/0

## Hurtado, Cindy

From:

Hurtado, Cindy

Sent:

Thursday, May 20, 2010 8:03 AM

To:

'Chavez, Carl J, EMNRD'; 'Roberts, Kelly G, EMNRD'; Kuehling, Monica, EMNRD

Cc:

Schmaltz, Randy

Subject:

Bloomfield Refinery - UICI-009

Attachments: Follow up C103-MIT.pdf

Good Morning Carl,

Please find attached the follow-up C-103 report for the MIT that was conducted on our Injection Well yesterday. Please contact me if you have questions or need more information.

Thanks, Cindy

Cindy Hurtado
Environmental Coordinator
Western Refining Southwest, Inc. - Bloomfield Refinery
cindy.hurtado@wnr.com
505-632-4161

Submit 3 Copies To Appropriate District Office	State of New Mexico	Form C-103
District I 1625 N. French Dr., Hobbs, NM 88240	Energy, Minerals and Natural Resources	May 27, 2004 WELL API NO.
District II 1301 W. Grand Avc., Artesia, NM 88210	OIL CONSERVATION DIVISION	30-045-29002-00 5. Indicate Type of Lease
District III 1000 Rio Brazos Rd., Aztec, NM 87410	1220 South St. Francis Dr.	STATE FEE X
District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505	Santa Fe, NM 87505	6. State Oil & Gas Lease No. N/A
SUNDRY NOTIC (DO NOT USE THIS FORM FOR PROPOS. DIFFERENT RESERVOIR. USE "APPLICA	CES AND REPORTS ON WELLS ALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A ATION FOR PERMIT" (FORM C-101) FOR SUCH	7. Lease Name or Unit Agreement Name Disposal
PROPOSALS.)  1. Type of Well: Oil Well   (	Gas Well OtherX (Disposal)	8. Well Number #001
2. Name of Operator		9. OGRID Number
Western Refining Southwest, Inc. –  3. Address of Operator	Bloomfeld Refinery	037218 10. Pool name or Wildcat
#50 Road 4990 Bloomfield, NM 8	7413	Blanco/Mesa Verde
4. Well Location		
Unit Letter I : 2442 fe	et from the South line and 1250 fe	eet from theEastline
Section 27	Township 29 Range II NMP	
	11. Elevation (Show whether DR, RKB, RT, GR, etc.	
Pit or Below-grade Tank Application or	Closure	
	terDistance from nearest fresh water wellDi	stance from nearest surface water
Pit Liner Thickness: mil	Below-Grade Tank: Volume bbls; C	Construction Material
12. Check A	ppropriate Box to Indicate Nature of Notice	, Report or Other Data
NOTICE OF INT PERFORM REMEDIAL WORK TEMPORARILY ABANDON PULL OR ALTER CASING	PLUG AND ABANDON   REMEDIAL WO	RILLING OPNS. P AND A
OTHER:	OTHER: MIT/Br	adenheadTest
	eted operations. (Clearly state all pertinent details, a k). SEE RULE 1103. For Multiple Completions: A	
	nnual High Pressure Shutdown Test, Bradenhead Tesnica Kuehling of NMOCD-Aztec. The MIT held at S	
grade tank has been/will be constructed or c	bove is true and complete to the best of my knowled closed according to NMOCD guidelines , a general permit	or an (attached) alternative OCD-approved plan .
SIGNATURE (undy Hunt	TITLE Environmental Coo	ordinator_DATE5/19/2010
Type or print name Cindy Hurtado For State Use Only	E-mail address: cindy.hurtado@wnr.com	Telephone No. (505)632-4161
APPROVED BY:	TITLE	DATE
Conditions of Approval (if any):		The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s



E-mail address

### NEW MEXICO ENERGY, MINERALS & NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION AZTEC DISTRICT OFFICE 1000 RIO BRAZOS ROAD AZTEC NM (7710

(505) 334-6178 FAX: (505) 334-6170 http://emord.state.nm.us/oc/d/District III/3distric.htm

#### BRADENHEAD TEST REPORT

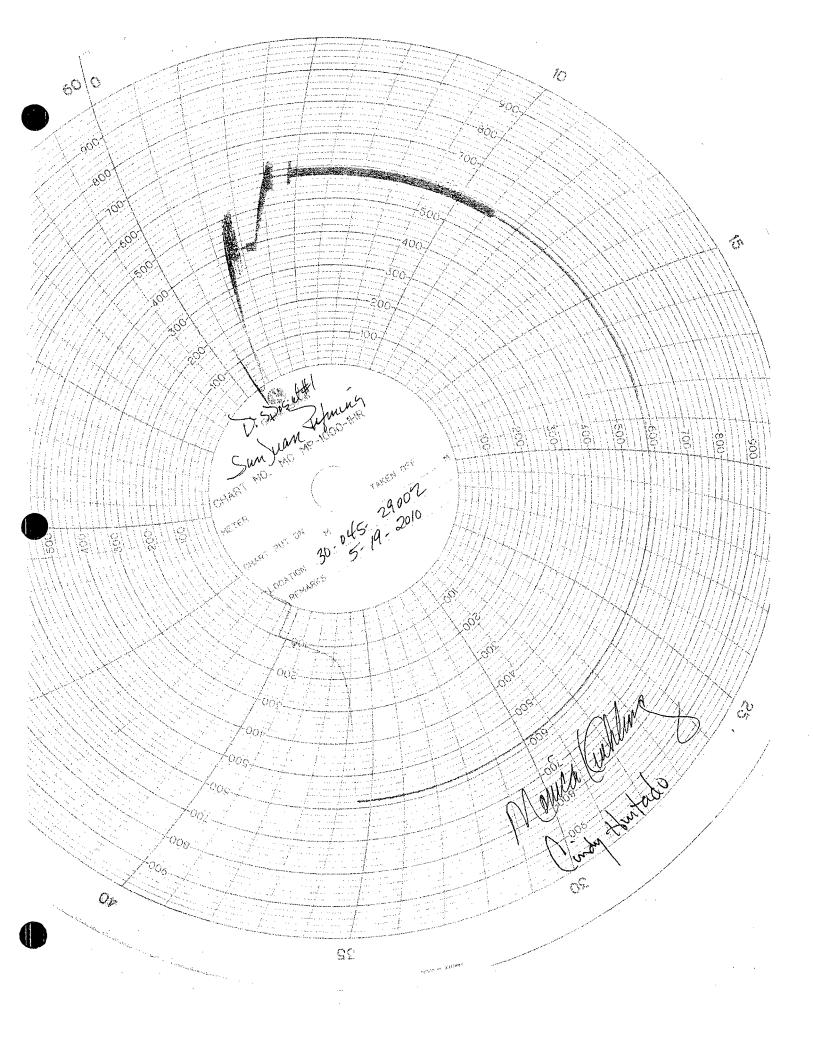
(submit 1 copy to above address) wan Lehning & API #30-0 45 29002 Date of Test 5-19-10 Operator Well No. / Location: Unit \( \overline{\infty} \) Section \( \overline{\infty} \) Township \( \overline{\infty} \) Range \( // \) Property Name Well Status (Shut-In of Producing) Initial PSI: Tubing 918 Intermediate VIA Casing 164 Bradenhead OPEN BRADENHEAD AND INTERMEDIATE TO ATMOSPHERE INDIVIDUALLY FOR 15 MINUTES EACH **PRESSURE** FLOW CHARACTERISTICS Testing Bradenhead **INTERM** BRADENHEAD INTERMEDIATE Csg Int Int Csg TIME Steady Flow 5 min 10 min Surges Down to Nothing 15 min 20 min 25 min 30 min Gas & Water Water If bradenhead flowed water, check all of the descriptions that apply below: FRESH SALTY SULFUR BLACK **5 MINUTE SHUT-IN PRESSURE** 



# NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

# MECHANICAL INTEGRITY TEST REPORT

(IAOR UIO)
Date of Test 5-19-10 Operator San want spring 6. API # 30-0 45-29003
Property Name 15 7054 Well # Location: Unit \( \overline{L} \) Sec \( \overline{27} \) Twn \( \overline{9} \) Rge \( \overline{17} \)
Land Type:  State
Temporarily Abandoned Well (Y/N): TA Expires:
Casing Pres. O Tbg. SI Pres. Max. Inj. Pres. Tbg. Inj. Pres. Tubing Pres. 9/8 Int. Casing Pres. O/A
Pressured annulus up to
REMARKS:
Lacker Det at 3221
Dudormed Lillcheck Passed
Canview E: 1 Setting on June / Thiorigh Menu
By Conductation Witness Mula Lukuno (Operator Representative)  Environmental Coordinators  (Position)  Revised 02-11-02



#### Hurtado, Cindy

From: Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]

**Sent:** Friday, August 20, 2010 11:58 AM

To: Hurtado, Cindy; Roberts, Kelly G, EMNRD

Schmaltz, Randy; Kuehling, Monica, EMNRD

Cc: Schmaltz, Randy; Kuehling, Monica, EMNRD

**Subject:** RE: Bloomfield Refinery - UiCI-009 Fall-Off Test (UICI-009)

Attachments: C-103 Annual FOT 8-20-10.pdf

#### Cindy:

Approved. Please see attachment.

As a reminder, during the steady-state injection period prior to fall-off test (FOT) monitoring, please be sure to include the real-time injection flow rate with pressure and temperature data to verify that a steady-state flow condition was achieved prior to FOT monitoring. Also, an updated historical pressure-flow rate chart should be submitted with the fall-off test package for the disposal well.

Please contact me if you have questions. Thank you.

Please be advised that NMOCD approval of this plan does not relieve Western Refining Southwest, Inc.- Bloomfield Refinery of responsibility should their operations pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve Western Refining Southwest, Inc.- Bloomfield Refinery of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: <a href="http://www.emnrd.state.nm.us/ocd/">http://www.emnrd.state.nm.us/ocd/</a> index.htm (Pollution Prevention Guidance is under "Publications")

**From:** Hurtado, Cindy [mailto:Cindy.Hurtado@wnr.com]

**Sent:** Friday, August 20, 2010 9:31 AM

**To:** Chavez, Carl J, EMNRD; Roberts, Kelly G, EMNRD **Cc:** Schmaltz, Randy; Kuehling, Monica, EMNRD **Subject:** Bloomfield Refinery - UiCI-009 Fall-Off Test

Good Morning Carl,

Please disregard the previous e-mail concerning Bloomfield Refinery's Fall-Off Test. It did not contain the signed C-103 application. This current e-mail contains the signed C-103.

Please find attached the C-103 application for Bloomfield Refinery's Class 1 Injection Well Fall-Off Test to begin on August 29, 2010. Also attached is the Fall-Off Test Plan incorporating your request to install bottom hole gauges at 48 hours before cessation of injection and the Wellbore Diagram.

Monica Kueling with Aztec OCD is available on August 30, 2010 to witness installation of the bottom hole gauges.

A hard copy of this submittal will be mailed to your office.

Thanks, Cindy

Cindy Hurtado
Environmental Coordinator
Western Refining Southwest, Inc. - Bloomfield Refinery
cindy.hurtado@wnr.com
505-632-4161

Confidentiality Notice: This e-mail, including all attachments is for the sole use of the intended recipient (s) and may contain confidential and privileged information. Any unauthorized review, use, disclosure or distribution is prohibited unless specifically provided under the New Mexico Inspection of Public Records Act. If you are not the intended recipient, please contact the sender and destroy all copies of this message. -- This email has been scanned by the Sybari - Antigen Email System.

Submit 3 Copies To Appropriate District Office	State of New Me		Form C-103
District I	Energy, Minerals and Natur	ral Resources	WELL API NO.
1625 N. French Dr., Hobbs, NM 88240 District II	OIL CONGERVATION	DIVIDION	30-045-29002-00
1301 W. Grand Ave., Artesia, NM 88210 District III	OIL CONSERVATION 1220 South St. Fran		5. Indicate Type of Lease
1000 Rio Brazos Rd., Aztec, NM 87410	Santa Fe, NM 87		STATE FEE X  6. State Oil & Gas Lease No.
District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505	Sainta FC, INIVI 67	505	N/A
SUNDRY NOTI	ICES AND REPORTS ON WELLS		7. Lease Name or Unit Agreement Name
	SALS TO DRILL OR TO DEEPEN OR PLU CATION FOR PERMIT" (FORM C-101) FO		Disposal
1. Type of Well: Oil Well	Gas Well  OtherX (Disposal)		8. Well Number #001
2. Name of Operator	Disconfield Ballinami		9. OGRID Number 037218
Western Refining Southwest, Inc  3. Address of Operator	- Bloomied Keinery		10. Pool name or Wildcat
#50 Road 4990 Bloomfield, NM	87413		Blanco/Mesa Verde
4. Well Location			
	feet from the South 1		
Section 27	Township 29 Range		
	11. Elevation (Show whether DR,	KKB, KI, GK, etc.,	
Pit or Below-grade Tank Application 0	r Closure		Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission of the Commission o
Pit typeDepth to Groundw	aterDistance from nearest fresh w	ater well Dist	ance from nearest surface water
Pit Liner Thickness: mil	Below-Grade Tank: Volume	bbls; Co	nistruction Material
12. Check /	Appropriate Box to Indicate N	ature of Notice,	Report or Other Data
		SUB REMEDIAL WOR COMMENCE DRI CASING/CEMEN	ILLING OPNS. P AND A
OTHER: Annual Fall-Off Test		OTHER:	
<u>^</u>			
			d give pertinent dates, including estimated date tach wellbore diagram of proposed completion
injection buildup period will begin of	on August 29, 2010. After 24 hours of	of stable injection t	I injection well referenced above. The he bottom hole pressure memory gauges will well will be shut-in for at least 72 hours.
			e and belief. I further certify that any pit or below- or an (attached) alternative OCD-approved plan
SIGNATURE ( undy // 4	ntado TITLE E	Environmental Coo	rdinator_DATE8/20/2010
Type or print name Clindy Hurtado	E-mail address: cindy hu	rtado@wnr.com	Telephone No. (505)632-4161

APPROVED BY: Can Charage Conditions of Approval (if any):

TITLE Engineen DATE 8/20/20/0

aud deser American



#### **COVER LETTER**

Wednesday, February 10, 2010

Cindy Hurtado Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4161 FAX (505) 632-3911

RE: Injection Well 1st QTR-2010

Dear Cindy Hurtado:

Order No.: 1001206

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 1/15/2010 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites.

Reporting limits are determined by EPA methodology.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Laboratory Manager

NM Lab # NM9425 NM0901 AZ license # AZ0682 ORELAP Lab # NM100001

Texas Lab# T104704424-08-TX



Date: 10-Feb-10

CLIENT:

Western Refining Southwest, Inc.

Project:

Injection Well 1st QTR-2010

Lab Order:

1001206

**CASE NARRATIVE** 

Analytical Comments for METHOD 8260_W, SAMPLE 1001206-01a: necessary dilution due to foamy nature of sample

Date: 10-Feb-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1001206

Injection Well 1st QTR-2010

Project: Lab ID:

1001206-01

Client Sample ID: Injection Well

Collection Date: 1/14/2010 2:00:00 PM

Date Received: 1/15/2010
Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS		· · · · · · · · · · · · · · · · · · ·			Analyst: LJE
Chloride	3500	50	mg/L	500	2/2/2010 5:32:49 AM
Sulfate	330	5.0	mg/L	10	1/29/2010 4:19:27 AM
EPA METHOD 7470: MERCURY					Analyst: SN\
Mercury	0.00039	0.00020	mg/L	1	1/21/2010 4:57:49 PM
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst: SN\
Arsenic	ND	0.040	mg/L	1	1/24/2010 5:28:37 PM
Barium	0.31	0.040	mg/L	1	1/24/2010 5:28:37 PM
Cadmium	ND	0.0040	mg/L	1	1/24/2010 5:28:37 PM
Calcium	140	2.0	mg/L	1	1/24/2010 5:28:37 PM
Chromium	ND	0.012	mg/L	1	1/24/2010 5:28:37 PM
Lead	ND	0.010	mg/L	1	1/24/2010 5:28:37 PM
Magnesium	40	2.0	mg/L	1	1/24/2010 5:28:37 PM
Potassium	45	2.0	mg/L	1	1/24/2010 5:28:37 PM
Selenium	ND	0.10	mg/L	1	1/24/2010 5:28:37 PM
Silver	ND	0.010	mg/L	1	1/24/2010 5:28:37 PM
Sodium	2000	100	mg/L	50	1/24/2010 5:53:47 PM
PA METHOD 8270C: SEMIVOLATILI	=S				Analyst: LBJ
Acenaphthene	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Acenaphthylene	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Aniline	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Anthracene	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Azobenzene	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Benz(a)anthracene	ND	50	µg/L	1	1/19/2010 11:09:40 PM
Benzo(a)pyrene	ND	50	µg/L	1	1/19/2010 11:09:40 PM
Benzo(b)fluoranthene	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Benzo(g,h,i)perylene	ND	50	µg/L	. 1	1/19/2010 11:09:40 PM
Benzo(k)fluoranthene	ND	50	µg/L	1	1/19/2010 11:09:40 PM
Benzoic acid	ND	100	μg/L	1	1/19/2010 11:09:40 PM
Benzyl alcohol	ND	50	µg/L	1	1/19/2010 11:09:40 PM
Bis(2-chloroethoxy)methane	ND	50	µg/L	1	1/19/2010 11:09:40 PM
Bis(2-chloroethyl)ether	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Bis(2-chlorolsopropyl)ether	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Bis(2-ethylhexyl)phthalate	ND	50	µg/L	1	1/19/2010 11:09:40 PM
4-Bromophenyl phenyl ether	, ND	50	µg/L	1	1/19/2010 11:09:40 PM
Butyl benzyl phthalate	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Carbazole	ND	50	μg/L	1	1/19/2010 11:09:40 PM
4-Chloro-3-methylphenol	ND	50	µg/L	1	1/19/2010 11:09:40 PM
4-Chloroaniline	ND	50 ⁻	µg/L	1	1/19/2010 11:09:40 PM
2-Chloronaphthalene	ND	50	μg/L	1	1/19/2010 11:09:40 PM

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 1 of 7

Date: 10-Feb-10

**CLIENT:** 

Western Refining Southwest, Inc.

Lab Order:

1001206

Injection Well 1st QTR-2010

Project: Lab ID:

1001206-01

Client Sample ID: Injection Well

Collection Date: 1/14/2010 2:00:00 PM

Date Received: 1/15/2010 Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATIL	ES				Analyst: LB.
2-Chlorophenol	ND	50	μg/L	1	1/19/2010 11:09:40 PM
4-Chlorophenyl phenyl ether	ND	50	μg/L	. 1	1/19/2010 11:09:40 PM
Chrysene	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Di-n-butyl phthalate	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Di-n-octyl phthalate	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Dibenz(a,h)anthracene	ND	50	μg/L	, 1	1/19/2010 11:09:40 Ph
Dibenzofuran	ND	50	µg/L	1	1/19/2010 11:09:40 PM
1,2-Dichlorobenzene	ND	50	μg/L	1	1/19/2010 11:09:40 PM
1,3-Dichlorobenzene	·ND	50	μg/L	1	1/19/2010 11:09:40 PM
1,4-Dichlorobenzene	ND	50	μg/L	1	1/19/2010 11:09:40 PM
3,3'-Dichloropenzidine	ND	50	µg/L	1	1/19/2010 11:09:40 PM
Diethyl phthalate	ND	50	µg/L	1	1/19/2010 11:09:40 PM
Dimethyl phthalate	ND	50	μg/L	1	1/19/2010 11:09:40 PM
2,4-Dichlorophenol	ND	100	μg/L	1	1/19/2010 11:09:40 PM
2,4-Dimethylphenol	ND	50	μg/L	1 .	1/19/2010 11:09:40 PM
4,6-Dinitro-2-methylphenol	ND	100	μg/L	1	1/19/2010 11:09:40 PM
2,4-Dinitrophenol	ND	100	μg/L	1	1/19/2010 11:09:40 PM
2,4-Dinitrotoluene	ND	50	µg/L	1	1/19/2010 11:09:40 PM
2,6-Dinitrotoluene	ND	50	µg/L	1	1/19/2010 11:09:40 PM
Fluoranthene	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Fluorene	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Hexachlorobenzene	ND	50	μg/L	1	1/19/2010 11:09:40 PN
Hexachlorobutadiene	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Hexachlorocyclopentadiene	ND	50	µg/L	1	1/19/2010 11:09:40 PN
Hexachloroethane	ND	50	μg/L	1	1/19/2010 11:09:40 PN
Indeno(1,2,3-cd)pyrene	ND	50	μg/L	1	1/19/2010 11:09:40 PN
Isophorone	NĐ	50	µg/L	1	1/19/2010 11:09:40 PM
2-Methylnaphthalene	ND	50	μ <b>g/L</b>	1	1/19/2010 11:09:40 PM
2-Methylphenol	ND	50	μ <b>g/L</b>	1	1/19/2010 11:09:40 PN
3+4-Methylphenol	ND	50	µg/L	1	1/19/2010 11:09:40 PM
N-Nitrosodi-n-propylamine	ND	50	μg/L	1	1/19/2010 11:09:40 PN
N-Nitrosodimethylamine	ND	50	μg/L	1	1/19/2010 11:09:40 PM
N-Nitrosodiphenylamine	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Naphthalene	ND	50	μ <b>g/L</b>	1	1/19/2010 11:09:40 PM
2-Nitroaniline	ND	50	μ <b>g/</b> L	1	1/19/2010 11:09:40 PN
3-Nitroaniline	ND	50	μg/L	1	1/19/2010 11:09:40 PN
4-Nitroaniline	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Nitrobenzene	ND	50	μg/L	1	1/19/2010 11:09:40 PN
2-Nitrophenol	ND	50	hã/ŗ	1	1/19/2010 11:09:40 PM
4-Nitrophenol	ND	. 50	μg/L	1	1/19/2010 11:09:40 PN
Pentachlorophenol	ND	100	μg/L	1	1/19/2010 11:09:40 PN
Phenanthrene	52	50	μg/L	1	1/19/2010 11:09:40 PN

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- Analyte detected below quantitation limits
- Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit



Date: 10-Feb-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1001206

Injection Well 1st QTR-2010

Project: Lab ID:

1001206-01

Client Sample ID: Injection Well

Collection Date: 1/14/2010 2:00:00 PM

Date Received: 1/15/2010

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILE	S	<del>• • • • • • • • • • • • • • • • • • • </del>			Analyst: LBJ
Phenol	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Pyrene	ND	50	μg/L	1	1/19/2010 11:09:40 PM
Pyridine	ND	50	μg/L	1	1/19/2010 11:09:40 PM
1,2,4-Trichlorobenzene	ND	50	µg/L	1	1/19/2010 11:09:40 PM
2,4,5-Trichlorophenol	ND	50	μg/L	1	1/19/2010 11:09:40 PM
2,4,6-Trichlorophenol	ND	50	µg/L	1	1/19/2010 11:09:40 PM
Surr: 2,4,6-Tribromophenol	60.6	16.6-150	%REC	1	1/19/2010 11:09:40 PM
Surr: 2-Fluorobiphenyl	41.7	19.6-134	%REC	1	1/19/2010 11:09:40 PM
Surr: 2-Fluorophenol	34.0	9.54-113	%REC	1	1/19/2010 11:09:40 PM
Surr: 4-Terphenyl-d14	50.4	22.7-145	%REC	1	1/19/2010 11:09:40 PM
Surr: Nitrobenzene-d5	48.6	14.6-134	%REC	1	1/19/2010 11:09:40 PM
Surr: Phenol-d5	29.4	10.7-80.3	%REC	1	1/19/2010 11:09:40 PM
EPA METHOD 8260B: VOLATILES					Analyst: DAM
Benzene	ND	5.0	μg/L	10	1/18/2010 4:44:21 PM
Toluene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
Ethylbenzene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
Methyl tert-butyl ether (MTBE)	ND	10	µg/L	10	1/18/2010 4:44:21 PM
1,2,4-Trimethylbenzene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,3,5-Trimethylbenzene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,2-Dichloroethane (EDC)	ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,2-Dibromoethane (EDB)	ND	10	μg/L	. 10	1/18/2010 4:44:21 PM
Naphthalene	ND	20	µg/L	10	1/18/2010 4:44:21 PM
1-Methylnaphthalene	ND	40	μg/L	10	1/18/2010 4:44:21 PM
2-Methylnaphthalene	ND	40	μg/L	10	1/18/2010 4:44:21 PM
Acetone	660	100	μα/L	10	1/18/2010 4:44:21 PM
Bromobenzene	ND	10	µg/L	10	1/18/2010 4:44:21 PM
Bromodichloromethane	ND	10	µg/L	10	1/18/2010 4:44:21 PM
Bromoform	ND.	10	μg/L	10	1/18/2010 4:44:21 PM
Bromomethane	ND	10	μg/L	10	1/18/2010 4:44:21 PM
2-Butanone	ND	100	µg/L	10	1/18/2010 4:44:21 PM
Carbon disulfide	ND	100	μg/L	10	1/18/2010 4:44;21 PM
Carbon Tetrachloride	ND	10	μg/L	10	1/18/2010 4:44:21 PM
Chlorobenzene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
Chloroethane	ND	20	μg/L	10	1/18/2010 4:44:21 PM
Chloroform	ND	10	μg/L	10	1/18/2010 4:44:21 PM
Chloromethane	ND	10	μg/L	10	1/18/2010 4:44:21 PM
2-Chlorotoluene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
4-Chlorotoluene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
cis-1,2-DCE	ND	10	µg/L	10	1/18/2010 4:44:21 PM
cls-1,3-Dichloropropene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,2-Dibromo-3-chloropropane	ND	20	μg/L	10	1/18/2010 4:44:21 PM



- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 3 of 7

Date: 10-Feb-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1001206

Injection Well 1st QTR-2010

Project: Lab ID:

1001206-01

Client Sample ID: Injection Well

Collection Date: 1/14/2010 2:00:00 PM

Date Received: 1/15/2010 Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	}	**************************************			Analyst: DAM
Dibromochloromethane	ND	10	μg/L	10	1/18/2010 4:44:21 PM
Dibromomethane	ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,2-Dichlorobenzene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,3-Dichlorobenzene	ND	10	µg/L	10	1/18/2010 4:44:21 PM
1,4-Dichlorobenzene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
Dichlorodifluoromethane	ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,1-Dichloroethane	· ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,1-Dichloroethene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,2-Dichloropropane	ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,3-Dichloropropane	ND	10	µg/L	10	1/18/2010 4:44:21 PM
2,2-Dichloropropane	ND	20	μg/L	10	1/18/2010 4:44:21 PM
1,1-Dichloropropene	ND	10	µg/L	10	1/18/2010 4:44:21 PM
Hexachlorobutadiene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
2-Hexanone	ND	100	µg/L	10	1/18/2010 4:44:21 PM
Isopropylbenzene	ND	10	µg/L	10	1/18/2010 4:44:21 PM
4-isopropyltoluene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
4-Methyl-2-pentanone	ND	100	μ <b>g/L</b>	10	1/18/2010 4:44:21 PM
Methylene Chloride	ND	30	µg/L	10	1/18/2010 4:44:21 PM
n-Butylbenzene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
n-Propylbenzene	ND	10	µg/L	10	1/18/2010 4:44:21 PM
sec-Butylbenzene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
Styrene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
tert-Butylbenzene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,1,1,2-Tetrachloroethane	ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,1,2,2-Tetrachloroethane	ND	20	µg/L	10	1/18/2010 4:44:21 PM
Tetrachloroethene (PCE)	ND	10	μg/L	10	1/18/2010 4:44:21 PM
trans-1,2-DCE	ND	10	µg/L	10	1/18/2010 4:44:21 PM
trans-1,3-Dichloropropene	ND	10	µg/L	10	1/18/2010 4:44:21 PM
1,2,3-Trichlorobenzene	ND	10	µg/L	10	1/18/2010 4:44:21 PM
1,2,4-Trichlorobenzene	ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,1,1-Trichloroethane	ND	10	μg/L	10	1/18/2010 4:44:21 PM
1,1,2-Trichloroethane	ND	10	µg/L	10	1/18/2010 4:44:21 PM
Frichloroethene (TCE)	ND	10	μg/L	10	1/18/2010 4:44:21 PM
Trichlorofluoromethane	ND	10	µg/L	10	1/18/2010 4:44:21 PM
1,2,3-Trichloropropane	ND	20	µg/L	10	1/18/2010 4:44:21 PM
/inyl chloride	ND	10	µg/L	10	1/18/2010 4:44:21 PM
(ylenes, Total	ND	15	μg/L	10	1/18/2010 4:44:21 PM
Surr: 1,2-Dichloroethane-d4	105	54.6-141	%REC	10	1/18/2010 4:44:21 PM
Surr: 4-Bromofluorobenzene	102	60.1-133	%REC	10	1/18/2010 4:44:21 PM
Surr: Dibromofluoromethane	109	78.5-130	%REC	10	1/18/2010 4:44:21 PM
Surr: Toluene-d8	99.5	79.5-126	%REC	10	1/18/2010 4:44:21 PM

#### Qualiflers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

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Date: 10-Feb-10

**CLIENT:** 

Western Refining Southwest, Inc.

Lab Order:

1001206

1001200

Injection Well 1st QTR-2010

Project: Lab ID:

1001206-01

Client Sample ID: Injection Well

Collection Date: 1/14/2010 2:00:00 PM

Date Received: 1/15/2010

Matrix: AQUEOUS

Analyses	ses Result PC		Qual Units	DF	Date Analyzed	
SM 2320B: ALKALINITY	<del></del>				Analyst: NSB	
Alkalinity, Total (As CaCO3)	710	20	mg/L CaCO3	1	1/18/2010 4:13:00 PM	
Carbonate	ND	2.0	mg/L CaCO3	1	1/18/2010 4:13:00 PM	
Bicarbonate	710	20	mg/L CaCO3	1	1/18/2010 4:13:00 PM	
EPA 120.1: SPECIFIC CONDUCTANCE					Analyst: NSB	
Specific Conductance	8100	0.010	µmhos/cm	1	1/18/2010 4:13:00 PM	
SM4500-H+B: PH					Analyst: NSB	
pH	7.85	0.1	pH units	1	1/18/2010 4:13:00 PM	
SM2540C MOD: TOTAL DISSOLVED SO	LIDS				Analyst: MMS	
Total Dissolved Solids	6190	200	mg/L	1	1/22/2010 8:14:00 AM	



Value exceeds Maximum Contaminant Level

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

MCL Maximum Contaminant Level

RL Reporting Limit

Page 5 of 7

Date: 10-Feb-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1001206

Collection Date:

Client Sample ID: Trip Blank

Project:

Injection Well 1st QTR-2010

Date Received: 1/15/2010

Lab ID:

1001206-02

Matrix: TRIP BLANK

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES		-		****	Analyst: DAM
Benzene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
Toluene	ND	1.0	µg/L	1	1/18/2010 5:40:49 PM
Ethylbenzene	ND	1.0	µg/L	1	1/18/2010 5:40:49 PM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
1,2-Dichloroethane (EDC)	ND	1.0	µg/L	1	1/18/2010 5:40:49 PM
1,2-Dibromoethane (EDB)	ND	1.0	µg/L	1	1/18/2010 5:40:49 PM
Naphthalene	ND	2.0	µg/L	1	1/18/2010 5:40:49 PM
1-Methylnaphthalene	ND	4.0	µg/L	1	1/18/2010 5:40:49 PM
2-Methylnaphthalene	ND	4.0	μg/L	1	1/18/2010 5:40:49 PM
Acetone	ND	10	μg/L	1	1/18/2010 5:40:49 PM
Bromobenzene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
Bromodichloromethane	ND	1.0	µg/L	1	1/18/2010 5:40:49 PM
Bromoform	ND	1.0	µg/L	1	1/18/2010 5:40:49 PM
Bromomethane	ND	1.0	µg/L	1	1/18/2010 5:40:49 PM
2-Butanone	ND	10	µg/L	1	1/18/2010 5:40:49 PM
Carbon disulfide	ND	10	μg/L	1	1/18/2010 5:40:49 PM
Carbon Tetrachloride	ND	1.0	μ <b>g/L</b>	1	1/18/2010 5:40:49 PM
Chlorobenzene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
Chloroethane	ND	2.0	µg/L	1	1/18/2010 5:40:49 PM
Chloroform	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
Chloromethane	· ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
2-Chlorotoluene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
4-Chlorotoluene	ND	1.0	µg/L	1 .	1/18/2010 5:40:49 PM
cis-1,2-DCE	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
cis-1,3-Dichloropropene	NĐ	1.0	µg/L	1	1/18/2010 5:40:49 PM
1,2-Dibromo-3-chloropropane	ND	2.0	µg/L	1	1/18/2010 5:40:49 PM
Dibromochloromethane	ND	1.0	µg/L	1	1/18/2010 5:40:49 PM
Dibromomethane	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
1,2-Dichlorobenzene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
1,3-Dichlorobenzene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
1,4-Dichlorobenzene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
Dichlorodifluoromethane	ND	1.0	µg/L	1	1/18/2010 5:40:49 PM
1,1-Dichloroethane	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
1,1-Dichloroethene	ND	1.0	μg/L	1 '	1/18/2010 5:40:49 PM
1,2-Dichloropropane	ND	1.0	µg/L	1	1/18/2010 5:40:49 PM
1,3-Dichloropropane	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
2,2-Dichloropropane	ND	2.0	µg/L	1	1/18/2010 5:40:49 PM
1,1-Dichloropropene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
Hexachlorobutadiene	ND	1.0	µg/L	1	1/18/2010 5:40:49 PM
2-Hexanone	ND	10	μg/L	1	1/18/2010 5:40:49 PM

Qualiflers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

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Date: 10-Feb-10

**CLIENT:** 

Western Refining Southwest, Inc.

Client Sample ID: Trip Blank

Lab Order:

1001206

**Collection Date:** 

Project:

Injection Well 1st QTR-2010

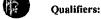
Date Received: 1/15/2010

Lab ID:

1001206-02

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Analyst: DAM
Isopropylbenzene	ND	1.0	µg/L	1	1/18/2010 5:40:49 PM
4-Isopropyltoluene	ND	1.0	µg/L	1	1/18/2010 5:40:49 PM
4-Methyl-2-pentanone	ND	10	μg/L	11	1/18/2010 5:40:49 PM
Methylene Chloride	ND	3.0	μg/L	1	1/18/2010 5:40:49 PM
n-Butylbenzene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
n-Propylbenzene	ND	1.0	μ <b>g/</b> L	1	1/18/2010 5:40:49 PM
sec-Butylbenzene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
Styrene	ND	1.0	µg∕Ļ	1	1/18/2010 5:40:49 PM
tert-Butylbenzene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
1,1,1,2-Tetrachioroethane	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
1,1,2,2-Tetrachloroethane	ND	2.0	µg/L	1	1/18/2010 5:40:49 PM
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
trans-1,2-DCE	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
1,2,3-Trichlorobenzene	ND	1.0	μ <b>g/L</b>	. 1	1/18/2010 5:40:49 PM
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
1,1,1-Trichloroethane	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
1,1,2-Trichloroethane	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
Trichloroethene (TCE)	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
Trichlorofluoromethane	ND	1.0	μg/L	İ	1/18/2010 5:40:49 PM
1,2,3-Trichloropropane	ND	2.0	μg/L	1	1/18/2010 5:40:49 PM
Vinyl chloride	ND	1.0	μg/L	1	1/18/2010 5:40:49 PM
Xylenes, Total	ND	1.5	μg/L	1	1/18/2010 5:40:49 PM
Surr: 1,2-Dichloroethane-d4	96.4	54.6-141	%REC	1	1/18/2010 5:40:49 PM
Surr: 4-Bromofluorobenzene	101	60.1-133	%REC	1	1/18/2010 5:40:49 PM
Surr: Dibromofluoromethane	104	78.5-130	%REC	1	1/18/2010 5:40:49 PM
Surr: Toluene-d8	101	79.5-126	%REC	1	1/18/2010 5:40:49 PM



Value exceeds Maximum Contaminant Level

E Estimated value

Analyte detected below quantitation limits

Not Detected at the Reporting Limit ND

Spike recovery outside accepted recovery-limits

Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

MCL Maximum Contaminant Level

Reporting Limit



#### LABORATORY ANALYTICAL REPORT

Client:

Hall Environmental

Project:

1001206

Lab ID:

C10010578-001

Client Sample ID: Injection Well

Report Date: 01/26/10

Collection Date: 01/14/10 14:00

DateReceived: 01/19/10

Matrix: Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Corrosivity - pH	7.93	8.u.		0.01		SW9045C	01/20/10 08:20 / mkf
Flash Point (ignitability)	> 140	°F		60	140	SW1010A	01/21/10 14:32 / ph
- Flashpoint has been corrected for barometric	pressure.						
REACTIVITY							
Sulfide, Reactive	ND	mg/kg		20.0	500	SW846 Ch 7	01/22/10 11:00 / eli-b1
Cyanide, Reactive	ND	mg/kg		0.050	250	SW846 Ch 7	01/22/10 16:00 / ell-b

Report Definitions: RL - Analyte reporting limit.

QCL - Quality control limit.

MCL - Maximum contaminant level. NO - Not detected at the reporting limit.





#### **QA/QC Summary Report**

Client: Hall Environmental

Report Date: 01/22/10

Project: 1001206

Work Order: C10010578

Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLImit	Qual
						Batch:	100121A-FL	SHPNT-S
Laboratory Con	trol Sample			Run: PM_F	LASHPOINT A	_100121	01/21	/10 14:33
90.8 netric pressure.	°F	60	101	96	104	_		
Method Blank				Run: PM_F	LASHPOINT A	_100121	01/21	/10 14:32
> 140	°F	60						
	Laboratory Con 90.8 etric pressure. Method Blank	Laboratory Control Sample 90.8 °F etric pressure Method Blank	Laboratory Control Sample 90.8 °F 60 etric pressure  Method Blank	Laboratory Control Sample 90.8 °F 60 101 stric pressure. Method Blank	Laboratory Control Sample Run: PM_F 90.8 °F 60 101 96 etric pressure.  Method Blank Run: PM_F	Laboratory Control Sample Run: PM_FLASHPOINT A 90.8 °F 60 101 96 104 etric pressure.  Method Blank Run: PM_FLASHPOINT A	Batch:  Laboratory Control Sample Run: PM_FLASHPOINT A_100121 90.8 °F 60 101 96 104  atric pressure.  Method Blank Run: PM_FLASHPOINT A_100121	Batch: 100121A-FL Laboratory Control Sample Run: PM_FLASHPOINT A_100121 01/21 90.8 °F 60 101 96 104 stric pressure.  Method Blank Run: PM_FLASHPOINT A_100121 01/21

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.





#### **QA/QC Summary Report**

Client: Hall Environmental

Report Date: 01/26/10

Project: 1001206

Work Order: C10010578

Analyte	Result Units	RL %REC Low Limit High Limit RPD RPDLimit Qual
Method: SW846 Ch 7		Batch: B_4402
Sample ID: MB-44026	Method Blank	Run: SUB-B142181 01/22/10 13:4
Cyanide, Reactive	ND mg/kg	0.05
Method: SW846 Ch 7		Batch: B_R14215
Sample ID: MB-R142154	Method Blank	Run: SUB-B142154 01/22/10 11:0
Sulfide, Reactive	ND mg/kg	10
Sample ID: LCS-R142154	Laboratory Control Sample	Run: SUB-B142154 01/22/10 11:0
Sulfide, Reactive	34.0 mg/kg	20 118 50 150

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

# **QA/QC SUMMARY REPORT**

Client: Project: Western Refining Southwest, Inc. Injection Well 1st QTR-2010

Work Order:

1001206

Tiojeet. Mjoetic							· 		Oruer:	1001200
Analyte	Result	Units	PQL	SPK Va SPK r	f %Rec	LowLimit H	ighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300	0.0: Anions									
Sample ID: MB		MBLK			Batch ID	: R37163	Analysis	Date:	1/28/2010	4:08:14 PI
Chloride	ND	mg/L	0.50							
Sulfate	ND	mg/L	0.50							
Sample ID: MB		MBLK	•		Batch ID	R37188	Analysis	Date:	1/29/2010	2:36:32 PM
Chloride	ND	mg/L	0.50						•	
Sulfate	ND	mg/L	0.50							
Sample ID: MB		MBLK			Batch (D	R37206	Analysis	Date:	2/1/2010	5:04:12 PM
Chloride	ND	mg/L	0.50							
Sulfate	ND	mg/L	0.50							
Sample ID: LCS		LCS			Batch ID	R37163	Analysis	Date:	1/28/2010	4:25:38 PN
Chloride	4.866	mg/L	0.50	5 0	97.3	90	110			
Sulfate	9.848	mg/L	0.50	10 0	98.5	90	110			
Sample ID: LCS		LCS			Batch ID	R37188	Analysis	Date:	1/29/2010	2:53:57 PN
Chloride	4.865	mg/L	0.50	5 0	97.3	90	110			
Sulfate	9.687	mg/L	0.50	10 0	96.9	90	110			
Sample ID: LCS		LCS			Batch ID:	R37206	Analysis	Date:	2/1/2010	5:21:36 PN
Chloride	4.804	mg/L	0.50	5 0	96.1	90	110			
Sulfate	9.712	mg/L	0.50	10 0	97.1	90	110		•	
ethod: SM 2320B: Alkali	mitu									
Sample ID: MB	incy	MBLK			Batch ID:	R37000	Analysis	Date:	1/18/2010	3:57:00 PN
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20				-			
Carbonate	ND	mg/L Ca	2.0			•				
Bicarbonate	ND	mg/L Ca	20							
Sample ID: 80PPM LCS		LCS			Batch ID:	R37000	Analysis	Date:	1/18/2010	1:03:00 PM
Alkalinity, Total (As CaCO3)	81.36	mg/L Ca	20	80 0	102	92.5	110			



E Estimated value

R RPD outside accepted recovery limits

S Spike recovery outside accepted recovery limits

J Analyte detected below quantitation limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

## **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st QTR-2010

Work Order:

1001206

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	wLimit Hig	jhLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B	: VOLATILES			1				<del></del>		
Sample ID: 5ml rb		MBLK			Batch ID:	R36998	Analys	is Date:	1/18/2010	9:41:25 AM
Benzene	ND	μg/L	1.0					•		
Toluene	ND	μg/L	1.0	•						
Ethylbenzene	ND	μg/L	1.0							
Methyl tert-butyl ether (MTBE)	ND	µg/L	1.0							
1,2,4-Trimethylbenzene	ND	µg/L	1.0	4	•					
1,3,5-Trimethylbenzene	ND	µg/L	1.0						•	
1,2-Dichloroethane (EDC)	ND	μg/L	1.0							
1,2-Dibromoethane (EDB)	ND	μg/L	1.0							
Naphthalene	ND	µg/L	2.0							
1-Methylnaphthalene	ND	µg/L	4.0							
2-Methylnaphthalene	ND	μg/L	4.0							
Acetone	ND	μg/L	10							
Bromobenzene	ND	µg/L	1.0							
Bromodichloromethane	ND	μg/L	1.0							
Bromoform	ND	μg/L	1.0							
Bromomethane	ND	μg/L	1.0							
2-Butanone	ND	μg/L	10							
Carbon disulfide	ND	µg/L	10						•	
Carbon Tetrachioride	ND	µg/L	1.0						•	
Chlorobenzene	ND	μg/L	1.0		,					,
Chloroethane	ND	μg/L	2.0							
Chloroform	ND	μg/L	1.0							
Chloromethane	ND	μg/L	1.0							
2-Chlorotoluene	ND	µg/L	1.0						•	
4-Chlorotoluene	ND.	μg/L	1.0							
cis-1,2-DCE	ND	μg/L	1.0							
cis-1,3-Dichloropropene	ND	µg/L	1.0							
1,2-Dibromo-3-chloropropane	ND	µg/L	2.0							
Dibromochloromethane	ND	μg/L	1.0							
Dibromomethane	ND	µg/L µg/L	1.0							
1,2-Dichlorobenzene	ND	μg/L	1.0							
1,3-Dichlorobenzene	ND	µg/L	1.0							
1,4-Dichlorobenzene	ND	µg/L	1.0	•						
Dichlorodifluoromethane	ND	μg/L	1.0							
1,1-Dichloroethane	ND	μg/L	1.0							
1,1-Dichloroethene	ND	µg/L	1.0							
1,2-Dichloropropane	ND	μg/L	1.0							
1,3-Dichloropropane	ND	μg/L	1.0							
2,2-Dichloropropane	ND	μg/L	2.0							
,1-Dichloropropene	ND	μg/L	1.0							
lexachlorobutadiene	ND	μg/L	1.0					•		
-Hexanone	ND	μg/L	10							
sopropylbenzene	ND	µg/L	1.0							
-isopropyltoluene	ND	μg/L μg/L	1.0							

#### Qualifiers:

- E Estimated value
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits

- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
  - S Spike recovery outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

lient:

Western Refining Southwest, Inc.

Project: Injection Well 1st QTR-2010

Work Order:

1001206

Analyte	Result	Units	PQL	SPK Va SPK re	f %Rec I	_owLimit H	ighLimit 9	%RPD	RPDLimit	Qual
Method: EPA Method 8260B:	VOLATILES									
Sample ID: 6ml rb		MBLK			Batch ID:	R36998	Analysis	Date:	1/18/2010	9:41:25 AN
4-Methyl-2-pentanone	ND	µg/L	10							
Methylene Chloride	ND	μg/L	3.0							
n-Butylbenzene	ND	μg/L	1.0							
n-Propylbenzene	ND	µg/L	1.0							
sec-Butylbenzene	ND	μg/L	1.0							
Styrene	ND	μg/L	1.0	•						
tert-Butylbenzene	ND	µg/L	1.0							
1,1,1,2-Tetrachloroethane	ND	μg/L	1.0							•
1,1,2,2-Tetrachloroethane	ND	μg/L	2.0						-	
Tetrachloroethene (PCE)	ND	µg/L	1.0							
trans-1,2-DCE	. ND	µg/L	1.0			•				
trans-1,3-Dichloropropene	ND	µg/L	1.0							
1,2,3-Trichlorobenzene	ND	μg/L	1.0					,		
1,2,4-Trichlorobenzene	ND	μg/L	1.0							
1,1,1-Trichloroethane	ND	µg/L	1.0							
1,1,2-Trichloroethane	ND	µg/L	1.0							
Trichloroethene (TCE)	ND	μg/L	1.0							
Frichlorofluoromethane	ND	μg/L	1.0						•	
3-Trichloropropane	ND	μg/L	2.0							
nyi chloride	ND	μg/L	1.0							
(ylenes, Total	ND	µg/L	1.5							
Sample ID: 100ng Ics		LCS			Batch ID:	R36998	Analysis E	Date:	1/18/2010 11	1:06:25 AM
Benzene	19.35	μg/L	1.0	20 0	96.8	76.7	114			
Toluene	20.54	μg/L	1.0	20 0	103	78.4	117			
Chlorobenzene	20.50	μg/L	1.0	20 0	103	80.7	127			
,1-Dichloroethene	20.84	µg/L	1.0	20 0	104	80.2	128			
richloroethene (TCE)	22.69	µg/L	1.0	20 0	113	77.4	115			



E Estimated value

R RPD outside accepted recovery limits

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

J Analyte detected below quantitation limits

H Holding times for preparation or analysis exceeded

## **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st QTR-2010

Work Order:

1001206

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lov	wLimit Hig	hLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270	C: Semivolatile								***************************************	· · · · · · · · · · · · · · · · · · ·
Sample ID: mb-21147		MBLK			Batch ID:	21147	Analys	is Date:	1/19/2010	2:56:45 PM
Acenaphthene	ND	μg/L	10							
Acenaphthylene	ND	μg/L	10							
Aniline	ND	μg/L	10							
Anthracene	ND	µg/L	10							
Azobenzene	ND	µg/L	10							
Benz(a)anthracene	ND	µg/L	10							
Benzo(a)pyrene	ND	μg/L	10							
Benzo(b)fluoranthene	ND	µg/L	10							
Benzo(g,h,i)perylene	ND	µg/L	10							
Benzo(k)fluoranthene	ND	μg/L	10							•
Benzoic acid	ND	µg/L	20							
Benzyl alcohol	ND	μg/L	10							
Bis(2-chloroethoxy)methane	ND	μg/L	10							
Bis(2-chloroethyl)ether	ND	μg/L	10		-					
Bis(2-chloroisopropyl)ether	ND	μg/L	10							
Bis(2-ethylhexyl)phthalate	ND	μg/L	10					•		
4-Bromophenyl phenyl ether	ND	µg/L	10							
Butyl benzyl phthalate	ND	µg/L	10							
Carbazole	ND	µg/L	10							
4-Chloro-3-methylphenol	ND	μg/L	10							
4-Chloroaniline	ND	μg/L	10		•					
2-Chloronaphthalene	ND	µg/L	10							
2-Chlorophenol	ND	μg/L	10							
4-Chlorophenyl phenyl ether	ND	μg/L	10							
Chrysene	ND	h8/F	10							
Di-n-butyl phthalate	ND	μg/L	10							
Di-n-octyl phthalate	ND	μg/L	10							
Dibenz(a,h)anthracene	ND	μg/L	10			•				
Dibenzofuran	ND	μg/L	10							
1,2-Dichlorobenzene	ND	μg/L	10		•					
,3-Dichlorobenzene	ND	µg/L	10							
4-Dichlorobenzene	ND	µg/L	10							
3,3'-Dichlorobenzidine	ND	µg/L	10							
Diethyl phthalate	ND	μg/L	10							
Dimethyl phthalate	ND	μg/L	10							
4,4-Dichlorophenol	. ND	μg/L	20							
,4-Dimethylphenol	ND	µg/L	10							
,6-Dinitro-2-methylphenol	ND	µg/L	20							
4-Dinitrophenol	ND	µg/L	20							
,4-Dinitrotoluene	ND	µg/L	10							
,6-Dinitrotoluene	ND	µg/L	10							
luoranthene	ND	μg/L	10							
luorene	ND	μg/L	10							
exachlorobenzene	ND	h8\r h8\r	10							

#### Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

lient:

Western Refining Southwest, Inc.

Project: Injection Well 1st QTR-2010

Work Order:

1001206

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec I	LowLimit H	ighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C:	Semivolatile	s							-		
Sample ID: mb-21147		MBLK				Batch ID:	21147	Analys	is Date:	1/19/2010	2:56:45 PI
Hexachlorobutadiene	ND	μg/L	10								
Hexachlorocyclopentadiene	ND	μg/L	10								
Hexachloroethane	ND	µg/L	10							•	
Indeno(1,2,3-cd)pyrene	ND	μg/L	10								
sophorone	ND	μg/L	10	-							
2-Methylnaphthalene	ND	µg/L	10								
2-Methylphenol	ND	μ <b>g/L</b>	10								
3+4-Methylphenol	ND	μg/L	10								
N-Nitrosodi-n-propylamine	ND	µg/L	10								
N-Nitrosodimethylamine	ND	µg/L	10								
N-Nitrosodiphenylamine	ND	μg/L	10								
Naphthalene	ND	μg/L	10				•				
2-Nitroaniline	ND	μg/L	10								
3-Nitroaniline	ND	μg/L	10								
1-Nitroaniline	ND	μg/L	10								
Vitrobenzene	ND	μg/L	10								
2-Nitrophenol	ND	μg/L	10								
I-Nitrophenol	ND	μg/L	10								
ntachlorophenol	ND	μg/L	20								
nenanthrene	ND	µg/L	10								
Phenol	ND	μg/L	10					•			
Pyrene	ND	μg/L	10								
Pyridine	ND	μg/L	10	•							
,2,4-Trichlorobenzene	ND	μg/L	10								
4,5-Trichlorophenol	ND	μg/L	10								
4,6-Trichlorophenol	ND	μg/L	10								
sample ID: Ics-21147		LCS				Batch ID:	21147	Analysi	s Date:	1/19/2010 3	3:26:09 PN
Acenaphthene	74.70	μg/L	10	100	0	74.7	33.2	88.1		•	
-Chloro-3-methylphenol	145.8	µg/L	10	200	Ö	72.9	26.5	101			
-Chlorophenol	128.1	µg/L	10	200	Ö	64.1	27.5	88.7			
,4-Dichlorobenzene	62.32	μg/L	10	100	ō	62.3	27.2	74.1			
.4-Dinitrotoluene	80.44	µg/L	10	100	0	80.4	32.6	107			
l-Nitrosodi-n-propylamine	65.36	µg/L	10	100	0	65.4	27.1	96.3			
-Nitrophenol	62.50	μg/L	10	200	0	31.3	6.78	74.7			
Pentachlorophenol	61.14	µg/L	20	200	3.3	28.9	14.8	113			
Phenol	79.58	μg/L	10	200	0	39.8	17	53.4			
vrene	73.90	μg/L	10	100	0	73.9	27	96.3			
,2,4-Trichlorobenzene	69.16	μg/L	10	100	0	69.2	30	77.9			
ample ID: Icsd-21147		LCSD				Batch ID:	21147	Analysis	s Date:	1/20/2010 1	:17:36 PM
	76.94	µg/L	10	100	0	76.9	33.2	88.1	2.95		<b>···</b>
.cenaphthene -Chloro-3-methylphenol					0	76. <del>9</del> 75.5				30.5	
= :	150.9	µg/L	10	200			26.5	101	3.44	28.6	
-Chlorophenol ,4-Dichlorobenzene	118.6	μg/L	10	200	0	59.3	27.5	88.7	7.70	107	
MAI III MINTANDUZANA	63.72	µg/L	10	100	0	63.7	27.2	74.1	2.22	62.1	
Dinitrotoluene	88.76	μg/L	10	100	0	88.8	32.6	107	9.83	14.7	

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

^{&#}x27;S Spike recovery outside accepted recovery limits

# **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project: Injection Well 1st QTR-2010

Work Order:

1001206

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec L	owLimit Hi	ighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270	C: Semivolatiles										
Sample ID: lcsd-21147		LCSD				Batch ID:	21147	Analys	is Date:	1/20/2010	1:17:36 PI
N-Nitrosodi-n-propylamine	64.32	µg/L	10	100	0	64.3	27.1	96.3	1.60	30.3	
4-Nitrophenol	43.70	µg/L	10	200	0	21.9	6.78	74.7	35.4	36.3	
Pentachlorophenol	36.58	µg/L	20	200	3.3	16.6	14.8	113	50.3	49	R
Phenol	76.60	μg/L	10	200	0	38.3	17	53.4	3.82	52.4	
Pyrene	67.32	μg/L	10	100	0	67.3	27	96.3	9.32	16.3	
1,2,4-Trichlorobenzene	73.78	µg/L	10	100	0	73.8	30	77.9	6.46	36.4	
Wethod: EPA Method 7470:	: Mercury										
Sample ID: MBLK-21186	•	MBLK				Batch ID:	21186	Analys	is Date:	. 1/21/2010 4	1:14:01 PN
Mercury	ND	mg/L	0.00020								
Sample ID: LCS1-21186		LCS				Batch ID:	21186	Analysi	is Date:	1/21/2010 4	1:15:44 PI
Mercury	0.004916	mg/L	0.00020	0.005	3E-05	97.6	80	120		.,	
			0.00020		<u> </u>			120			
Wethod: EPA 6010B: Total   Sample ID: MB-21166	Recoverable Met	als MBLK				Batch ID:	21166	Δnelvei	is Date:	1/19/2010 1	·22·12 DI
	ND		0.020			Daton ID.	27100	, maryo	o Dato.	1710/2010	
Arsenic	ND ND	mg/L						•			
Barium Sadarium	ND ND	mg/L	0.020								
Cadmium	ND ND	mg/L	0.0020 1.0								
Calcium Chromium	ND	mg/L mg/L	0.0060								
-ead	ND	mg/L	0.0050								
Magnesium	ND	mg/L	1.0								
Potassium	ND	mg/L	1.0								
Selenium	ND	mg/L	0.050								
Silver	ND	mg/L	0.0050								
Godium	ND	mg/L	1.0								
Sample ID: LCS-21166	NO	LCS	1.0			Batch ID:	21166	Analysi	s Date:	1/19/2010 1	·24·25 PM
Arsenic	0.5020	mg/L	0.020	0.5	0	100	80	120	- u.u.		
arium	0.4952	mg/L	0.020	0.5	0	99.0	80	120			
admium	0.5006	mg/L	0.0020	0.5	0	100	80	120			
Calcium	48.91	mg/L	1.0	50	0	97.8	80	120			
Chromium	0.4962	mg/L	0.0060	0.5	0	99.2	80	120			
ead	0.4919	mg/L	0.0050	0.5	Ö	98.4	80	120			
lagnesium	49.28	mg/L	1.0	50	ō	98.6	80	120			
otassium	51.47	mg/L	1.0	50	0	103	80	120			
elenium	0.4879	mg/L	0.050	0.5	. 0	97.6	80	120			
ilver	0.5098	mg/L	0.0050	0.5	0	102	80	120			
odium	52.39	mg/L	1.0	50	0	105	80	120			
ethod: SM2540C MOD: Tot	tal Dissolved So	lids								*** *** *******************************	
ample ID: MBLK-21196	5.0001100 00	MBLK				Batch ID:	21196	Analysis	Date:	1/22/2010 8:	14:00 AM
otal Dissolved Solids	ND	mg/L	20.0					,			
ample ID: LCS1-21198	HD	LCS	20.0			Batch ID:	21196	Anghreic	Date:	1/22/2010 8:	1.4·00 A&
	4.4			4055	_			Analysis	Date.	1/44/4U IU 0.	14.00 AIV
otal Dissolved Solids	1024	mg/L	20.0	1000	0	102	80	120			

Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

	Sample Receipt Cl	necklist	
Client Name WESTERN REFINING SOUT		Date Received:	1/15/2010
Work Order Number 1001208		Received by: Al	RS
Checklist completed by:	Date	Sample ID labels chec	cked by: Initials
Matrix: Ca	rrier name: <u>UPS</u>		
Shipping container/cooler in good condition?	Yes 🗹	No Not Pres	sent
Custody seals intact on shipping container/cooler?	Yes 🗹	No Not Pres	sent 🗌 Not Shipped 🔲
Custody seals intact on sample bottles?	Yes 🗌	No 🗌 N/A	<b>2</b>
Chain of custody present?	Yes 🗹	No 🗌	
Chain of custody signed when relinquished and received?	Yes 🗹	No 🗔	
Chain of custody agrees with sample labels?	Yes 🗹	No 🗆	,
Samples in proper container/bottle?	Yes 🗹	No 🗀	
Sample containers intact?	Yes 🗹	No 🗌	
Sufficient sample volume for indicated test?	Yes 🗹	No 🗆	
All samples received within holding time?	Yes 🗹	No 🗀	Number of prese
Water - VOA vials have zero headspace? No VO	A vials submitted .	Yes 🗹 No	o ☐ bottles checked for pH: 2 > \2
Water Preservation labels on bottle and cap match?	Yes 🗹	No ☐ N/A	
Water - pH acceptable upon receipt?	Yes 🗹	No □ N/A	<2 >12 unless not below.
Container/Temp Blank temperature?	1.5°	<6° C Acceptable	·
COMMENTS:		If given sufficient time to co	ool.
			:
Cilent contacted Date cont	acted:	Person contact	ted
Contacted by: Regarding	<b>3</b> :		
Comments:			
Outminding.	. , , , , , , , , , , , , , , , , , , ,	•	
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Corrective Action			
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Chain-of-Custody Record	Malling Address: #50 (12 4990)		Phone #:	email or Fax#:	QA/QC Package:	V Standard	Accreditation □ NELAP	☐ EDD (Tvpe)		Date	五十五	7	7	$\downarrow$								T	8	Date: T	



#### **COVER LETTER**

Tuesday, June 01, 2010

Cindy Hurtado Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4161 FAX (505) 632-3911

RE: Injection Well 2nd QTR 4-21-10

Dear Cindy Hurtado:

Order No.: 1004554

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 4/23/2010 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites.

Reporting limits are determined by EPA methodology.

Please do not hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Laboratory Manager

NM Lab # NM9425 NM0901 AZ license # AZ0682 ORELAP Lab # NM100001 Texas Lab# T104704424-08-TX



Date: 01-Jun-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1004554

Injection Well 2nd QTR 4-21-10

Project:

1004554-01

Client Sample ID: Injection Well

Collection Date: 4/22/2010 11:00:00 AM

Date Received: 4/23/2010

Matrix: AQUEOUS

Lab ID: 1004554-01			14.	Idellia, AQUEO	<i>,</i>
Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: MMS
Chloride	1200	10	mg/L	100	5/6/2010 3:11:67 AM
Sulfate	250	10	mg/L	20	4/23/2010 9:02:08 PM
EPA METHOD 7470: MERCURY					Analyst: RAGS
Mercury	ND	0.00020	mg/L	1	5/4/2010 3:47:06 PM
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst: SNV
Arsenic	ND	0.020	mg/L	1	5/3/2010 1:06:08 PM
Barium	0.28	0.020	mg/L	1	5/3/2010 1:06:08 PM
Cadmium	ND	0.0020	mg/L	1	5/3/2010 1:06:08 PM
Calcium	74	1.0	mg/L	. 1	5/3/2010 1:06:08 PM
Chromium	0.0080	0.0060	mg/L	1	5/3/2010 1:06:08 PM
Lead	ND	0.0050	mg/L	1	5/3/2010 1:06:08 PM
Magnesium	21	1.0	mg/L	. 1	5/3/2010 1:06:08 PM
Potassium	14	1.0	mg/L	1	5/3/2010 1:06:08 PM
Selenium	ND	0.050	mg/L	1	5/3/2010 1:06:08 PM
Silver	ND	0.0050	mg/L	1	5/3/2010 1:06:08 PM
Sodium	980	10	mg/L	10	5/3/2010 1:14:50 PM
EPA METHOD 8270C: SEMIVOLATIL	.ES				Analyst: LBJ
Acenaphthene	ND	50	µg/L	1	5/4/2010 3:46:28 PM
Acenaphthylene	ND	50	µg/L	1	5/4/2010 3:46:28 PM
Aniline	ND	50	µg/L	1	5/4/2010 3:46:28 PM
Anthracene	ND	50	µg/L	1	5/4/2010 3:46:28 PM
Azobenzene	ND	50	μg/L	1	5/4/2010 3:46:28 PM
Benz(a)anthracene	ND	50	µg/L	1	5/4/2010 3:46:28 PM
Benzo(a)pyrene	ND	50	µg/L	1	5/4/2010 3:46:28 PM
Benzo(b)fluoranthene	ND	50	μg/L	1	5/4/2010 3:46:28 PM
Benzo(g,h,i)parylene	ND	50	μg/L	1	5/4/2010 3:46:28 PM
Benzo(k)fluoranthene	ND	50	μg/L	· 1	5/4/2010 3:46:28 PM
Benzoic acid	ND	100	μg/L	1	5/4/2010 3:46:28 PM
Benzyl alcohol	ND	50	μg/L	1	5/4/2010 3:46:28 PM
Bis(2-chloroethoxy)methane	ND	50	μg/L	1	5/4/2010 3:48:28 PM
Bis(2-chloroethyl)ether	ND	50	µg/L	. 1	5/4/2010 3:46:28 PM
Bis(2-chlorolsopropyl)ether	ND	50	µg/L	1	5/4/2010 3:46:28 PM
Bis(2-ethylhexyl)phthalate	ND	50	µg/L	1	5/4/2010 3:46:28 PM
4-Bromophenyl phenyl ether	ND	50	µg/L	1	5/4/2010 3:46:28 PM
Butyl benzyl phthalate	ND	50	μg/L	1	5/4/2010 3:46:28 PM
Carbazole	ND	50	μg/L	1	5/4/2010 3:46:28 PM
4-Chloro-3-methylphenol	ND ·	50	μg/L	1	5/4/2010 3:46:28 PM
4-Chloroaniline	ND	50	μg/L	1	5/4/2010 3:46:28 PM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 1 of 7

Date: 01-Jun-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1004554

Project:

Injection Well 2nd QTR 4-21-10

Lab ID:

1004554-01

Client Sample ID: Injection Well

Collection Date: 4/22/2010 11:00:00 AM

Date Received: 4/23/2010

Matrix: AQUEOUS

Analyses	Result	PQL	Qual I	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATIL	ES	****	<del>,</del>			Analyst: LB.
2-Chloronaphthalene	ND	50	μ	ıg/L	1	5/4/2010 3:46:28 PM
2-Chlorophenol	ND	50	. μ	ıg/L	1	5/4/2010 3:46:28 PM
4-Chlorophenyl phenyl ether	ND	50	μ	ig/L	1	5/4/2010 3:46:28 PM
Chrysene	ND	50	μ	ıg/L	1	5/4/2010 3:46:28 PM
Di-n-butyl phthalate	ND	50	μ	ıg/L	1	5/4/2010 3:46:28 PM
Di-n-octyl phthalate	ND	50	μ	ıg/L	1	5/4/2010 3:46:28 PM
Dibenz(a,h)anthracene	ND	50	μ	ıg/L	1	5/4/2010 3:46:28 PM
Dibenzofuran	ND	50	μ	ıg/L	1	5/4/2010 3:46:28 PM
1,2-Dichlorobenzene	ND	50	μ	g/L	1	5/4/2010 3:46:28 PM
1,3-Dichlorobenzene	ND	50		g/L	1	5/4/2010 3:46:28 PM
1,4-Dichlorobenzene	ND	50	μ	g/L	1	5/4/2010 3:46:28 PM
3,3'-Dichlorobenzidine	ND	50	μ	g/L	`1	5/4/2010 3:46:28 PM
Diethyl phthalate	ND	50		g/L	1	5/4/2010 3:46:28 PM
Dimethyl phthalate	ND	50		g/L	1	5/4/2010 3:46:28 PM
2,4-Dichlorophenol	ND	100	μ	g/L	1	5/4/2010 3:46:28 PM
2,4-Dimethylphenol	ND	50	μ	g/L	1	5/4/2010 3:46:28 PM
4,6-Dinitro-2-methylphenol	ND	100		g/L	1	5/4/2010 3:46:28 PM
2,4-Dinitrophenol	ND	100		g/L	1	5/4/2010 3:46:28 PM
2,4-Dinitrotoluene	ND	50	μι	g/L	1	5/4/2010 3:46:28 PM
2,6-Dinitrotoluene	ND	50		g/L	1	5/4/2010 3:46:28 PM
Fluoranthene	ND	50	μ	g/L	1	5/4/2010 3:46:28 PM
Fluorene	ND	50		g/L	1	5/4/2010 3:46:28 PM
Hexachlorobenzene	ND	50	μ	g/L	1	5/4/2010 3:46:28 PM
Hexachlorobutadiene	ND	50	μ	g/L	1	5/4/2010 3:46:28 PM
Hexachlorocyclopentadiene	ND	50		g/L	1	5/4/2010 3:46:28 PM
Hexachloroethane	ND	50	μg	g/L	1	5/4/2010 3:46:28 PM
Indeno(1,2,3-cd)pyrene	ND	50		g/L	1	5/4/2010 3:48:28 PM
Isophorone	ND	50		g/L.	1	5/4/2010 3:46:28 PM
2-Methylnaphthalene	ND	50		9/L	1	5/4/2010 3:46:28 PM
2-Methylphenol	ND	50		g/L	1	5/4/2010 3:46:28 PM
3+4-Methylphenol	ND	50		g/L	1	5/4/2010 3:46:28 PM
N-Nitrosodi-n-propylamine	ND	50	μ	g/L	1	5/4/2010 3:46:28 PM
N-Nitrosodimethylamine	ND	50	μg	g/L	1	5/4/2010 3:46:28 PM
N-Nitrosodiphenylamine	ND	50	μg	J/L	1	5/4/2010 3:46:28 PM
Naphthalene	ND	50	μg	J/L	1	5/4/2010 3:46:28 PM
2-Nitroaniline	ND	50	μg		1 .	5/4/2010 3:46:28 PM
3-Nitroanillne	ND	50	μg	3/L	1	5/4/2010 3:46:28 PM
4-Nitroaniline	ND	50	μg	g/L	1	5/4/2010 3:46:28 PM
Nitrobenzene	ND	50	рg	_I /L	1	5/4/2010 3:46:28 PM
2-Nitrophenol	ND	50	μg		1	5/4/2010 3:46:28 PM
4-Nitrophenol	ND	50	μg		1	5/4/2010 3:46:28 PM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
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- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 2 of 7

Date: 01-Jun-10

**CLIENT:** 

Western Refining Southwest, Inc.

Lab Order:

1004554

Project:

Injection Well 2nd QTR 4-21-10

Lab ID:

1004554-01

Client Sample ID: Injection Well

Collection Date: 4/22/2010 11:00:00 AM

Date Received: 4/23/2010
Matrix: AQUEOUS

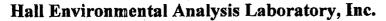
Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILE	S	· · · · · ·			Analyst: LB.
Pentachlorophenol	ND	100	μg/L	1	5/4/2010 3:46:28 PM
Phenanthrene	ND	50	μg/L	1	5/4/2010 3:46:28 PM
Phenol	ND	50	μg/L	1	5/4/2010 3:46:28 PM
Pyrene	ND	50	μg/L	1	5/4/2010 3:46:28 PM
Pyridine	ND	50	μg/L	1	5/4/2010 3:46:28 PM
1,2,4-Trichlorobenzene	ND	50	μg/L	1	5/4/2010 3:46:28 PM
2,4,5-Trichlorophenol	ND	50	μ <b>g/</b> L	1	5/4/2010 3:46:28 PM
2,4,6-Trichlorophenol	ND	50	μg/L	1	5/4/2010 3:46:28 PM
Surr: 2,4,6-Tribromophenol	66.8	16.6-150	%REC	1	5/4/2010 3:46:28 PM
Surr: 2-Fluorobiphenyl	68.6	19.6-134	%REC	1	5/4/2010 3:46:28 PM
Surr: 2-Fluorophenol	51.1	9.54-113	%REC	1 -	5/4/2010 3:46:28 PM
Surr: 4-Terphenyl-d14	62.6	22.7-145	%REC	1	5/4/2010 3:46:28 PM
Surr: Nitrobenzene-d5	66.5	14.6-134	%REC	1	5/4/2010 3:46:28 PM
Surr: Phenol-d5	36.6	10.7-80.3	%REC	1	5/4/2010 3:46:28 PM
EPA METHOD 8260B: VOLATILES					Analyst: HL
Benzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
Toluene	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
Ethylbenzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
1,2-Dichloroethane (EDC)	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
Naphthalene	ND	2.0	μg/L	1	4/28/2010 1:44:39 PM
1-Methylnaphthalene	ND	4.0	μg/L	1	4/28/2010 1:44:39 PM
2-Methylnaphthalene	ND	4.0	μg/L	1	4/28/2010 1:44:39 PM
Acetone	410	100	μg/L	10	4/27/2010 1:13:47 PM
Bromobenzene	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
Bromodichloromethane	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
Bromoform	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
Bromomethane	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
2-Butanone	300	100	μg/L	10	4/27/2010 1:13:47 PM
Carbon disulfide	ND	10	μg/L	1	4/28/2010 1:44:39 PM
Carbon Tetrachloride	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
Chlorobenzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
Chloroethane	ND	2.0	μg/L	1	4/28/2010 1:44:39 PM
Chloroform	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
Chloromethane	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
2-Chlorotoluene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
4-Chlorotoluene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 3 of 7



Date: 01-Jun-10

**CLIENT:** 

Western Refining Southwest, Inc.

Lab Order:

1004554

Project: Inject

Injection Well 2nd QTR 4-21-10

Lab ID:

1004554-01

Client Sample ID: Injection Well

Collection Date: 4/22/2010 11:00:00 AM

**Date Received: 4/23/2010** 

Matrix: AQUEOUS

Analyses	Result	PQL (	Quai Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Analyst: HL
cis-1,2-DCE	·ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
cis-1,3-Dichloropropene	ND	1.0	µg/L	1 -	4/28/2010 1:44:39 PM
1,2-Dibromo-3-chloropropane	ND	2.0	µg/L	1	4/28/2010 1:44:39 PM
Dibromochloromethane	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
Dibromomethane	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
1,2-Dichlorobenzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
1,3-Dichlorobenzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
1,4-Dichlorobenzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
Dichlorodifluoromethane	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
1,1-Dichloroethane	ND	1.0	μ <b>g/L</b>	1	4/28/2010 1:44:39 PM
1,1-Dichloraethene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
1,2-Dichloropropane	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
1,3-Dichloropropane	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
2,2-Dichloropropane	ND	2.0	µg/L	1	4/28/2010 1:44:39 PM
1,1-Dichloropropene	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
Hexachtorobutadiene	ND	1.0	- µg/L	1	4/28/2010 1:44:39 PM
2-Hexanone	ND	10	μg/L	1	4/28/2010 1:44:39 PM
Isopropylbenzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
4-Isopropyltoluene	. ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
4-Methyl-2-pentanone	ND	- 10	μg/L	1	4/28/2010 1:44:39 PM
Methylene Chloride	ND	3.0	μg/L	1	4/28/2010 1:44:39 PM
n-Butylbenzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
n-Propylbenzene	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
sec-Butylbenzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
Styrene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
tert-Butylbenzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
1,1,1,2-Tetrachloroethane	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	4/28/2010 1:44:39 PM
Tetrachloroethene (PCE)	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
trans-1,2-DCE	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
1,1,1-Trichloroethane	ND	1.0	μg/Ľ	1	4/28/2010 1:44:39 PM
1,1,2-Trichloroethane	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
Trichloroethene (TCE)	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
Trichlorofluoromethane	ND	1.0	µg/L	1	4/28/2010 1:44:39 PM
1,2,3-Trichloropropane	ND	2.0	μg/L	1	4/28/2010 1:44:39 PM
Vinyl chloride	ND	1.0	μg/L	1	4/28/2010 1:44:39 PM
Xylenes, Total	ND	1.5	µg/L	1	4/28/2010 1:44:39 PM
Surr: 1,2-Dichloroethane-d4	105	54.6-141	%REC	1	4/28/2010 1:44:39 PM

#### Qualifiers:

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- E Estimated value
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- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
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- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 4 of 7

Date: 01-Jun-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1004554

Project:

Injection Well 2nd QTR 4-21-10

Lab ID:

1004554-01

Client Sample ID: Injection Well

Collection Date: 4/22/2010 11:00:00 AM

Date Received: 4/23/2010

Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES			<del></del>			Analyst: HL
Surr: 4-Bromofluorobenzene	107	60.1-133		%REC	1	4/28/2010 1:44:39 PM
Surr: Dibromofluoromethane	111	78.5-130		%REC	1	4/28/2010 1:44:39 PM
Surr: Toluene-d8	105	79.5-126		%REC	1	4/28/2010 1:44:39 PM
SM 2320B: ALKALINITY						Analyst: NSB
Alkalinity, Total (As CaCO3)	350	20		mg/L CaCO3	1	4/27/2010 12:38:00 AM
Carbonate	ND	2.0		mg/L CaCO3	1	4/27/2010 12:38:00 AM
Bicarbonate	350	20		mg/L CaCO3	1	4/27/2010 12:38:00 AM
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: NSB
Specific Conductance	4100	0.010		µmhos/cm	1	4/27/2010 6:51:00 PM
SM4500-H+B: PH						Analyst: NSB
р <b>Н</b>	7.60	0.1		pH units	1	4/27/2010 12:38:00 AM
SM2540C MOD: TOTAL DISSOLVED SOI	_ID\$					Analyst: <b>KS</b>
Total Dissolved Solids	3060	100		mg/L	1	4/27/2010 3:58:00 PM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 5 of 7

Date: 01-Jun-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1004554

Project:

Injection Well 2nd QTR 4-21-10

Lab ID:

1004554-02

Client Sample ID: Trip Blank

**Collection Date:** 

Date Received: 4/23/2010

Matrix: TRIP BLANK

Analyses	Result	PQL Q	ual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES			······································		Analyst: HL
Benzene	ND	1.0	μg/L	· 1	4/27/2010 6:42:25 PN
Toluene	ND	1.0	μg/L·	1	4/27/2010 6:42:25 PN
Ethylbenzene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PN
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	4/27/2010 6:42:25 PN
1,2,4-Trimethylbenzene	ND `	1.0	μg/L	1	4/27/2010 6:42:25 PN
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	4/27/2010 6:42:25 PN
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
Naphthalene	ND	2.0	μg/L	1	4/27/2010 6:42:25 PM
1-Methylnaphthalene	ND	4.0	μg/L	1	4/27/2010 6:42:25 PM
2-Methylnaphthalene	NĎ	4.0	μg/L	1	4/27/2010 6:42:25 PM
Acetone	ND	10	μg/L	1	4/27/2010 6:42:25 PM
Bromobenzene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PN
Bromodichloromethane	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
Bromoform	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
Bronfomethane	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
2-Butanone	ND	10	μg/L	1	4/27/2010 6:42:25 PM
Carbon disulfide	ND	10	μg/L	1	4/27/2010 6:42:25 PM
Carbon Tetrachloride	ND	1.0	μg/L	. 1	4/27/2010 6:42:25 PN
Chlorobenzene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PN
Chloroethane	ND	2.0	μg/L	1	4/27/2010 6:42:25 PN
Chloroform	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
Chloromethane	ND	1.0	μ <b>g/L</b>	1	4/27/2010 6:42:25 PM
2-Chlorotoluene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
4-Chlorotoluene .	ND	1.0	μ <b>g/L</b>	1	4/27/2010 6:42:25 PM
cis-1,2-DCE	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
cis-1,3-Dichloropropene	ND	1.0	μg/L -	1	4/27/2010 6:42:25 PM
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	4/27/2010 6:42:25 PM
Dibromochloromethane	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
Dibromomethane	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
1,2-Dichlorobenzene	ND	1.0	µg/L	1	4/27/2010 6:42:25 PM
1,3-Dichlorobenzene	ND	1.0	μ <b>g/L</b>	1	4/27/2010 6:42:25 PM
1,4-Dichlorobenzene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
Dichlorodifluoromethane	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
1,1-Dichloroethane	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
1,1-Dichloroethene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
1,2-Dichloropropane	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
1,3-Dichloropropane	ND	1.0	μ <b>g/L</b>	1	4/27/2010 6:42:25 PM
2,2-Dichloropropane	ND	2.0	μg/L	1	4/27/2010 6:42:25 PM
1,1-Dichloropropene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
Hexachlorobutadiene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM

#### Qualiflers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 6 of 7

Date: 01-Jun-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1004554

Project:

Injection Well 2nd QTR 4-21-10

Lab ID:

1004554-02

Client Sample ID: Trip Blank

**Collection Date:** 

Date Received: 4/23/2010

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Analyst: HL
2-Hexanone	ND	10	µg/L	1	4/27/2010 6:42:25 PM
Isopropylbenzene	ND	1.0	μ <b>g/L</b>	1	4/27/2010 6:42:25 PM
4-Isopropyltoluene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
4-Methyl-2-pentanone	ND	10	μg/L	· 1	4/27/2010 6:42:25 PM
Methylene Chloride	ND	3.0	µg/L	1	4/27/2010 6:42:25 PM
n-Butylbenzene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
n-Propylbenzene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
sec-Butylbenzene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
Styrene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
tert-Butylbenzene	ND	1.0	μg/L	1 -	4/27/2010 6:42:25 PM
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
1,1,2,2-Tetrachloroethane	ND	2.0	μ <b>g/</b> L	1	4/27/2010 6:42:25 PM
Tetrachloroethene (PCE)	ND	1.0	μ <b>g/</b> L	1	4/27/2010 6:42:25 PM
trans-1,2-DCE	ND	1.0	μ <b>g/</b> L	1	4/27/2010 6:42:25 PM
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
1,1,1-Trichloroethane	ND	1.0	μg/L	. 1	4/27/2010 6:42:25 PM
1,1,2-Trichloroethane	. ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
Trichloroethene (TCE)	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
Trichlorofluoromethane	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
1,2,3-Trichloropropane	ND	2.0	µg/L	1	4/27/2010 6:42:25 PM
Vinyl chloride	ND	1.0	μg/L	1	4/27/2010 6:42:25 PM
Xylenes, Total	ND	1.5	µg/L	1	4/27/2010 6:42:25 PM
Surr: 1,2-Dichloroethane-d4	102	54.6-141	%REC	1	4/27/2010 6:42:25 PM
Surr: 4-Bromofluorobenzene	105	60.1-133	%REC	1	4/27/2010 6:42:25 PM
Surr: Dibromofluoromethane	111	78.5-130	%REC	· 1	4/27/2010 6:42:25 PM
Surr: Toluene-d8	106	79.5-126	%REC	1	4/27/2010 6:42:25 PM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
  - ND Not Detected at the Reporting Limit
  - S Spike recovery outside accepted recovery limits

Page 7 of 7



YOUR LAB OF CHOICE

12065 Lebanon Rd. 1205 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax 1.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

May 05, 2010

Anne Thorne Hall Environmental Analysis Laborat 4901 Hawkins NE Albuquerque, NM 87109

27, 2010

Date Received Description April 1004554

INJECTION WELL Sample ID

Collected By : Collection Date : 04/22/10 11:00 ESC Sample # : L456130-01

Site ID :

Project # : 1004554

Parameter ·	Result	Det. Limit	Units	Method	Date	Dil.
Corrosivity	Non-Corrosive			9040C	04/29/10	1
Flashpoint	See Footnote		deg F	D93/1010A	05/05/10	1
Reactive CN (SW846 7.3.3.2)	BDL	0.125	mg/l	9012B	04/29/10	1
Reactive Sulf. (SW846 7.3.4.1)	BDL	25.	mg/l	9034/9030B	04/28/10	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.
This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 05/05/10 17:03 Printed: 05/05/10 17:03 L456130-01 (FLASHPOINT) - Did Not Flash @ 170 F



YOUR LAB OF CHOICE

Hall Environmental Analysis Laboratory

Anne Thorne 4901 Hawkins NE

Albuquerque, NM 87109

Quality Assurance Report Level II

May 05, 2010

12065 Lebanon Rd. 12053 AEBARON RG. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

L456130

Analyte	Result	Mibør Unit	eboty Black s & r		mit Ba	tch Date	Analyzed
KGAOFIJÆTSULE JEMBUB USALAKAP	FF   TE   E   Z5   E   E   E   E   E   E   E   E   E	n vonce <b>thu</b> al			ga ya ila ang ang ang ang ang ang ang ang ang an	75496 (04220)	<b>1</b> 5:1
Corrosivity Reactive CN (SW846 7.3.3.2)	5.10 < .125	mg/l			ST#1294 705 P49 475	175800 04/29 175450 04/29	WET HE
Analyte	Units	Result	uplicate Duplicate	RPD	Limit Re	ef Samp	Batch
REACHIVE RELIANCE SHOWS AND AND AND AND AND AND AND AND AND AND	A TALEMAN TO	0.000.000	iado garteran		200857 - 1 ¹² 7   189 <b>2</b>	56120401446	M097544
Corrosivity Reactive CN (SW846 7.3.3.2)	mg/l	0				156130-01 156130-01	WG47580 WG47545
Glashpoint: 37 to # Facility States	BA GAG KAN	0 7 5	0.75	0.07		56575401745	<b>761</b> 7596
Analyte	Units	Known Va	y/gohtrol/sa) 1 R	DAN esult t	Rec Lin	ilt	Batch
BANGELVEYSULTS.COMERC 25 3 (4 JV) 17 And	77 19 <b>6</b> 4 7		(500 <b>0</b> 0.741 <b>0</b> 2.14	0//55777771482	0.75%	43037146	XG47544
Corrosivity Flashpoint	deg F	6.46 82	6.40 85.0	WAXE TO HER	11 14 17 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18		WG475800 WG475960
Analyte	¦%∑tjä Units R	oovatory Con esult Re	rol sample:	oplicate Limit	: RPD	Limit	Batch
ROAVELVESSUITANSWEAF 77.7147.107.655			0.775		(O.W.)		 WG495446
Corrosivity Flashpoint	6	.40 6.4 2.0 85.	WARE THE TAXABLE		-100.8 0 -4 3.59	10	WG475800

Batch number /Run number / Sample number cross reference

WG475446: R1199436: L456130-01 WG475800: R1200800: L455130-01 WG475450: R1201654: L456130-01 WG475968: R1206468: L456130-01

 ^{*} Calculations are performed prior to rounding of reported values .
 Performance of this Analyte is outside of established criteria.
 For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

## **QA/QC SUMMARY REPORT**

lient: Project: Western Refining Southwest, Inc. Injection Well 2nd QTR 4-21-10

Work Order:

1004554

Analyte	Result	Units	PQL	SPK Va S	PK ref	%Rec. L	owLimit Hi	ighLimit %RPD	RPDLimit Qual
fethod: EPA Method 300.0:	Anions								
sample ID: MB		MBLK				Batch ID:	R38365	Analysis Date:	4/23/2010 12:19:50 Pł
Chloride	ND	mg/L	0.50						,
Sulfate	ND .	mg/L	0.50						
Sample ID: MB		MBLK				Batch ID:	R38365	Analysis Date:	4/24/2010 4:17:21 Af
Chloride	ND	mg/L	0.50						
Sulfate	ND	mg/L	0.50					•	
iample ID: MB		MBLK				Batch ID:	R38552	Analysis Date:	5/5/2010 3:04:25 PI
Chloride	ND	mg/L	0.50						
Sulfate	ND	mg/Ł	0.50	•					
iample ID: LCS		LCS				Baich ID:	R38365	Analysis Date:	4/23/2010 12:37:15 PM
Chloride	5.126	mg/L	0.50	5	0	103	90	110	
Gulfate	10.36	mg/L	0.50	. 10	0	104	90	110	
ample ID: LCS		LCS				Batch ID:	R38365	Analysis Date:	4/24/2010 4:34:46 AN
hloride	4.958	mg/L	0.50	5	0	99.2	90	110	
ulfate	9.968	mg/L	0.50	10	0	99.7	90	110	
ample ID: LCS	0.000	LCS	0.90	. •	•	Batch ID:	R38552	Analysis Date:	5/5/2010 3:21:50 PM
Chloride	4.991	mg/L	0.50	5	0	99.8	90	110	
iulfate	10.33	mg/L	0.50	10	0	103	90	110	
lethod: SM 2320B: Alkalinit		my/L						710	······································
ample ID: MB		MBLK				Batch ID:	R38393	Analysis Date:	4/26/2010 2:53:00 PN
Ikalinity, Total (As CaCO3)	ND	mg/L Ca	20						
arbonate	ND	mg/L Ca	2.0	•					
Icarbonate	ND	mg/L Ca	20						·
ample ID: MB-II		MBLK				Batch ID:	R38393	Analysis Date:	4/26/2010 9:33:00 PM
kalinity, Total (As CaCO3)	ND	mg/L Ca	20	÷				•	
arbonate	ND	mg/L Ca	2.0						
icarbonate	ND	mg/L Ca	20						
ample ID: MB		MBLK				Batch ID:	R38419	Analysis Date:	4/27/2010 2:22:00 PM
kalinity, Total (As CaCO3)	ND	mg/L Ca	20						
arbonate	ND	mg/L Ca	2.0						
icarbonate	ND	mg/L Ca	20						
ample ID: 80PPM LCS		LCS				Batch ID:	R38393	Analysis Date:	4/26/2010 2:58:00 PM
kalinity, Total (As CaCO3)	79.36	mg/L Ca	20	80	0	99.2	96.5	104	
ample ID: 80PPM LCS-II	, 0.00	LCS		••	•	Batch ID:	R38393	Analysis Date:	4/26/2010 9:39:00 PM
-	70 0k		20	80	0	100	96.5	104	
kalinity, Total (As CaCO3) ample ID: 80PPM LCS	79.96	mg/L Ca <i>LCS</i>	20	ου	U	Batch ID:	96.5 R38419	Analysis Date:	4/27/2010 2:28:00 PM
ample ID. OUTTIN LCO		LUS	20	80		99.7	96.5	104	7121120 10 2.20.00 FIV

W40.5		
100	V	
4		
_	A 1147	
•	)naliflers:	

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

# **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd QTR 4-21-10

Work Order:

1004554

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	wLimit Hig	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B:	VOLATILES									
Sample ID: 5ml rb		MBLK			Batch ID:	R38406	Analys	is Date:	4/27/2010	9:17:56 AN
Benzene	ND	μg/L	1.0							
Toluene	ND	μg/L	1.0							
Ethylbenzene	ND	µg/L	1.0						•	
Methyl tert-butyl ether (MTBE)	ND	µg/Ļ	1.0							
1,2,4-Trimethylbenzene	ND	μg/L	1.0							
1,3,5-Trimethylbenzene	ND	μg/L	1.0							
1,2-Dichloroethane (EDC)	ND	. µg/L	1.0							
1,2-Dibromoethane (EDB)	ND	µg/L	1.0							
Naphthalene	ND	µg/L	2.0							
1-Methylnaphthalene	ND	μg/L	4.0							
2-Methylnaphthalene	ND	µg/L	4.0							
Acetone	ND	µg/L	10							
Bromobenzene	ND	μg/L	1.0	•						
Bromodichloromethane	ND	μg/L	1.0							
Bromoform	ND	μg/L.	1.0							
Bromomethane	ND	µg/L	1.0							
2-Butanone	ND	µg/L	10							
Carbon disulfide	ND	μg/L	10							
Carbon Tetrachloride	ND	μg/L	1.0							
Chlorobenzene	ND	μg/L	1.0					•		
Chloroethane	ND	μg/L	2.0							
Chloroform	ND	μg/L	1.0							
Chloromethane	ND	μg/L	1.0							
2-Chlorotoluene	ND	µg/L	1.0							
I-Chlorotoluene	ND	µg/L	1.0							
cis-1,2-DCE	ND	μg/L	1.0	•						
sis-1,3-Dichloropropene	ND	μg/L	1.0							
,2-Dibromo-3-chloropropane	ND	µg/L	2.0							
Dibromochloromethane	ND	μ <b>g/L</b>	1.0							
Dibromomethane	ND	µg/L	1.0							
,2-Dichlorobenzene	ND	μg/L	1.0							
,3-Dichlorobenzene	ND	μg/L	1.0							
,4-Dichlorobenzene	ND	µg/L	1.0	•						
Dichlorodifluoromethane	ND	μg/L	1.0							
,1-Dichloroethane	ND	μg/L	1.0							
,1-Dichloroethene	ND	μg/L	1.0							
,2-Dichloropropane	ND	µg/L	1.0							
,3-Dichloropropane	ND	µg/L	1.0							
,2-Dichloropropane	ND	μg/L	2.0							
,1-Dichloropropene	ND	μg/L	1.0							
lexachlorobutadiene	ND	μg/L	1.0							
-Hexanone	ND	μg/L	10							
sopropylbenzene	ŇD	μg/L	1.0							
-Isopropyltoluene	ND	μg/L	1.0							

#### Qualiflers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

Date: 01-Jun-10

## QA/QC SUMMARY REPORT

Project:

Western Refining Southwest, Inc. Injection Well 2nd QTR 4-21-10

Work Order:

1004554

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec L	owLimit, Hi	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B	: VOLATILES									
Sample ID: 5ml rb		MBLK			Batch ID:	R38406	Analys	is Date:	4/27/2010 9	9:17:56 Af
4-Methyl-2-pentanone	ND	μ <b>g/L</b>	10		•					
Methylene Chloride	ND	μg/L	3.0							
n-Butylbenzene	ND	μg/L	1.0							
n-Propylbenzene	ND	μg/L	1.0							
sec-Butylbenzene	ND	μg/L	1.0							
Styrene	ND	µg/L	1.0							
tert-Butylbenzene	ND	h8/L	1.0	X						
1,1,1,2-Tetrachloroethane	ND	μ <b>g/L</b>	1.0							
1,1,2,2-Tetrachloroethane	ND	µg/L	2.0							
Tetrachioroethene (PCE)	ND	µg/L	1.0							
trans-1,2-DCE	ND	µg/L	1.0							
trans-1,3-Dichloropropene	ND	μg/L	1.0							
1,2,3-Trichlorobenzene	ND	μg/L	1.0							
1,2,4-Trichiorobenzene	ND	μg/L	1.0		•					
1,1,1-Trichloroethane	· ND	µg/L	1.0							
1,1,2-Trichtoroethane	ND	μg/L	1.0							
Trichloroethene (TCE)	ND	μg/L	1.0							
Trichlorofluoromethane	ND	μg/L	1.0							
2,3-Trichloropropane	ND	μg/L	2.0							
vinyl chloride	ND	μg/L	1.0							
Xylenes, Total	ND	μg/L	1.5							
Sample ID: b8		MBLK			Batch ID:	R38406	Analysis	s Date:	4/27/2010 11:	:35:09 PM
Benzene	ND	μg/L	1.0							
Toluene	ND	µg/L	1.0							
Ethylbenzene	ND	μg/L	1.0							
Methyl tert-butyl ether (MTBE)	ND	μg/L	1.0							
1,2,4-Trimethylbenzene	ND	µg/L	1.0							
1,3,5-Trimethylbenzene	ND	μg/L	1.0							
i,2-Dichloroethane (EDC)	ND	μg/L	1.0							
,2-Dibromoethane (EDB)	ND	μg/L	1.0							
Naphthalene	ND	μg/L	2.0							
-Methylnaphthalene	ND	μg/L	4.0		•					
-Methylnaphthalene	ND	μg/L	4.0							
Acetone	ND	μg/L	10							
Bromobenzene	ND	µg/L	1.0							
Bromodichloromethane	ND	μg/L	1.0							
Bromoform	ND	μg/L	1.0							
Bromomethane	ND	µg/L	1.0							
-Butanone	ND	µg/L	10							
Carbon disulfide	ND	μg/L	10							
Carbon Tetrachloride	ND	μg/L	1.0							
Chlorobenzene	ND	μg/L	1.0							
chloroethane	ND	μg/L	2.0						*	
hloroform	ND	µg/L	1.0							

Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

Date: 01-Jun-10

# **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project: Injection Well 2nd QTR 4-21-10

Work Order:

1004554

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec L	owLimit Hi	ghLimit	%RPD	RPDLimit Qual	
Method: EPA Method 8260B	: VOLATILES		_				: .		4.00-10-10-1	
Sample ID: b8		MBLK			Batch ID:	R38406	Analysi	s Date:	4/27/2010 1	1:35:09 PN
Chloromethane	ND	µg/L	1.0							
2-Chlorotoluene	ND	μg/L	1.0							
4-Chlorotoluene	ND	µg/L	1.0							
cis-1,2-DCE	ND	μg/L	1.0							
cis-1,3-Dichioropropene	ND	h8/L	1.0							
1,2-Dibromo-3-chloropropane	ND	µg/L	2.0							
Dibromochloromethane	ND	μg/L	1.0							
Dibromomethane	ND	μg/L	1.0							
1,2-Dichlorobenzene	ND	μg/L	1.0							
1,3-Dichlorobenzene	ND	µg/L	1.0							
1,4-Dichlorobenzene	ND	µg/L	1.0							
Dichlorodifluoromethane	ND	µg/L	1.0							-
1,1-Dichloroethane	ND	μg/L	1.0							
1,1-Dichloroethene	ND	μg/L	1.0							
1,2-Dichloropropane	ND	μg/L	1.0							
1,3-Dichloropropane	ND	μg/L	1.0							
2,2-Dichloropropane	ND	µg/L	2.0							
1,1-Dichloropropene	ND	µg/L	1.0							
Hexachlorobutadiene	ND	µg/L	1.0							
2-Hexanone	ND	h8/F	10							
isopropylbenzene	ND	μg/L	1.0							
4-Isopropyltoluene	ND	μg/Ľ	1.0							
4-Methyl-2-pentanone	ND	µg/L	10							
Methylene Chloride	ND	μg/L	3.0							
n-Butylbenzene	ND	μg/L	1.0							
n-Propylbenzene	ND	μg/L	1.0							
sec-Butylbenzene	ND	μg/L	1.0				•			
Styrene	ND	μg/L	1.0							
ert-Butylbenzene	ND	μg/L	1.0							
1,1,1,2-Tetrachloroethane	ND	μg/L	1.0							
1,1,2,2-Tetrachloroethane	ND	µg/L	2.0							
Tetrachloroethene (PCE)	ND	µg/L	1.0							
rans-1,2-DCE	ND	µg/L	1.0							
rans-1,3-Dichloropropene	ND	µg/L	1.0							
1,2,3-Trichlorobenzene	ND	µg/L	1.0							
1,2,4-Trichlorobenzene	ND	µg/L	1.0							
1,1,1-Trichloroethane	ND	µg/L	1.0							
,1,2-Trichloroethane	ND	μg/L	1.0							
richloroethene (TCE)	ND	µg/L	1.0							
richlorofluoromethane	ND	µg/L	1.0							
,2,3-Trichloropropane	ND	μg/L	2.0							
/inyl chloride	ND	μg/L	1.0							
(ylenes, Total	ND	µg/L	1.5							
iample ID: 6ml rb		MBLK		ŧ	Batch (D:	R38447	Analysis	Date:	4/28/2010 9:	44:36 AM

Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

nt:

Western Refining Southwest, Inc.

oject: Injection Well 2nd QTR 4-21-10

Work Order:

1004554

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec L	owLimit Hig	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 82608:	VOLATILES									
Sample ID: 5ml rb	,	MBLK			Batch ID:	R38447	Analys	s Date:	4/28/2010	9:44:36 AN
Benzene	ND	μg/L	1.0							
Toluene	ND	μg/L	1.0							
Ethylbenzene	ND	µg/L	1.0							
Methyl tert-butyl ether (MTBE)	ND	µg/L	1.0							
1,2,4-Trimethylbenzene	ďИ	µg/L	1.0							
1,3,5-Trimethylbenzene	ND	µg/L	1.0		•		•			
1,2-Dichloroethane (EDC)	ND	μg/L	1.0							
1,2-Dibromoethane (EDB)	ND	μg/L	1.0							
Naphthalene	ND	µg/L	2.0							
1-Methylnaphthalene	ND	μg/L	4.0							
2-Methylnaphthalene	ND	µg/L	4.0							
Acetone	ND	μg/L	10							
Bromobenzene	ND	μg/L	1.0						•	
Bromodichloromethane	ND	μg/L	1.0							
Bromoform	ND	μg/L	1.0							
Bromomethane	ND	μg/L	1.0							
2-Butanone	ND	µg/L	10							
Carbon disulfide	ND	µg/L	10							
pon Tetrachloride	ND	µg/L	1.0						•	
Sworobenzene	ND	µg/L	1.0							
Chloroethane	ND	μg/L	2.0							
Chloroform	ND	μg/L	1.0							
Chloromethane	ND	µg/L	1.0							
2-Chlorotoluene	ND	μg/L	1.0							
4-Chlorotoluene	ND	μg/L	1.0							
cis-1,2-DCE	ND	μg/L	1.0							
cis-1,3-Dichloropropene	ND	µg/L	1.0							
1,2-Dibromo-3-chloropropane	ND	µg/L	2.0							
Dibromochloromethane	ND	μg/L	1.0							
Dibromomethane	ND	µg/L	1.0							
2-Dichlorobenzene	ND	µg/L	1.0							
,3-Dichlorobenzene	ND	μg/L	1.0							
,4-Dichlorobenzene	ND	µg/L	1.0	•						
Dichlorodifluoromethane	ND	μ <b>g/L</b>	1.0			•				
,1-Dichloroethane	ND	μg/L	1.0							
,1-Dichloroethene	ND	μg/L	1.0							
,2-Dichloropropane	ND	μg/L	1.0							
,3-Dichloropropane	ND	μg/L	1.0							
2,2-Dichloropropane	ND	µg/L	2.0							
,1-Dichloropropene	ND	µg/L	1.0							
lexachtorobutadiene	ND	µg/L	1.0							
-Hexanone	ND	μg/L	10							
sopropylbenzene	ND	µg/L	1.0							
-isopropyltoluene	ND	μg/L	1.0							
		-								

Conclitions

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

# **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project: Injection Well 2nd QTR 4-21-10

Work Order:

1004554

Analyte	Result	Units	PQL	SPK Va S	SPK ref	%Rec I	_owLlmit H	ighLimit %RP	D RPDLimit Qual
Method: EPA Method 8260	B: VOLATILES								
Sample ID: 5ml rb		MBLK				Batch ID:	R38447	Analysis Date:	4/28/2010 9:44:36 A
4-Methyl-2-pentanone	ND	µg/L	10						
Methylene Chloride	. ND	μg/L	3.0					•	
n-Butylbenzene	ND	µg/L	1.0						
n-Propylbenzene	ND	μg/L	1.0						
sec-Butylbenzene	ND	μg/L	1.0						
Styrene	ND	μ <b>g/L</b>	1.0						
tert-Butylbenzene	ND	µg/L	1.0						
1,1,1,2-Tetrachloroethane	ND	μ <b>g/L</b>	1.0						
1,1,2,2-Tetrachloroethane	ND	µg/L	2.0						
Tetrachloroethene (PCE)	ND	µg/L	1.0						
trans-1,2-DCE	ND	µg/L	1.0						
trans-1,3-Dichloropropene	ND.	µg/Ł	1.0						
1,2,3-Trichlorobenzene	ND	µg/L	1.0			•			
1,2,4-Trichlorobenzene	ND	μg/L	1.0						
1,1,1-Trichloroethane	ND	µg/L	1.0						
1,1,2-Trichloroethane	ND	μg/L	1.0						
Trichloroethene (TCE)	ND	μg/L	1.0						
Trichlorofluoromethane	ND	μg/L	1.0						
1,2,3-Trichloropropane	ND	µg/L	2.0						
√inyl chloride	ND	µg/L	1.0						
Kylenes, Total	ND	µg/L	1.5					•	
Sample ID: 100ng Ics		LCS				Batch ID:	R38406	Analysis Date:	4/27/2010 10:46:41 Al
Benzene	17.75	μg/L	1.0	20	0	88.7	82.4	116	
Toluene	20.13	μg/L	1.0	20	0	101	89.5	123	
Chlorobenzene	21.03	μg/L	1.0	20	0	105	87.8	120	
,1-Dichloroethene	19.05	μg/L	1.0	20	. 0	95.2	90.3	138	
richloroethene (TCE)	18.02	μg/L	1.0	20	0	90.1	64	129	
Sample ID: 100ng lcs_b		LCS				Batch ID:	R38406	Analysis Date:	4/27/2010 11:05:56 PI
Benzene	18.01	μg/L	1.0	20	0	90.0	82.4	116	
oluene	19.75	μg/L	1.0	20	0	98.8	89.5	123	
Chlorobenzene	20.97	µg/L	1.0	20	0	105	87.8	120	
,1-Dichloroethene	19.12	μ <b>g/L</b>	1.0	20	0	95.6	90.3	138	
richloroethene (TCE)	17.50	µg/L	1.0	20	0	87.5	64	129	
Sample ID: 100ng ics		LCS				Batch ID:	R38447	Analysis Date:	4/28/2010 11:18:25 AM
Benzene	17.81	μ <b>g/L</b>	1.0	20	0	89.0	82.4	116	
oluene	20.00	µg/L	1.0	20	0	100	89.5	123	
Chlorobenzene	20.90	μg/L	1.0	20	0	104	87.8	120	
,1-Dichloroethene	18.98	µg/L	1.0	20	0	94.9	90.3	138	
richloroethene (TCE)	18.13	µg/L	1.0	20	0	90.7	64	129	

Oug	lif	ere

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

Date: 01-Jun-10

## **QA/QC SUMMARY REPORT**

roject:

Western Refining Southwest, Inc. Injection Well 2nd QTR 4-21-10

Work Order:

1004554

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	wLimit Hig	hLimit	%RPD	RPDLimit	Qual
Method: EPA Method 82700	C: Semivolatites				-					
Sample ID: mb-22099		MBLK			Batch ID:	22099	Analys	is Date:	5/4/2010 1	1:39:59 A
Acenaphthene	ND	μg/L	10							
Acenaphthylene	ND	μg/L	10							
Aniline	ND	μg/L	10				,			
Anthracene	ND	µg/L	10							
Azobenzene	ND	μg/L	10							
Benz(a)anthracene	ND	µg/L	10							
Benzo(a)pyrene	ND	µg/L	10		•					
Benzo(b)fluoranthene	ND	µg/L	10							
Benzo(g,h,i)perylene	ND	µg/L	10						•	
Benzo(k)fluoranthene	ND	µg/L	10							
Benzoic acid	ND	μg/L	20							
Benzyl alcohol	ND	μg/L	10					•		
Bis(2-chloroethoxy)methane	ND	µg/L	10							
Bis(2-chloroethyl)ether	ND	μg/L	10							
Bis(2-chlorolsopropyl)ether	ND	µg/L	10							
3is(2-ethylhexyl)phthalate	ND	µg/L	10							
4-Bromophenyl phenyl ether	ND	µg/L	10							
Butyl benzyl phthalate	ND	µg/L	10							
rbazole	ND	μg/L	10							
hloro-3-methylphenol	ND	µg/L	10							
1-Chloroanlline	ND	µg/L	10							
2-Chloronaphthalene	ND	μg/L	10							
2-Chlorophenol	ND	μg/L	10							
I-Chlorophenyl phenyl ether	ND	μg/L	10							
Chrysene	ND	μ <b>g/</b> L	10						•	
Di-n-butyl phthalate	ND	µg/L	10							
Di-n-octyl phthalate	ND	µg/L	10							
Dibenz(a,h)anthracene	ND	µg/L	10							
Dibenzofuran	ND	µg/L	10							
,2-Dichlorobenzene	ND	µg/L	10							
,3-Dichlorobenzene	ND	µg/L	10							
,4-Dichlorobenzene	ND	µg/L	10							
3'-Dichlorobenzidine	ND	μ <b>g/L</b>	10							
Diethyl phthalate	ND	µg/L	10							
Dimethyl phthalate	ND	µg/L	10							
,4-Dichlorophenol	ND	µg/L	20							
,4-Dimethylphenol	ND	µg/L	10							
,6-Dinitro-2-methylphenol	ND	µg/L	20							
,4-Dinitrophenol	ND	h8/L	20							
4-Dinitrotoluene	ND	µg/L	10							
,6-Dinitrotoluene	ND	µg/L	10							
luoranthene	ND	µg/L	10							
luorene	ND	µg/L	10							
exachlorobenzene	ND	µg/L	10							

ND Not Detected at the Reporting Limit

Analyte detected below quantitation limits

Н Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd QTR 4-21-10

Work Order:

1004554

Analyte	Result	Únits	PQL	SPK Va	SPK ref	%Rec	LowLimit H	lighLlmit	%RPD	RPDLimit	Qual
Method: EPA Method 82700	: Semivolatile								_		
Sample ID: mb-22099		MBLK				Batch ID:	22099	Analys	sis Date:	5/4/2010 1	1:39:59 AM
Hexachlorobutadiene	ND	µg/L	10								
Hexachlorocyclopentadiene	ND	μg/L	10								
Hexachloroethane	ND	μg/L	10								
Indeno(1,2,3-cd)pyrene	ND	µg/L	10								
Isophorone	ND	μg/L	10						_		
2-Methylnaphthalene	ND	μg/L	10					-			
2-Methylphenol	ND	μg/L	10								
3+4-Methylphenol	ND	μg/L	10								
N-Nitrosodi-n-propylamine	ND	µg/L	10								•
N-Nitrosodimethylamine	ND	μg/L	10							•	
N-Nitrosodiphenylamine	ND	µg/L	10								
Naphthalene	ND	µg/L	10								
2-Nitroaniline	ND	µg/L	10								
3-Nitroaniline	ND	μg/L	10							•	
1-Nitroanillne	ND	µg/L	10								
Nitrobenzene	ND	µg/L	10								
2-Nitrophenol	ND	µg/L	10	•							
I-Nitrophenol	ND	µg/L	10								
Pentachlorophenol	ND	µg/L	20								
Phenanthrene	ND	μg/L	10								
Phenol	ND	µg/L	10								
Pyrene	ND	µg/L	10								•
Pyridine	ND	μg/L	10								
,2,4-Trichlorobenzene	ND	µg/L	10								
2,4,5-Trichlorophenol	ND	μg/L	10								
2,4,6-Trichlorophenol	ND	μg/L	10								
Sample ID: Ics-22099		LCS				Batch ID:	22099	Analys	s Date:	5/4/2010 2	:45:06 PM
cenaphthene	50.98	μg/L	10	100	0	51.0	33.2	88.1			
-Chloro-3-methylphenol	80.56	μg/L	10	200	0	40.3	26.5	101			
-Chlorophenol	80.68	μ <b>g/L</b>	10	200	0	40.3	27.5	88.7			
,4-Dichlorobenzene	37.40	μg/L	10	100	0	37.4	27.2	74.1			
,4-Dinitrotoluene	42.14	μg/L	10	100	0	42.1	32.6	107			,
l-Nitrosodi-n-propylamine	42.06	μg/L	10	100	0	42.1	27.1	96.3			
-Nitrophenol	50.10	μg/L	10	200	0	25.1	6.78	74.7			
entachiorophenoi	69.66	μg/L	20	200	3.92	32.9	14.8	113			
henol	53.62	µg/L	10	200	0	26.8	17	53.4			
yrene	40.80	µg/L	10	100	0	40.8	27	96.3			
,2,4-Trichlorobenzene	44.66	µg/L	10	100	0	44.7	30	77.9			
ample ID: lcsd-22099		LCSD				Batch ID:	22099	Analysi	s Date:	5/4/2010 3	:15:46 PM
cenaphthene	42.82	μ <b>g/</b> L	10	100	0	42.8	33.2	88.1	17.4	30.5	
-Chloro-3-methylphenol	85.98	μg/L	10	200	0	43.0	26.5	101	6.51	28.6	
-Chlorophenol	85.80	μg/L	10	200	0	42.9	27.5	88.7	6.18	107	
4-Dichlorobenzene	35.58	hã\jr ha	10	100	0	35.6	27.2	74.1	4.99	62.1	
4-Dinitrotoluene	43.06	µg/L	10	100	ō	43.1	32.6	107	2.16	14.7	

Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

Date: 01-Jun-10

## **QA/QC SUMMARY REPORT**

Project:

Western Refining Southwest, Inc.

Injection Well 2nd QTR 4-21-10

Work Order:

1004554

Analyte	Result Units PQL SPK Va SPK ref				%Rec L	owLimit Hi	RPDLimit	Qual			
Method: EPA Method 82700	: Semivolatiles										
Sample ID: lcsd-22099		LCSD				Batch ID:	22099	<ul> <li>Analysi</li> </ul>	is Date:	5/4/2010	3:15:46 PN
N-Nitrosodi-n-propylamine	44.76	µg/L	10	100	0	44.8	27.1	96.3	6.22	30.3	
4-Nitrophenol	75.52	μg/L	10	200	0	37.8	6.78	74.7	40.5	36.3	R
Pentachlorophenol	97.78	µg/L	20	200	3.92	46.9	14.8	113	33.6	49	
Phenol	74.60	µg/L	10	200	0	37.3	17	53.4	32.7	52.4	
Pyrene	34.80	μg/L	10	100	0	34.8	27	96.3	15.9	16.3	
1,2,4-Trichlorobenzene	37,92	µg/L	10	100	0	37.9	30	77.9	16.3	36.4	
Method: EPA Method 7470:	Mercury						•				
Sample ID: MB-22150		MBLK			•	Batch ID:	22150	Analysi	s Date:	5/4/2010 3	:28:56 PM
Mercury	ND	mg/L	0.00020							•	
Sample ID: LCS-22150		LCS			•	Batch ID:	22150	Analysi	s Date:	5/4/2010 3	:30:44 PM
Mercury	0.005465	mg/L	0.00020	0.005	0	109	80	120			
Sample ID: LCS-22150		LCS				Batch ID:	22150	Analysi	s Date:	5/4/2010 3	:32:33 PM
Mercury	0.005593	mg/L	0.00020	0.005	0	112	80	120	2.32	0	



E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project: Injection Well 2nd QTR 4-21-10

Work Order:

1004554

Analyte	Result	Units	PQL	SPK V	a SPK ref	%Rec L	owLimit Hi	ghLimit %RI	PD RPDLimit Qual
Method: EPA 6010B: Total Sample ID: MB-22113	Recoverable M	etals MBLK				Batch ID:	22113	Analysis Date	ə: 5/3/2010 12:15:43 P
Arsenic	ND	mg/L	0.020			Date: 10,	11.10	. maryon ban	, popular (2.10.701)
Aiseriic Barlum	ND	-	0.020						
Cadmium	ND	mg/L	0.020						
Calcium	ND	mg/L	1.0					•	
Chromium	ND	mg/L	0.0060						
Lead	ND	mg/L	0.0050		•				
Magnesium	ND	mg/L mg/L	1.0		-				
Potassium	ND		1.0						
Selenium	ND	mg/L mg/L	0.050						
Silver	ND	mg/L	0.0050						
Sodium	ND	mg/L	1.0						
Sample ID: LCS-22113	ND	LCS	1.0			Batch ID:	22113	Analysis Date	e: 5/3/2010 12:18:52 Pi
Arsenic	0.5271	mg/L	0.020	0.5	0	105	80	120	
Barium	0.4954	mg/L	0.020	0.5	0	99.1.	80	120	
Cadmium	0.5053	mg/L	0.0020	0.5	0	101	80	120	
Calcium	51.98	mg/L	1.0	50	0	104	80	120	
Chromium	0.5065	mg/L	0.0060	0.5	0	101	80	120	
_ead	0.5081	mg/L	0.0050	0.5	0	102	80	120	
Magnesium	52.28	mg/L	1.0	50	0	105	80	120	
Potassium	54.39	mg/L	1.0	50	0	109	80	120	
Selenium	0.5137	mg/L	0.050	0.5	0	103	80	120	
Silver	0.5112	mg/L	0.0050		0.0011	102	80	120	
Sodium	54.84	mg/L	1.0	50	0.0011	110	80	120	
Sample ID: LCS-22113	<b>V</b> 1.51	LCS	1.0		•	Batch ID:	22113	Analysis Date	: 5/3/2010 12:21:69 PM
Arsenic	0.5309	mg/L	0.020	0.5	0	106	80	120	
Barium	0.4971	mg/L	0.020	0.5	0	99.4	80	120	
Cadmium	0.5058	mg/L	0.0020	0.5	0	101	80	120	
Calcium	52.25	mg/L	1.0	50	0	104	80	120	
Chromium	0.5088	mg/L	0.0060	0.5	0	102	80	120	·
ead .	0.5095	mg/L	0.0050	0.5	0	102	80	120	
Magnesium	52.41	mg/L	1.0	50	0	105	80	120	
Potassium	54.58	mg/L	1.0	50	0	109	80	120	
Selenium	0.5225	mg/L	0.050	0.5	0	105	80	120	
Silver	0.5118	mg/L	0.0050		0.0011	102	80	120	
Sodium	54.90	mg/L	1.0	50	0	110	80	120	
	-,,								
Method: SM2540C MOD: To	tal Dissolved S					Datah ID-	22007	Analysis Mate	. A19719040 9.50.00 DA
Sample ID: MB-22067		MBĽK				Batch ID:	22067	Analysis Date:	; 4/27/2010 3:58:00 PN
otal Dissolved Solids	ND	mg/L	20.0						
sample ID: LCS-22067		LCS				Batch ID:	22067	Analysis Date:	4/27/2010 3:58:00 PN
otal Dissolved Solids	1032	mg/L	20.0	1000	0	103	80	120	

Qual	fiers

E Estimated value

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

J Analyte detected below quantitation limits

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

	Sample	Receipt C	hecklist		
Client Name WESTERN REFINING\SOUT			Date Receive	ad:	4/23/2010
Work Order Number 1004554		}	Received by	y: ARS	$\hat{\mathcal{L}}$
	X)	1) 00	Sample ID	abels checked by:	05
Checklist completed by:	44	Date	tho		Initials
	<u> </u>				
Matrix:	Carrier name:	<u>UPS</u>			
Shipping container/cooler in good condition?		Yes 🗹	No 🗀	Not Present	
Custody seals Intact on shipping container/coo	oler?	Yes 🗹	No 🗌	Not Present	Not Shipped
Custody seals intact on sample bottles?		Yes 🗌	No 🗌	N/A ☑	
Chain of custody present?		Yes 🗹	No 🗌		
Chain of custody signed when relinquished and	d received?	Yes 🗹	No 🗌		
Chain of custody agrees with sample labels?		Yes 🗹	No 🗆		
Samples in proper container/bottle?		Yes 🗹	No 🗆		
Sample containers intact?	٠	Yes 🗹	No 🗆		
Sufficient sample volume for indicated test?		Yes 🗹	No 🗆		
All samples received within holding time?	•	Yes 🗹	No 🗔	•	Number of preserved
Vater - VOA vials have zero headspace?	No VOA vials subn	nitted	Yes 🗹	No 🗌	bottles checked for pH:
Water - Preservation labels on bottle and cap n	natch?	Yes 🗹	No 🗌	N/A	22
Water - pH acceptable upon receipt?		Yes 🗹	No 🗔	N/A	<2>>12 unless noted
Container/Temp Blank temperature?		4.9°	<6° C Acceptab		
COMMENTS:			If given sufficien	t time to cool.	
Client contacted	Date contacted:		Pers	on contacted	
Contacted by:	Regarding:				
Comments:					
				_	
Corrective Action					
				, , , , , , , , , , , , , , , , , , , ,	

	HALL ENVIRONMENTAL	www.nallenvironmental.com  4901 Hawkins NE - Albuquerque, NM 87109	Tel. 505-345-3975 Fax 505-345-4107	Analysis	<b>~</b> (9) (3)	selices	1004 1004 1004 1004	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	115 A A A A A A A A A A A A A A A A A A	NON YNC YNC YNC YNC YNC YNC YNC YNC YNC YN	MTE  Moth  Moth  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  Work  W	BTEX +  BTEX +  BTEX +  BTEX +  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS2 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 Pe  BOS1 PE	7 × × × × × × × × × × × × × × × × × × ×	×	×	×	X	<b>X</b>	<b>X</b>	×				Kemarks:	is as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical r
Tum-Around Time:	Standard   Rush	Injection Well "-21-10	Project #:		Project Manager:		,	Sampler CAR KMK	Onlice with the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and the particular and t	Sample dimension of the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second		Container Preservative Type and # Type	3-10A HC 1	1- liter Amber 1	1-500ml	1-50ml	1- (25mg H2504)	1-500ml HNO3		1-500ml Zive Acetate		C		Received by: Time	redited laboratories. This
Chain-of-Custody Record		Mailing Address: # 50 CR 4990		Phone #: 565-639-4/6/	email or Fax#: 525-632-37/	QA/QC Package:	X Standard	On	☐ Other	□ EDD (Type)		Date Time Matrix Sample Request ID	422-10 11AM Had INJECTION Well								Chip Blank 00		Date: Time: Reflectisched hr.	2	If necessary



#### **COVER LETTER**

Monday, August 09, 2010

Cindy Hurtado Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4161 FAX (505) 632-3911

RE: Injection Well 3rd QTR 7/21/10

Dear Cindy Hurtado:

Order No.: 1007798

Hall Environmental Analysis Laboratory, Inc. received 1 sample(s) on 7/22/2010 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites.

Reporting limits are determined by EPA methodology.

Please do not hesitate to contact HEAL for any additional information or clarifications.

Sincerely.

Andy Freeman, Laboratory Manager

NM Lab # NM9425 NM0901 AZ license # AZ0682

ORELAP Lab # NM100001

Texas Lab# T104704424-08-TX



Date: 09-Aug-10

**CLIENT:** 

Western Refining Southwest, Inc.

Lab Order:

1007798

Project:

Injection Well 3rd QTR 7/21/10

Lab ID:

1007798-01

Client Sample ID: Injection Well

Collection Date: 7/21/2010 8:30:00 AM

Date Received: 7/22/2010

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: LJB
Chloride	220	5.0	mg/L	50	7/22/2010 10:01:53 PM
Sulfate	130	5.0	mg/L	10	7/22/2010 9:44:28 PM
EPA METHOD 7470: MERCURY					Analyst: SNV
Mercury	0.00095	0.00020	mg/L	1	7/26/2010 5:37:37 PM
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst: RAGS
Arsenic	ND	0.020	mg/L	1	7/29/2010 4:43:29 PM
Barium	0.24	0.020	mg/L	1	7/29/2010 4:43:29 PM
Cadmium	ND	0.0020	mg/L	1	7/29/2010 4:43:29 PM
Calcium	76	1.0	mg/L	1	7/29/2010 4:43:29 PM
Chromlum	0.012	0.0060	mg/L	1	7/29/2010 4:43:29 PM
Lead	0.0052	0.0050	mg/L	1	7/29/2010 4:43:29 PM
Magnesium	16	1.0	mg/L	1	7/29/2010 4:43:29 PM
Potassium	5.3	1.0	mg/L	1	7/29/2010 4:43:29 PM
Selenium	NĐ	0.050	mg/L	1	7/29/2010 4:43:29 PM
Silver	ND	0.0050	mg/L	1	7/29/2010 4:43:29 PM
Sodium	210	5.0	mg/L	5	7/29/2010 4:47:20 PM
EPA METHOD 8270C: SEMIVOLATILI	ES				Analyst: LBJ
Acenaphthene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Acenaphthylene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Aniline	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Anthracene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Azobenzene	ND	50	µg/L	1	7/28/2010 3:43:29 PM
Benz(a)anthracene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Benzo(a)pyrene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Benzo(b)fluoranthene	ND	50	µg/L	1	7/28/2010 3:43:29 PM
Benzo(g,h,i)perylene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Benzo(k)fluoranthene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Benzoic acid	ND	100	µg/L	1	7/28/2010 3:43:29 PM
Benzyl alcohol	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Bis(2-chloroethoxy)methane	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Bis(2-chloroethyl)ether	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Bis(2-chloroisopropyl)ether	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Bis(2-ethylhexyl)phthalate	ND	50	μg/L	1	7/28/2010 3:43:29 PM
4-Bromophenyl phenyl ether	ND	50	µg/L	1	7/28/2010 3:43:29 PM
Butyl benzyl phthalate	ND	50	µg/L	1	7/28/2010 3:43:29 PM
Carbazole	ND	50	μg/L	1	7/28/2010 3:43:29 PM
4-Chloro-3-methylphenol	ND	50	μg/L	1	7/28/2010 3:43:29 PM
4-Chloroaniline	ND	50	μg/L	1	7/28/2010 3:43:29 PM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 1 of 5

Date: 09-Aug-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1007798

Project:

Injection Well 3rd QTR 7/21/10

Lab ID:

1007798-01

Client Sample ID: Injection Well

Collection Date: 7/21/2010 8:30:00 AM

Date Received: 7/22/2010

Matrix: AQUEOUS

Analyses	Result	PQL Q	ual Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLA	TILES				Analyst: LB.
2-Chloronaphthalene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
2-Chlorophenol	ND	50	μg/L	1	7/28/2010 3:43:29 PM
4-Chlorophenyl phenyl ether	ND	50	µg/L	1	7/28/2010 3:43:29 PM
Chrysene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Di-n-butyi phthalate	. ND	50	μg/L	1 -	7/28/2010 3:43:29 PM
Di-n-octyl phthalate	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Dibenz(a,h)anthracene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Dibenzofuran	ND	50	μg/L	1	7/28/2010 3:43:29 PM
1,2-Dichlorobenzene	NĐ	50	μg/L	1	7/28/2010 3:43:29 PM
1,3-Dichlorobenzene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
1,4-Dichlorobenzene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
3,3'-Dichlorobenzidine	ND	50	µg/L	1	7/28/2010 3:43:29 PM
Diethyl phthalate	ND	50	µg/L	1	7/28/2010 3:43:29 PM
Dimethyl phthalate	ND	50	μg/L	1	7/28/2010 3:43:29 PM
2,4-Dichlorophenol	ND	100	µg/L	1	7/28/2010 3:43:29 PM
2,4-Dimethylphenol	ND	50	μg/L	1	7/28/2010 3:43:29 PM
4,6-Dinitro-2-methylphenol	ND	100	μg/L	1	7/28/2010 3:43:29 PM
2,4-Dinitrophenol	ND	100	μg/L	1	7/28/2010 3:43:29 PM
2,4-Dinitrotoluene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
2,6-Dinitrotoluene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Fluoranthene	ND	50	µg/L	1	7/28/2010 3:43:29 PM
Fluorene	ND	50	μg/L	1	7/28/2010 3:43;29 PM
Hexachlorobenzene	ND	50	μg/L'	1	7/28/2010 3:43:29 PM
Hexachlorobutadiene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Hexachlorocyclopentadiene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Hexachloroethane	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Indeno(1,2,3-cd)pyrene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Isophorone	· ND	50	µg/L	1	7/28/2010 3:43:29 PM
2-Methylnaphthalene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
2-Methylphenol	ND	50	μg/L	1	7/28/2010 3:43:29 PM
3+4-Methylphenol	ND	50	μg/L	1	7/28/2010 3:43:29 PM
N-Nitrosodi-n-propylamine	ND	50	μg/L	1	7/28/2010 3:43:29 PM
N-Nitrosodimethylamine	ND	50	μg/L	1	7/28/2010 3:43:29 PM
N-Nitrosodiphenylamine	ND	50	µg/L	1	7/28/2010 3:43:29 PM
Naphthalene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
2-Nitroaniline	ND	50	μg/L	1	7/28/2010 3:43:29 PM
3-Nitroaniline	ND	50	μg/L	1	7/28/2010 3:43:29 PM
4-Nitroaniline	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Nitrobenzene	ND	50	µg/L	1	7/28/2010 3:43:29 PM
2-Nitrophenol	ND	50	μg/L	1	7/28/2010 3:43:29 PM
4-Nitrophenol	ND	50	μg/L	1	7/28/2010 3:43:29 PM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 2 of 5

Date: 09-Aug-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1007798

Project:

Injection Well 3rd QTR 7/21/10

Lab ID:

1007798-01

Client Sample ID: Injection Well

Collection Date: 7/21/2010 8:30:00 AM

Date Received: 7/22/2010

Matrix: AQUEOUS

Analyses	Result	PQL Qı	ıal Units	DF	Date Analyzed
<b>EPA METHOD 8270C: SEMIVOLATILES</b>			T STALL DOZEN.		Analyst: LBJ
Pentachlorophenol	ND	100	μg/L	1	7/28/2010 3:43:29 PM
Phenanthrene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Phenol	ND	50	µg/L	1	7/28/2010 3:43:29 PM
Pyrene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Pyridine	ND	50	µg/L	1	7/28/2010 3:43:29 PM
1,2,4-Trichlorobenzene	ND	50	μg/L	1	7/28/2010 3:43:29 PM
2,4,5-Trichlorophenol	ND	50	μg/L	1	7/28/2010 3:43:29 PM
2,4,6-Trichlorophenol	ND	50	μg/L	1	7/28/2010 3:43:29 PM
Surr: 2,4,6-Tribromophenol	62.3	16.6-150	%REC	1	7/28/2010 3:43:29 PM
Surr: 2-Fluorobiphenyl	50.9	19.6-134	%REC	1	7/28/2010 3:43:29 PM
Surr: 2-Fluorophenol	48.6	9.54-113	%REC	1	7/28/2010 3:43:29 PM
Surr: 4-Terphenyl-d14	61.2	22.7-145	%REC	1	7/28/2010 3:43:29 PM
Surr: Nitrobenzene-d5	48.7	14.6-134	%REC	1	7/28/2010 3:43:29 PM
Surr: Phenol-d5	37.1	10.7-80.3	%REC	1	7/28/2010 3:43:29 PM
EPA METHOD 8260B: VOLATILES					Analyst: HL
Benzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Toluene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Ethylbenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,2,4-Trimethylbenzene	ND	1.0	µg/L	1	7/26/2010 2:21:43 PM
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Naphthalene	ND	2.0	μg/L	1	7/26/2010 2:21:43 PM
1-Methylnaphthalene	ND	4.0	μg/L	1	7/26/2010 2:21:43 PM
2-Methylnaphthalene	ND	4.0	µg/L	1	7/26/2010 2:21:43 PM
Acetone	21	10	μg/L	1	7/26/2010 2:21:43 PM
Bromobenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Bromodichloromethane	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Bromoform	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Bromomethane	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
2-Butanone	ND	10	μg/L	1	7/26/2010 2:21:43 PM
Carbon disulfide	ND	10	µg/L	1	7/26/2010 2:21:43 PM
Carbon Tetrachloride	ND	1.0	µg/L	1	7/28/2010 2:21:43 PM
Chlorobenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Chloroethane	ND	2.0	μg/L	1	7/26/2010 2:21:43 PM
Chloroform	ND	1.0	µg/L	1	7/26/2010 2:21:43 PM
Chloromethane	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
2-Chlorotoluene	ND	1.0	µg/L	1	7/26/2010 2:21:43 PM
4-Chlorotoluene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM

#### Qualiflers:

- Value exceeds Maximum Contaminant Level
- Estimated value Е
- Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
  - Not Detected at the Reporting Limit
  - Spike recovery outside accepted recovery limits

Page 3 of 5



Date: 09-Aug-10

**CLIENT:** 

Western Refining Southwest, Inc.

Lab Order:

1007798

Injection Well 3rd QTR 7/21/10

Project: Lab ID:

1007798-01

Client Sample ID: Injection Well

Collection Date: 7/21/2010 8:30:00 AM

Date Received: 7/22/2010

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	<u></u>				Analyst: HL
cis-1,2-DCE	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PN
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	7/26/2010 2:21:43 PM
Dibromochloromethane	ND	1.0	µg/L	1	7/26/2010 2:21:43 PN
Dibromomethane	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,2-Dichlorobenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,3-Dichlorobenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,4-Dichlorobenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Dichlorodifluoromethane	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,1-Dichloroethane	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,1-Dichloroethene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,2-Dichloropropane	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,3-Dichloropropane	ND	1.0	µg/L	1	7/26/2010 ⁻ 2:21:43 PM
2,2-Dichloropropane	ND	2.0	μg/L	1	7/26/2010 2:21:43 PM
1,1-Dichloropropene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Hexachlorobutadiene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
2-Hexanone	ND	10	μg/L	1	7/26/2010 2:21:43 PM
Isopropylbenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
4-isopropyitoluene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
4-Methyl-2-pentanone	ND	10	μg/L	1	7/26/2010 2:21:43 PM
Methylene Chloride	ND	3.0	µg/L	1	7/26/2010 2:21:43 PM
n-Butylbenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
n-Propylbenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
sec-Butylbenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Styrene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
tert-Butylbenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	7/26/2010 2:21:43 PM
Tetrachloroethene (PCE)	ND	.1.0	µg/L	1	7/26/2010 2:21:43 PM
trans-1,2-DCE	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,1,1-Trichloroethane	ND	1.0	µg/L	1	7/26/2010 2:21:43 PM
1,1,2-Trichloroethane	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Trichloroethene (TCE)	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Trichlorofluoromethane	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
1,2,3-Trichloropropane	ND	2.0	µg/L	1	7/26/2010 2:21:43 PM
Vinyl chloride	ND	1.0	μg/L	1	7/26/2010 2:21:43 PM
Xylenes, Total	ND	1.5	μg/L	1	7/26/2010 2;21:43 PM
Surr: 1,2-Dichloroethane-d4	105	54.6-141	%REC	1	7/26/2010 2:21:43 PM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- Estimated value
- Analyte detected below quantitation limits J
- Non-Chlorinated
- PQL Practical Quantitation Limit

- В Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded H
- MCL Maximum Contaminant Level
- Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits

Page 4 of 5

Date: 09-Aug-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1007798

Project:

Injection Well 3rd QTR 7/21/10

Lab ID:

1007798-01

Client Sample ID: Injection Well

Collection Date: 7/21/2010 8:30:00 AM

Date Received: 7/22/2010

Matrix: AQUEOUS

Analyses	Result	PQL (	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	<u> </u>	*				Analyst: HL
Surr: 4-Bromofluorobenzene	90.3	60.1-133		%REC	- 1	7/26/2010 2:21:43 PM
Surr: Dibromofluoromethane	108	78.5-130		%REC	1	7/26/2010 2:21:43 PM
Surr: Toluene-d8	89.0	79.5-126		%REC	1	7/26/2010 2:21:43 PM
SM 2320B: ALKALINITY						Analyst: MMS
Alkalinity, Total (As CaCO3)	230	20		mg/L CaCO3	1	7/29/2010 3:48:29 PM
Carbonate	ND	2.0		mg/L CaCO3	1	7/29/2010 3:48:29 PM
Bicarbonate	230	20		mg/L CaCO3	1	7/29/2010 3:48:29 PM
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: MMS
Specific Conductance	1400	0.010		µmhos/cm	1	7/29/2010 3:48:29 PM
SM4500-H+B: PH						Analyst: MMS
pH ·	7.39	0.1	H	pH units	1	7/29/2010 3:48:29 PM
SM2540C MOD: TOTAL DISSOLVED SOLID	S					Analyst: KS
Total Dissolved Solids	905	100		mg/L	1	7/27/2010 1:27:00 PM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 5 of 5

#### LABORATORY ANALYTICAL REPORT

Client:

Hall Environmental

Project:

1007798

Lab ID:

B10072234-001

Client Sample ID 1007798-01E Injection Well

Report Date: 08/02/10

Collection Date: 07/21/10 08:30

DateReceived: 07/23/10

Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL.	MCL/ QCL	Method	Analysis Date / By
IGNITABILITY						· · · · · · · · · · · · · · · · · · ·	
Flash Point (Ignitability)	>200	٩F		30		SW1010A	07/27/10 10:00 / jh
CORROSIVITY						•	
pH of Liquid Waste	7.20	s.u.		0.10		SW9040C	07/30/10 13:00 / jh
REACTIVITY							
Cyanide, Reactive	ND	mg/kg		0.05	250	SW846 Ch 7	07/28/10 15:40 / kjp
Sulfide, Reactive	ND	mg/kg		20	500	SW846 Ch 7	07/27/10 08:00 / jh

Report Definitions: RL - Analyte reporting limit.

QCL - Quality control limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.

Client:

Western Refining Southwest, Inc.

Project: Injection Well 3rd QTR 7/21/10

Work Order:

1007798

Analyte	Result	Units	PQL	SPK Va SPI	K ref	%Rec L	owLimit Hi	ghLimit %RPD	RPDLimit Qual
Method: EPA Method 300.0:	Anions		· · · · · ·						
Sample ID: MB		MBLK				Batch ID:	R39990	Analysis Date:	7/22/2010 10:08:01 AN
Chloride	ND	mg/L	0.50						
Sulfate	ND	mg/L	0.50						
Sample ID: LCS		LCS				Batch ID:	R39990	Analysis Date:	7/22/2010 10:25:25 AN
Chloride	4.996	mg/L	0.50	5	0	99.9	90	110	
Sulfate	10.30	mg/L.	0.50	10	0	103	90	110	
Method: SM 2320B: Alkalinity	,								
Sample ID: MB		MBLK				Batch ID:	R40069	Analysis Date:	7/27/2010 3:06:00 PN
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20						
Carbonate	ND	mg/L Ca	2.0						
Blcarbonate	ND	mg/L Ca	20						
Sample ID: MB		MBLK				Batch ID:	R40101	Analysis Date:	7/29/2010 1:44:18 PM
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20						
Carbonate	ND	mg/L Ca	2.0	•					
Bicarbonate	ND .	mg/L Ca	20						
Sample ID: MB		MBLK				Batch ID:	R40101	Analysis Date:	7/29/2010 7:10:25 PM
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20						
Carbonate	ND	mg/L Ca	2.0						
Bicarbonate	ND	mg/L Ca	20						
Sample ID: 80PPM LCS		LCS				Batch ID:	R40069	Analysis Date:	7/27/2010 3:12:00 PM
Alkalinity, Total (As CaCO3)	79.68	mg/L Ca	20	80	0	99.6	96.5	104	
Sample ID: LCS		LCS				Batch ID:	R40101	Analysis Date:	7/29/2010 1:50:25 PM
Alkalinity, Total (As CaCO3)	79.04	mg/L Ca	20	80	0	98.8	96.5	104	
Sample ID: LCS2		LCS				Batch ID:	R40101	Analysis Date:	7/29/2010 7:15:22 PM
Alkalinity, Total (As CaCO3)	80.04	mg/L Ca	20	80	0	100	96.5	104	



E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits



lient: Project: Western Refining Southwest, Inc.

Injection Well 3rd QTR 7/21/10

Work Order:

1007798

Analyte	Result	Units	PQL	SPK Va SI	PK ref	%Rec L	owLimit Hi	ghLimit	%RPD	RPDLimi	t Qual
Method: EPA Method 8260B:	VOLATILES			•							
Sample ID: 1007798-01a med	•	MSD				Batch ID:	R40039	Analys	sis Date:	7/26/2010	3:14:17 PN
Benzene	20.66	μg/L	1.0	20	0	103	75.7	118	4.07	15	
Toluene	18.33	μg/L	1.0	20	0	91.7	80.1	114	11.4	15	
Chlorobenzene	19.79	μg/L	1.0	20	0	99.0	81.5	112	4.43	15	
1,1-Dichtoroethene	23.26	μg/L	1.0	20	0	116	77.4	132	8.74	17.8	
Trichloroethene (TCE)	19.19	μg/L	1.0	20	0	95.9	61.1	121	3.92	19.8	
Sample ID: b2		MBLK				Batch ID:	R40039	Analys	sis Date:	7/26/2010	9:32:51 AN
Benzene	ND	μg/L	1.0								
Toluene	ND	μg/L	1.0						•		
Ethylbenzene	ND	μg/L	1.0								
Methyl tert-butyl ether (MTBE)	ND	µg/L	1.0								
1,2,4-Trimethylbenzene	ND	µg/L	1.0								
1,3,5-Trimethylbenzene	ND	μg/L	1.0								
1,2-Dichloroethane (EDC)	ND	µg/L	1.0								
1,2-Dibromoethane (EDB)	ND	μg/L	1.0								
Naphthalene	ND	µg/L	2.0								
1-Methylnaphthalene	ND	µg/L	4.0							•	
2-Methylnaphthalene	ND	μg/L	4.0								
Acetone	ND	μg/L	. 10								
Promobenzene	ND	μg/L	1.0								
romodichloromethane	ND	μg/L	1.0								
Bromoform	ND	µg/L	1.0								
Bromomethane	ND	μg/L	1.0								
2-Butanone	ND.	µg/L	10						<b>~</b>		
Carbon disulfide	ND .	µg/L	10								
Carbon Tetrachloride	ND	hâ\r hâ\r	1.0								
Chlorobenzene	ND	μg/L μg/L	1.0								
Chloroethane	ND		2.0								
Chloroform	ND	μg/L	1.0								
Chloromethane		μg/L	1.0								
2-Chlorotoluene	ND ND	μg/L	1.0								
4-Chiorotoluene	ND	μ <b>g/</b> L μg/L	1.0								
cis-1,2-DCE	ND	μg/L μg/L	1.0								
cis-1,3-Dichloropropene	ND	μg/L	1.0								
1,2-Dibromo-3-chloropropane	ND	hã/r	2.0								
Dibromochloromethane	ND	μg/L μg/L	1.0								
Dibromomethane	ND	μg/L	1.0								
1,2-Dichlorobenzene	ND	μg/L	1.0								
1,3-Dichlorobenzene	ND	μg/L	1.0								
1,4-Dichlorobenzene	ND	μg/L	1.0								
Dichlorodifluoromethane	ND	μg/L	1.0								
1,1-Dichloroethane	ND	µg/L	1.0								
1,1-Dichloroethene	ND	μg/L	1.0								
1,2-Dichloropropane	ND	µg/L	1.0								
I,3-Dichloropropane	ND	μg/L	1.0								
	110	ha.r	1,0								

ualisters:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

Project: Injection Well 3rd QTR 7/21/10

Work Order:

Date: 09-Aug-10

1007798

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec L	owLimit Hi	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B	: VOLATILES									
Sample ID: b2		MBLK			Batch ID:	R40039	Analys	is Date:	7/26/2010	9:32:51 A
2,2-Dichloropropane	ND	µg/L	2.0							
1,1-Dichloropropene	ND	μg/L	1.0							
Hexachlorobutadiene	ND	μg/L	1.0							
2-Hexanone	ND	μg/L	10							
Isopropylbenzene	ND	µg/Ľ	1.0							
4-Isopropyltoluene	ND	μg/L	1.0							
4-Methyl-2-pentanone	ND	μg/L	10							
Methylene Chloride	ND	μg/L	3.0							
n-Butylbenzene	NĐ	µg/L	1.0					*		
n-Propylbenzene	ND	μg/L	1.0							
sec-Butylbenzene	ND	µg/L	1.0							
Styrene	ND	µg/L	1.0							
tert-Butylbenzene	ND	µg/L	1.0							
1,1,1,2-Tetrachloroethane	ND	μg/L	1.0							
1,1,2,2-Tetrachloroethane	ND	µg/L	2.0							
Tetrachloroethene (PCE)	ND	μg/L	1.0							
trans-1,2-DCE	ND	µg/L	1.0							
trans-1,3-Dichloropropene	ND	μg/L	1.0						,	
1,2,3-Trichlorobenzene	ND	μg/L	1.0							
1,2,4-Trichlorobenzene	ND	µg/L	1.0							
1,1,1-Trichloroethane	ND	μg/L	1.0							
1,1,2-Trichloroethane	ND	µg/L	1.0							
Trichloroethene (TCE)	ND	μg/L	1.0							
Trichlorofluoromethane	ND	μg/L	1.0							
1,2,3-Trichioropropane	ND	µg/L	2.0							
Vinyl chloride	ND	µg/L	1.0							
Kylenes, Total	ND	μg/L	1.5							
Sample ID: b6		MBLK			Batch ID:	R40039	Analysi	s Date:	7/26/2010 7	':37:36 PM
3enzene	ND	µg/L	1.0							*
Toluene	ND	µg/L	1.0							
Ethylbenzene	ND	μg/L	1.0							
Methyl tert-butyl ether (MTBE)	ND	μg/L	1.0							
1,2,4-Trimethylbenzene	ND	µg/L	1.0							
1,3,5-Trimethylbenzene	ND	µg/L	1.0							
i,2-Dichloroethane (EDC)	ND	μg/L	1.0							
,2-Dibromoethane (EDB)	ND	μg/L	1.0							
Naphthalene	ND	μg/L	2.0							
-Methylnaphthalene	ND	µg/L	4.0							
-Methylnaphthalene	ND	µg/L	4.0							
Acetone	ND	µg/L	10							
Bromobenzene	ND	μg/L	1.0							•
Bromodichloromethane	ND	µg/L	1.0							
Bromoform	ND	µg/L	1.0							
Bromomethane	ND	μg/L	1.0							

Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

Client: Project: Western Refining Southwest, Inc. Injection Well 3rd QTR 7/21/10

Work Order:

1007798 -

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec LowLin	nit HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B:	VOLATILES								
Sample ID: b6		MBLK			Batch ID: R4	0039 Analy	sis Date:	7/26/2010	7:37:36 PI
2-Butanone	ND	μg/L	10						
Carbon disulfide	ND	μg/L	10		•				
Carbon Tetrachloride	ND	µg/L	1.0						
Chlorobenzene	ND	µg/L	1.0				•		
Chloroethane	ND	µg/L	2.0						
Chloroform	ND	μg/L	1.0						
Chloromethane	ND	μg/L	1.0						
2-Chlorotoluene	ND	µg/L	1.0						
4-Chlorotoluene	ND	µg/L	1.0						
cis-1,2-DCE	- ND	μg/L	1.0		•				
cis-1,3-Dichloropropene	ND	μg/L	1.0						
1,2-Dibromo-3-chloropropane	ND	µg/L	2.0						
Dibromochloromethane	ND	μg/L	1.0						
Dibromomethane	ND	μg/L	1.0						
1,2-Dichlorobenzene	ND	μg/L	1.0						
1,3-Dichlorobenzene	ND	μg/L	1.0						
1,4-Dichlorobenzene	ND	μg/L	1.0						
Dichlorodifluoromethane	ND	μg/L	1.0						
1,1-Dichloroethane	ND	µg/L	1.0						
,1-Dichloroethene	ND	μg/L	1.0						
1,2-Dichloropropane	ND	µg/L	1.0				•		
1,3-Dichloropropane	ND	μg/L	1.0						
2,2-Dichloropropane	ND	μg/L	2.0						•
1,1-Dichloropropene	ND	μg/L	1.0						
Hexachlorobutadiene	ND	μg/L	1.0						
2-Hexanone	ND	µg/L	10						
sopropylbenzene	ND	μg/L	1.0						
1-Isopropyitoluene	ND	μg/L	1.0						
I-Methyl-2-pentanone	ND	µg/L	10						
Methylene Chloride	ND	µg/L	3.0						
n-Butylbenzene	ND	µg/L	1.0						
a-Propylbenzene	ND	µg/L	1.0						
ec-Butylbenzene	ND	μg/L	1.0						
Styrene	ND	μg/L	1.0						
ert-Butylbenzene	ND	µg/L	1.0						
,1,1,2-Tetrachloroethane	ND	μg/L	1.0						
,1,2,2-Tetrachloroethane	ND	μg/L	2.0						
etrachloroethene (PCE)	ND	μg/L	1.0						
ans-1,2-DCE	ND	µg/L	1.0						
rans-1,3-Dichloropropene	ND	µg/L	1.0						
,2,3-Trichlorobenzene	ND	µg/L	1.0						
,2,4-Trichlorobenzene	ND	μg/L	1.0						
,1,1-Trichloroethane	ND	μg/L	1.0						
,1,2-Trichloroethane	ND	µg/L	1.0						

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project: Injection Well 3rd QTR 7/21/10

Work Order:

1007798

Analyte	Result	Units	PQL	SPK Va SPK I	ef	%Rec L	owLimit Hi	ghLimit	%RPD	RPDLimit Qual
Method: EPA Method 8260B	: VOLATILES	MOUL				Batch ID:	D40020	A natuaia	Date	7/08/2010 7:27:28 1
Sample ID: b6		MBLK				Daten ID:	R40039	Analysis	Date.	7/26/2010 7:37:36 F
Trichloroethene (TCE)	ND	μg/L	1.0							
Trichlorofluoromethane	ND	μg/L	1.0			•				
1,2,3-Trichtoropropane	ND	μg/L	2.0							
Vinyl chloride	ND	μg/L	1.0							
Xylenes, Total	ND	μg/L	1.5							
Sample ID: 100ng Ics		LCS				Batch ID:	R40039	Analysis	Date:	7/26/2010 10:25:19 A
Benzene	19.06	µg/L	1.0	20 (	)	95.3	82.4	116		
Toluene	22.82	μg/L	1.0	20 (	)	114	89.5	123		
Chlorobenzene	21.00	μg/L	1.0	20 (	)	105	87.8	120		
1,1-Dichloroethene	21.41	μg/L	1.0	20 0	)	107	90.3	138		
Trichloroethene (TCE)	17.98	μg/Ł	1.0	20 0	}	89.9	64	129		
Sample ID: 1007798-01a ms		MS				Batch ID:	R40039	Analysis	Date:	7/26/2010 2:48:10 F
Benzene	19.84	μg/L	1.0	20 0	1	99.2	75.7	118		
Toluene	20.55	μg/L	1.0	20 0	)	103	80.1	114		
Chlorobenzene	20.69	µg/L	1.0	20 0	ì	103	81.5	112		
1,1-Dichloroethene	21.32	μg/L	1.0	20 0		107	77.4	132		
Trichloroethene (TCE)	18.45	μg/L	1.0	20 0		92.3	61.1	121		

Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

lient:

Western Refining Southwest, Inc. Injection Well 3rd QTR 7/21/10

Work Order:

1007798

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	wLimit Hig	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C	: Semivolatiles	3								
Sample ID: mb-23145	•	MBLK			Batch ID:	23145	Analysi	s Date:	7/28/2010 1	2:10:57 P
Acenaphthene	ND	μg/L	10							
Acenaphthylene	ND	μg/L	10					•		
Aniline	ND	μg/L	10			•				
Anthracene	ND	μg/L	10							
Azobenzene	ND	µg/L	10							
Benz(a)anthracene	ND	µg/L	10						**	
Benzo(a)pyrene	ND	μg/Ł	10					-		
Benzo(b)fluoranthene	ND	μg/L	10							
Benzo(g,h,i)perylane	ND	μg/L	10							
Benzo(k)fluoranthene	ND	μg/L	10							
Benzoic acid	ND	µg/L	20							
Benzyl alcohol	ND	μg/L	10							
Bis(2-chloroethoxy)methane	NÓ	μg/L	10							
Bis(2-chloroethyl)ether	ND	μg/L	10							
Bis(2-chloroisopropyl)ether	ND	μg/L	10							
Bis(2-ethylhexyl)phthalate	ND	µg/L	10							
4-Bromophenyl phenyl ether	ND	μg/L	10							
Butyl benzyl phthalate	ND	μg/L	10							
<u>Carbazole</u>	ND ·	μg/L	10							
Chloro-3-methylphenol	ND.	μg/L	10							
4-Chloroaniline	ND	µg/L	10							
2-Chloronaphthalene	ND:	µg/L	10							
2-Chlorophenoi	ND	μg/L	10							
4-Chlorophenyl phenyl ether	ND	µg/L	10							
Chrysene	ND	μg/L	10							
Di-n-butyl phthalate	ND	μg/L	10							
Di-n-octyl phthalate	ND	µg/L	10							
Dibenz(a,h)anthracene	ND	μg/L	10							
Dibenzofuran	ND	μg/L	10							
1,2-Dichlorobenzene	ND	µg/L	10							
1,3-Dichlorobenzene	ND	µg/L	10							
1,4-Dichlorobenzene	ND	µg/L	10							
3,3´-Dichtorobenzidine	ND	μg/L	10							
Diethyl phthalate	ND	µg/L	10							
Dimethyl phthalate	ND	μg/L	10							
2,4-Dichlorophenol	ND	µg/L	20							
2,4-Dimethylphenol	ND	μg/L	10							
1,6-Dinitro-2-methylphenol	ND	μg/L	20							
2,4-Dinitrophenol	ND	µg/L	20							
2,4-Dinitrotoluene	ND	µg/L	10							
2,6-Dinitrotoluene	ND	µg/L	10							
Fluoranthene	ND	μg/L	10							
luorene	ND	μg/L	10							
fexachlorobenzene	ND	µg/L	10							

alifiers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project: Injection Well 3rd QTR 7/21/10

Work Order:

1007798

Analyte	Result	Units	PQL	SPK Va SP	K re	%Rec	LowLimit H	ighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 82700	: Semivolatile										
Sample ID: mb-23145		MBLK				Batch ID:	23145	Analys	is Date:	7/28/2010 1	2:10:57 PN
Hexachlorobutadiene	МÐ	µg/L	10								
Hexachlorocyclopentadiene	ND	µg/L	10								
Hexachloroethane	ND	µg/L	10								
Indeno(1,2,3-cd)pyrene	ND	μg/L	10								
Isophorone	ND	μg/L	10								
2-Methylnaphthalene	ND	μg/L 	10								
2-Methylphenol	ND	μg/L	10								
3+4-Methylphenol	ND	µg/L	10		-						
N-Nitrosodi-n-propylamine	ND	μg/L 	10		•						
N-Nitrosodimethylamine	ND	µg/L	10								
N-Nitrosodiphenylamine	ND	µg/L	10								
Naphthalene	ND	µg/L	10								
2-Nitroaniline	ND	µg/L	10	-							
3-Nitroaniline	ΝD	μg/L	10								
4-Nitroaniline	ND	μg/L	10								
Nitrobenzene	ND	µg/L	10								
2-Nitrophenol	ND	µg/L	10								
4-Nitrophenol	ND	µg/L	10								
Pentachlorophenol	ND	µg/L	20								
Phenanthrene	ND	µg/L	10							•	
Phenol	ND	μg/L	10			•					
Pyrene	ND	µg/L	10								
Pyridine	ND	µg/L	10								
1,2,4-Trichiorobenzene	ND	µg/L	10								
2,4,5-Trichlorophenol	ND	µg/L	10								
2,4,6-Trichlorophenol	ND	μg/L	10							•	
Sample ID: lcs-23145		LCS				Batch ID:	23145	Analysi	s Date:	7/28/2010 12	2:41:12 PN
Acenaphthene	55.44	µg/L	10	100	0	55.4	29.3	113			
4-Chloro-3-methylphenol	145.2	µg/L	10	200	Q	72.6	23.3	123			
2-Chlorophenol	107.1	µg/L	10	200	0	53.5	23.9	112			
1,4-Dichlorobenzene	48.70	μg/L	10	100	0	48.7	16.5	106			
2,4-Dinitrotoluene	55.86	µg/L	10	100	0	55.9	27.7	126			
N-Nitrosodi-n-propylamine	55.72	µg/L	10	100	0	55.7	25.9	113			
1-Nitrophenol	42.36	μg/L	10	200	0	21.2	13.2	76.7			
Pentachlorophenol	62.22	μg/L	20	200	0	31.1	22.4	121			
Phenol	75.82	μg/L	10	200	0	37.9	15.3	68.3			
Pyrene	69.98	μg/L	10	100	0	70.0	23.5	119			
,2,4-Trichlorobenzene	55.30	µg/L	10	100	0	55.3	23	107			
Sample ID: lcsd-23145		LCSD				Batch ID:	23145	Analysis	s Date:	7/28/2010 1	:11:30 PM
Acenaphthene	67.22	μg/L	10	100	0	67.2	29.3	113	19.2	30.5	
-Chloro-3-methylphenol	165.0	μg/L	10	200	0	82.5	23.3	123	12.8	28.6	
-Chlorophenol	122.1	μg/L	10	200	0	61.1	23.9	112	13.1	107	
,4-Dichlorobenzene	55.38	µg/L	10	100	0	55.4	16.5	106	12.8	62.1	
,4-Dinitrotoluene	70.84	µg/L	10	100	0	70.8	27.7	126	23.6	14.7	R

Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

# **QA/QC SUMMARY REPORT**

ient:

Western Refining Southwest, Inc. Injection Well 3rd QTR 7/21/10

Work Order:

1007798

Analyte	Result	Units	PQL	SPK V	a SPK re	of %Rec t	.owLimit Hi	ighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270	C: Semivolatiles				_						
Sample ID: Icsd-23145	•	LCSD				Batch ID:	23145	Analysi	s Date:	7/28/2010	1:11:30 PM
N-Nitrosodi-n-propylamine	63.60	μg/L	10	100	0	63.6	25.9	113	13.2	30.3	
4-Nitrophenol	52.54	μg/L	10	200	0	26.3	13.2	76.7	21.5	36.3	
Pentachlorophenol	69.78	μg/L	20	200	) 0	34.9	22.4	121	11.5	49	
Phenol	86.12	μg/L	10	200	0	43.1	15.3	68.3	12.7	52.4	
Pyrene	83.48	μg/L	10	100	0	83.5	23.5	119	17.6	16.3	R
1,2,4-Trichlorobenzene	55.46	µg/L	10	100	0	55.5	23	107	0.289	36.4	
Method: EPA Method 7470:	Mercury										
Sample ID: MB-23144	-	MBLK				Batch ID:	23144	Analysi	s Date:	7/26/2010	5:21:09 Pl
Mercury	ND	mg/L	0.00020								
Sample ID: LCS-23144		LCS				Batch ID:	23144	Analysi	s Date:	7/26/2010	5:22:57 PM
Mercury	0.005269	mg/L	0.00020	0.005	. 0	105	80	120			
Sample ID: LCS-23144	0.000200	LCS	4.4-424	0.000	•	Batch ID:	23144	Analysi	s Date:	7/26/2010 5	5:24:46 PN
Mercury	0.005365	mg/L	0.00020	0.005	0	107	80	120	1.79	0	
A 10 10 10 10 10 10 10 10 10 10 10 10 10			0.00020	0.000				120	1170		
Method: EPA 6010B: Total F	Recoverable Met					D-4-6 (D.	20420	A a b sate	- D-4	7/00/0040	
Sample ID: MB-23130		MBLK				Batch ID:	23130	Analysis	s Date:	7/29/2010 3	1:03:07 PR
Arsenic	ND	mg/L	0.020								
rium Umium	ND	mg/L	0.020								
	ND	mg/L	0.0020								
Calcium	ND	mg/L	1.0								
Chromium	ND	mg/L	0.0060								
_ead	ND	mg/L	0.0050								
Magnesium	ND	mg/L	1.0								
Potassium	ND	mg/L	1.0								
Selenium	ND	mg/L	0.050								
Silver	ND	mg/L	0.0050								
Sodium	ND	mg/L	1.0			Detak ID.	00400	0 ali rala	Data.	7/00/0040 0	.45.05 DM
Sample ID: LCS-23130		LCS				Batch ID:	23130	•	nate:	7/29/2010 3	:15:U5 PW
Arsenic	0.4835	mg/L	0.020	0.5	0	96.7	80	120			
Barium	0.4589	mg/L	0.020	0.5	0	91.8	80	120			
Cadmium	0.4703	mg/L	0.0020	0.5	0	94.1	80	120			
Calcium	50.30	mg/L	1.0	50	0	101	80	120			
Chromium .ead	0.4661 0.4658	mg/L	0.0060 0.0050	0.5	0	93.2	80 80	120			
	0.4938 52.35	mg/L mg/l	1.0	0.5 50	0	93.2 106	80 80	120			
/lagnesium Potassium	52.36 55.81	mg/L mg/L	1.0		0.0462	105 112	80	120			
rotassium Belenium	0.4724			0.5	0.0462		80 80	120			
ilver	0.4724	mg/L mg/L	0.050 0.0050	0.5	0	94.5 97.4	80 80	120 120			
III V CI I	U.4012	1110/6	v.0050	U.0	U	97.4	ฉบ	120			

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E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project: Injection Well 3rd QTR 7/21/10

Work Order:

1007798

									1007120
Analyte	Result	Units	PQL	SPK Va SPK r	ef %Rec L	owLimit Hi	ghLimit %RPD	RPDLim	it Qual
Method: SM2640C MOD: To Sample ID: MB-23142	otal Dissolved S	Solids MBLK			Batch ID:	23142	Analysis Date:	7/27/201	0 1:27:00 PM
Total Dissolved Solids Sample ID: LCS-23142	ND	mg/L LCS	20.0		Batch ID:	23142	Analysis Date:	7/27/201	0 1:27:00 PN
Total Dissolved Solids	1014	mg/L	20.0	1000 0	101	80	120		

Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits



## **QA/QC Summary Report**

Client: Hall Environmental

Report Date: 08/02/10

Project: 1007798

Work Order: B10072234

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW1010A									Batch	R151335
Sample ID: LCS-R151335	Lab	oratory Con	trol Sample			Run: PENS	KY MARTEN (	CLOSED C	07/27	/10 10:00
Flash Point (Ignitability)		90.0	°F	30	100	98	102			
Sample ID: LCSD-R151335	Lab	oratory Coni	troi Sample D	uplicate		Run: PENS	KY MARTEN C	CLOSED C	07/12	/10 11:00
Flash Point (Ignitability)		90.0	۹F	30	100	98	102			



### **QA/QC Summary Report**

Client: Hall Environmental

Report Date: 08/02/10

Project: 1007798

Work Order: B10072234

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: 8W846 Ch 7									Bal	ch: 47890
Sample ID: MB-47890	Me	thod Blank				Run: AUTO	AN201-B_10072	28B	07/28	/10 15:42
Cyanide, Reactive		ND	mg/kg	0.05						
Method: SW846 Ch 7									Batch	R151368
Sample ID: MB-R151368	Me	thod Blank				Run: MISC-	HZW_100727B		07/27	/10 08:00
Sulfide, Reactive		ND	mg/kg	10						
Sample ID: LCS-R151368	Lab	oratory Con	trol Sample			Run: MISC-	HZW_100727B		07/27	/10 08:00
Sulfide, Reactive		24	mg/kg	20	82	50	150			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



### **QA/QC Summary Report**

Client: Hall Environmental

Report Date: 08/02/10

**Project: 1007798** 

Work Order: B10072234

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW9040C							Analy	tical Run	: PH METER	_100730B
Sample ID: ICV	Initi	al Calibratio	n Verification	1 Standard					07/30	/10 13:00
pH of Liquid Waste		4.02	8.U.	0.10	100	98	102			
Method: SW9040C							•		Batch	: R151564
Sample ID: B10072075-001ADUP	Sar	nple Duplica	te			Run: PH MI	ETER_100730B		07/30	/10 13:00
pH of Liquid Waste		ND	8.U.	0.10					10	

### Sample Receipt Checklist

Client Name WESTERN REFINING SOUT	•			Date Receive	d:		7/22/2010
Work Order Number 1007798	٠			Received by	r: TLS		
Checklist completed by:			7	22/10	abels checked	by:	Initials
Matrix:	Carrier name:	UPS	!		·		
Shipping container/cooler in good condition?		Yes	$\square$	No 🗆	Not Present		
Custody seals intact on shipping container/cooler?	•	Yes	¥	No 🗀	Not Present		Not Shipped
Custody seals intact on sample bottles?	•	Yes	$\checkmark$	No 🗌	N/A		
Chain of custody present?		Yes	V	No 🗆			
Chain of custody signed when relinquished and re-	ceived?	Yes		No 🗆			
Chain of custody agrees with sample labels?		Yes		No 🗆			
Samples in proper container/bottle?		Yes	$\checkmark$	No 🗌			
Sample containers intact?		Yes	$\checkmark$	No 🗌			
Sufficient sample volume for indicated test?		Yes	V	No 🗆			
All samples received within holding time?		Yes	$\checkmark$	No 🗌			Number of preserved
Water - VOA vials have zero headspace?	No VOA vials subm	itted		Yes 🗹	No 🗀		bottles checked for pH:
Water - Preservation labels on bottle and cap mate	sh?	Yes	$\checkmark$	No 🗆	N/A □		$\mathcal{V}_{-}$
Water - pH acceptable upon receipt?		Yes	$\checkmark$	No 🗆	N/A		<2 >12 unless noted
Container/Temp Blank temperature?		3.0	6°	<6° C Acceptab	le		below.
COMMENTS:				If given sufficient	time to cool.		
· ====================================							
Client contacted De	ite contacted:			Pers	on contacted		
Contacted by:	garding:						
Comments:							
Corrective Action							

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	ENVIRONMENTA	WALTELS LABORATOR								- 1 -	MeacTiVII	<b></b>			X	<u> </u>		×	W				_	-	
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Time:	□ Rush			1		iger:	)		504 SOS	perature &	Preservative Type	Hcl	Amber		\	H2SC4	HNC3	No CH	ZINC ACETATE					1/20/	
Tum-Around Time:	-   X Standard	Project Name:	Injection Vell	Project #:		Project Manager:	'		Sampler: E	Sample Tempera	Container Type and #	3-164	1-1:ter	1-500ml	1-50ch	1-125m	1-50cm	1-50cm	1-500ml					Received by:	Received by:
Chair of-Custody Record	Dient: Western Refining		Aailing Address: サ50 CR 4990	Bloomfield, NM 874/3	505-632-4161	ı. J		☐ Level 4 (Full Validation)	□ Other		Matrix   Sample Request ID	Hao Injection Well	•											Relinquished by:  The Kinghan	Relinquished by:
laito	esterk		ddress: #	16(B) 1	505	mail or Fax#: 52	AVQC Package:	ard		Type)		8:30 H	_			-		_	<del> </del>					R	Time: Reli
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#### **COVER LETTER**

Monday, November 15, 2010

Cindy Hurtado Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4161 FAX (505) 632-3911

RE: Injection Well 4th QTR 10-25-10

Dear Cindy Hurtado:

Order No.: 1010B70

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 10/27/2010 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites.

Reporting limits are determined by EPA methodology.

Please do not hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Laboratory Manager

NM Lab # NM9425 NM0901 AZ license # AZ0682 ORELAP Lab # NM100001

Texas Lab# T104704424-08-TX



Date: 15-Nov-10

**CLIENT:** 

Western Refining Southwest, Inc.

Lab Order:

1010B70

Project:

Injection Well 4th QTR 10-25-10

Lab ID:

1010B70-01

Client Sample ID: Injection Well

Collection Date: 10/25/2010 10:20:00 AM

**Date Received:** 10/27/2010

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS			· · · · · · · · · · · · · · · · · · ·		Analyst: SRM
Chloride	240	5.0	mg/L	50	11/3/2010 1:44:46 AM
Sulfate	48	5.0	mg/L	10	11/3/2010 1:27:22 AM
EPA METHOD 7470: MERCURY					Analyst: ELS
Mercury	0.00030	0.00020	mg/L	1	11/3/2010 12:38:32 PM
EPA 6010B: TOTAL RECOVERABL	E METALS				Analyst: RAGS
Arsenic	ND	0.020	mg/L	1	11/2/2010 11:43:19 AM
Barium	0.33	0.020	mg/L	1	11/2/2010 11:43:19 AM
Cadmium	ND	0.0020	mg/L	1	11/2/2010 11:43:19 AM
Calcium	97	1.0	mg/L	1	11/2/2010 11:43:19 AM
Chromium	ND	0.0060	mg/L	1	11/2/2010 11:43:19 AM
Lead	ND	0.0050	mg/L	1	11/2/2010 11:43:19 AM
Magnesium	21	1.0	mg/L	1	11/2/2010 11:43:19 AM
Potassium	4.7	1.0	mg/L	1	11/2/2010 11:43:19 AM
Selenium	ND	0.050	mg/L	1	11/2/2010 11:43:19 AM
Silver	ND	0.0050	mg/L	1	11/2/2010 11:43:19 AM
Sodium	220	5.0	mg/L	5	11/7/2010 1:38:03 PM
EPA METHOD 8270C: SEMIVOLATI	LES				Analyst: JDC
Acenaphthene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Acenaphthylene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Aniline	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
Anthracene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Azobenzene	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
Benz(a)anthracene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Benzo(a)pyrene	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
Benzo(b)fluoranthene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Benzo(g,h,i)perylene	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
Benzo(k)fluoranthene	ND	50.0	μ <b>g/L</b>	1	11/1/2010 1:08:54 PM
Benzoic acid	ND	100	μg/L	1	11/1/2010 1:08:54 PM
Benzyl alcohol	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Bis(2-chloroethoxy)methane	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Bis(2-chloroethyl)ether	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Bis(2-chloroisopropyl)ether	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Bis(2-ethylhexyl)phthalate	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
4-Bromophenyl phenyl ether	ND	50.0	μg/L	· 1	11/1/2010 1:08:54 PM
Butyl benzyl phthalate	ND	50.0	μ <b>g/L</b>	1	11/1/2010 1:08:54 PM
Carbazole	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
4-Chloro-3-methylphenol	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
4-Chloroaniline	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits

Page 1 of 7

Date: 15-Nov-10

CLIENT: Western Refining Southwest, Inc.

Lab Order:

1010B70

Client Sample ID: Injection Well Collection Date: 10/25/2010 10:20:00 AM

Project:

Injection Well 4th QTR 10-25-10

Date Received: 10/27/2010

Lab ID:

1010B70-01

Matrix: AQUEOUS

Analyses	Result	PQL (	Qual Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLA	TILES	*******			Analyst: JDC
2-Chloronaphthalene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
2-Chlorophenol	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
4-Chlorophenyl phenyl ether	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
Chrysene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Di-n-butyl phthalate	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Di-n-octyl phthalate	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
Dibenz(a,h)anthracene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Dibenzofuran	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
1,2-Dichlorobenzene	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
1,3-Dichlorobenzene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
1,4-Dichlorobenzene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
3,3'-Dichlorobenzidine	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
Diethyl phthalate	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
Dimethyl phthalate	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
2,4-Dichlorophenol	ND	100	µg/L	1	11/1/2010 1:08:54 PM
2,4-Dimethylphenol	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
4,6-Dinitro-2-methylphenol	ND	100	μg/L	1	11/1/2010 1:08:54 PM
2,4-Dinitrophenol	ND	100	µg/L	1	11/1/2010 1:08:54 PM
2,4-Dinitrotoluene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
2,6-Dinitrotoluene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Fluoranthene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Fluorene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Hexachlorobenzene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Hexachlorobutadiene	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
Hexachlorocyclopentadiene	ND	50.0	µg/∟	1	11/1/2010 1:08:54 PM
Hexachioroethane	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Indenc(1,2,3-cd)pyrene	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
Isophorone	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
2-Methylnaphthalene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
2-Methylphenol	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
3+4-Methylphenol	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
N-Nitrosodi-n-propylamine	ИD	50.0	μg/L	1	11/1/2010 1:08:54 PM
N-Nitrosodimethylamine	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
N-Nitrosodiphenylamine	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
Naphthalene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
2-Nitroaniline	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
3-Nitroaniline	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
4-Nitroaniline	ND	100	µ <b>g/L</b>	1	11/1/2010 1:08:54 PM
Nitrobenzene	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
2-Nitrophenoi	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
4-Nitrophenol	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- Analyte detected below quantitation limits
- Non-Chlorinated NC
- PQL Practical Quantitation Limit

- Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits

Page 2 of 7

Date: 15-Nov-10

**CLIENT:** 

Western Refining Southwest, Inc.

Lab Order:

1010B70

Client Sample ID: Injection Well

Collection Date: 10/25/2010 10:20:00 AM

Project:

Injection Well 4th QTR 10-25-10

Date Received: 10/27/2010

Lab ID:

1010B70-01

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
<b>EPA METHOD 8270C: SEMIVOLATIL</b>	ES				Analyst: JDC
Pentachlorophenol	ND	100	μg/L	1	11/1/2010 1:08:54 PM
Phenanthrene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Phenol	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Pyrene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Pyridine	ND	50.0	µg/L	1	11/1/2010 1:08:54 PM
1,2,4-Trichlorobenzene	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
2,4,5-Trichlorophenol	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
2,4,6-Trichlorophenol	ND	50.0	μg/L	1	11/1/2010 1:08:54 PM
Surr: 2,4,6-Tribromophenol	53.9	17.5-104	%REC	1	11/1/2010 1:08:54 PM
Surr: 2-Fluorobiphenyl	38.3	30.9-98.9	%REC	1	11/1/2010 1:08:54 PM
Surr: 2-Fluorophenol	32.0	12.4-90.1	%REC	· 1	11/1/2010 1:08:54 PM
Surr: 4-Terphenyl-d14	53.2	43.5-91.9	%REC	1	11/1/2010 1:08:54 PM
Surr: Nitrobenzene-d5	40.6	26.2-108	%REC	1	11/1/2010 1:08:54 PM
Surr: Phenol-d5	24.9	11.8-73.1	%REC	1	11/1/2010 1:08:54 PM
EPA METHOD 8260B: VOLATILES					Analyst: MMS
Benzene	ND	1.0	μg/L	1	10/29/2010 5:02:06 PM
Toluene	ND	1.0	µg/L	1	10/29/2010 5:02:06 PM
Ethylbenzene	ND	1.0	μg/L	1	10/29/2010 5:02:08 PM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	10/29/2010 5:02:06 PM
1,2,4-Trimethy/benzene	ND	1.0	μg/L	1	10/29/2010 5:02:06 PM
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	10/29/2010 5:02:06 PM
1,2-Dichloroethane (EDC)	ND	1.0	µg/L	1	10/29/2010 5:02:06 PM
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	10/29/2010 5:02:06 PM
Naphthalene	ND	2.0	μg/L	1	10/29/2010 5:02:06 PM
1-Methylnaphthalene	ND	4.0	μg/L	1	10/29/2010 5:02:06 PM
2-Methylnaphthalene	ND	4.0	µg/L	1	10/29/2010 5:02:06 PM
Acetone	340	50	μg/L	5	11/1/2010 8:05:20 PM
Bromobenzene	ND.	1.0	μg/L	1	10/29/2010 5:02:06 PM
Bromodichloromethane	ND	1.0	μg/L	1	10/29/2010 5:02:06 PM
Bromoform	ND	1.0	μg/L	1	10/29/2010 5:02:06 PM
Bromomethane	ND	3.0	µg/L	1	10/29/2010 5:02:06 PM
2-Butanone	ND	10	μg/L	1	10/29/2010 5:02:06 PM
Carbon disulfide	ND	10	μg/L	1	10/29/2010 5:02:06 PM
Carbon Tetrachloride	ND	1.0	μg/L	1	10/29/2010 5:02:06 PM
Chlorobenzene	ND	1.0	μg/L	1	10/29/2010 5:02:06 PM
Chloroethane	ND	2.0	μg/L	1	10/29/2010 5:02:06 PM
Chloroform	ND	1.0	μg/L	1	10/29/2010 5:02:06 PM
Chloromethane	ND	3.0	μg/L	1	10/29/2010 5:02:06 PM
2-Chlorotoluene	ND	1.0	μg/L.	1	10/29/2010 5:02:06 PM
4-Chiorotoluene	ND	1.0	µg/L	1	10/29/2010 5:02:06 PM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 3 of 7



Date: 15-Nov-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

1010B70

Project:

Injection Well 4th QTR 10-25-10

Lab ID:

1010B70-01

Client Sample ID: Injection Well

Collection Date: 10/25/2010 10:20:00 AM

Date Received: 10/27/2010

Matrix: AQUEOUS

Analyses	Result	PQL	Qual U	Jnits	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: MM
cis-1,2-DCE	ND	1.0	μ	ıg/L	1	10/29/2010 5:02:06 PM
cis-1,3-Dichloropropene	ND	1.0	μ	ıg/L	1	10/29/2010 5:02:06 PM
1,2-Dibromo-3-chloropropane	ND	2.0	·μ	ıg/L	1	10/29/2010 5:02:06 PM
Dibromochloromethane	ND	1.0	μ	ıg/L	1	10/29/2010 5:02:06 PM
Dibromomethane	ND	1.0	μ	ıg/L	1	10/29/2010 5:02:08 PM
1,2-Dichlorobenzene	ND	1.0	μ	ıg/L	1	10/29/2010 5:02:06 PM
1,3-Dichlorobenzene	ND	1.0	μ	ıg/L	1	10/29/2010 5:02:06 PM
1,4-Dichlorobenzene	ND	1.0	μ	ıg/L	1	10/29/2010 5:02:06 PM
Dichlorodifluoromethane	ND	1.0	μ	ıg/L	1	10/29/2010 5:02:06 PM
1.1-Dichloroethane	.ND	1.0	μ	ıg/L	1	10/29/2010 5:02:06 PM
1,1-Dichloroethene	ND	1.0	μ	ıg/L	1	10/29/2010 5:02:06 PM
1,2-Dichloropropane	ND	1.0	μ	ıg/L	1	10/29/2010 5:02:06 PM
1,3-Dichloropropane	ND	1.0		ıg/L	1	10/29/2010 5:02:06 PM
2,2-Dichloropropane	ND	2.0	μ	ıg/L	1	10/29/2010 5:02:06 PM
1,1-Dichioropropene	ND	1.0		ig/L	1	10/29/2010 5:02:06 PM
Hexachlorobutadiene	ND	1.0		ıg/L	1	10/29/2010 5:02:06 PM
2-Hexanone	ND	10		ıg/L	1	10/29/2010 5:02:06 PM
isopropylbenzene	ND	1.0		ıg/L	1	10/29/2010 5:02:06 PM
4-Isopropyltoluene	ND	1.0	μ	ıg/L	1	10/29/2010 5:02:06 PM
4-Methyl-2-pentanone	ND	10		ıg/L	1	10/29/2010 5:02:06 PM
Methylene Chloride	ND	3.0	μ	ıg/L	1	10/29/2010 5:02:06 PM
n-Butylbenzene	ND	. 1.0	-	ıg/L	1	10/29/2010 5:02:06 PM
n-Propylbenzene	ND	1.0		ıg/L	1	10/29/2010 5:02:06 PM
sec-Butylbenzene	ND	1,0		ıg/L	1	10/29/2010 5:02:06 PM
Styrene	ND	1.0		ıg/L	1	10/29/2010 5:02:06 PM
tert-Butylbenzene	ND	1.0		ig/L	1	10/29/2010 5:02:06 PM
1,1,1,2-Tetrachioroethane	ND	1.0		rg/L	1	10/29/2010 5:02:06 PM
1,1,2,2-Tetrachloroethane	ND	2.0		ıg/L	1	10/29/2010 5:02:06 PM
Tetrachloroethene (PCE)	ND	1.0		ıg/L	1	10/29/2010 5:02:06 PM
trans-1,2-DCE	ND	1.0		ıg/L	1	10/29/2010 5:02:06 PM
trans-1,3-Dichloropropene	ND	1.0		ıg/L	1	10/29/2010 5:02:06 PM
1,2,3-Trichlorobenzene	ND	1.0		ig/L	1	10/29/2010 5:02:08 PM
1,2,4-Trichlorobenzene	ND	1.0		ıg/L	1	10/29/2010 5:02:06 PM
1,1,1-Trichloroethane	ND	1.0		ig/L	1	10/29/2010 5:02:06 PM
1.1.2-Trichloroethane	ND	1.0		ıg/L	1	10/29/2010 5:02:06 PM
Trichloroethene (TCE)	ND	1.0		ıg/L	1	10/29/2010 5:02:06 PM
Trichlorofluoromethane	ND	1.0		ig/L	1	10/29/2010 5:02:06 PM
1,2,3-Trichloropropane	ND	2.0		ıg/L	1	10/29/2010 5:02:06 PM
Vinyl chloride	ND	1.0		ig/L	1	10/29/2010 5:02:06 PM
Xylenes, Total	ND	1.5		ıg/L	1	10/29/2010 5:02:06 PM
Surr: 1,2-Dichloroethane-d4	97.5	77.7-113		6REC	1	10/29/2010 5:02:06 PM



- Value exceeds Maximum Contaminant Level
- Estimated value E
- Analyte detected below quantitation limits
- NC Non-Chlorinated
- Practical Quantitation Limit

- Analyte detected in the associated Method Blank В
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
  - Spike recovery outside accepted recovery limits

Page 4 of 7

Date: 15-Nov-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

Project:

1010B70

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Injection Well 4th QTR 10-25-10

Lab ID:

1010B70-01

Client Sample ID: Injection Well

Collection Date: 10/25/2010 10:20:00 AM

Date Received: 10/27/2010 Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: MMS
Surr: 4-Bromofluorobenzene	92.2	76.4-106	•	%REC	1	10/29/2010 5:02:06 PM
Surr: Dibromofluoromethane	101	91.6-125	4	%REC	1	10/29/2010 5:02:06 PM
Surr: Toluene-d8	97.8	92.3-107	•	%REC	1	10/29/2010 5:02:06 PM
SM 2320B: ALKALINITY						Analyst: IC
Alkalinity, Total (As CaCO3)	280	20	1	mg/L CaCO3	1	11/3/2010 3:42:00 PM
Carbonate	ND	2.0	ı	mg/L CaCO3	1	11/3/2010 3:42:00 PM
Bicarbonate	280	20	ľ	ng/L CaCO3	1	11/3/2010 3:42:00 PM
EPA 120.1: SPECIFIC CONDUCTANCE					**	Analyst: IC
Specific Conductance	1400	0.010	ŀ	umhos/cm	1	11/3/2010 3:42:00 PM
SM4500-H+B: PH						Analyst: IC
pΗ	7.16	0.100	ŧ	oH units	1	11/3/2010 3:42:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIE	s					Analyst: <b>KS</b>
Total Dissolved Solids	982	40.0	r	ng/L	1	11/1/2010 7:37:00 AM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
  - S Spike recovery outside accepted recovery limits

Page 5 of 7



Date: 15-Nov-10

CLIENT:

Western Refining Southwest, Inc.

Lab Order: Project:

Lab ID:

1010B70

Injection Well 4th QTR 10-25-10

1010B70-02

Collection Date:

Date Received: 10/27/2010

Client Sample ID: Trip Blank

Matrix: TRIP BLANK

Analyses	Result	PQL Q	ual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	<del></del>			·	Analyst: BDI
Benzene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
Toluene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PN
Ethylbenzene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PN
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	10/28/2010 4:52:05 PN
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PN
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
1,2-Dibromoethane (EDB)	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
Naphthalene	ND	2.0	µg/L	1	10/28/2010 4:52:05 PN
1-Methylnaphthalene	ND	4.0	μg/L	1	10/28/2010 4:52:05 PM
2-Methylnaphthalene	ND	4.0	µg/L	1	10/28/2010 4:52:05 PM
Acetone	ND	10	μg/L	1	10/28/2010 4:52:05 PM
Bromobenzene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
Bromodichloromethane	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
Bromoform	ND	1,0	μg/L	1	10/28/2010 4:52:05 PM
Bromomethane	ND	3.0	μg/L	1	10/28/2010 4:52:05 PM
2-Butanone	ND	10	μg/L	1	10/28/2010 4:52:05 PM
Carbon disulfide	ND	10	μ <b>g/L</b>	1	10/28/2010 4:52:05 PM
Carbon Tetrachloride	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
Chlorobenzene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
Chloroethane	ND	2.0	μg/L	1	10/28/2010 4:52:05 PM
Chloroform	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
Chloromethane	ND	3.0	µg/L	1	10/28/2010 4:52:05 PM
2-Chlorotoluene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
4-Chlorotoluene	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
cis-1,2-DCE	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
1,2-Dibromo-3-chloropropane	ND	2.0	µg/L	1	10/28/2010 4:52:05 PM
Dibromochloromethane	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
Dibromomethane	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
1,2-Dichlorobenzene	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
1,3-Dichlorobenzene	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
1,4-Dichlorobenzene	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
Dichlorodifluoromethane	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
i,1-Dichloroethane	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
1,1-Dichloroethene	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
1,2-Dichloropropane	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
1,3-Dichloropropane	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
2,2-Dichloropropane	ND	2.0	µg/L	1	10/28/2010 4:52:05 PM
1,1-Dichloropropene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
Hexachlorobutadiene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM



#### Qualiflers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits

Page 6 of 7

Date: 15-Nov-10

**CLIENT:** 

Western Refining Southwest, Inc.

Lab Order:

1010B70

Injection Well 4th QTR 10-25-10

Project: Lab ID:

1010B70-02

Client Sample ID: Trip Blank

**Collection Date:** 

Date Received: 10/27/2010

Matrix: TRIP BLANK

Analyses	Result .	PQL	Quai Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES		· · · · · · · · · · · · · · · · · · ·			Analyst: BDH
2-Hexanone	ND	10	μg/L	1	10/28/2010 4:52:05 PM
Isopropylbenzene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
4-Isopropyltoluene	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
4-Methyl-2-pentanone	ND	10	μg/L	1	10/28/2010 4:52:05 PM
Methylene Chloride	ND	3.0	μg/L	1	10/28/2010 4:52:05 PM
n-Butylbenzene	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
n-Propylbenzene	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
sec-Butylbenzene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
Styrene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
tert-Butylbenzene	ND	1.0	· μg/L	1	10/28/2010 4:52:05 PM
1,1,1,2-Tetrachioroethane	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	10/28/2010 4:52:05 PM
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
trans-1,2-DCE	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
1,1,1-Trichloroethane	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
1,1,2-Trichloroethane	ND	1.0	µg/L	1	10/28/2010 4:52:05 PM
Trichloroethene (TCE)	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
Trichlorofluoromethane	ND	1.0	μg/L	1	10/28/2010 4:52:05 PM
1,2,3-Trichloropropane	ND	2.0	μg/L	1	10/28/2010 4:52:05 PM
Vinyl chloride	ND	1.0	µg/L	1 .	10/28/2010 4:52:05 PM
Xylenes, Total	ND	1.5	μg/L	1	10/28/2010 4:52:05 PM
Surr: 1,2-Dichloroethane-d4	94.4	77.7-113	%REC	1	10/28/2010 4:52:05 PM
Surr: 4-Bromofluorobenzene	105	76.4-106	%REC	1	10/28/2010 4:52:05 PM
Surr: Dibromofluoromethane	98.6	91.6-125	%REC	1	10/28/2010 4:52:05 PM
Surr: Toluene-d8	102	92.3-107	%REC	1	10/28/2010 4:52:05 PM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- Estimated value E
- Analyte detected below quantitation limits
- NC Non-Chlorinated
- PQL Practical Quantitation Limit

- Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits

Page 7 of 7

#### Inorganic non-metals

Client: Hall Environmental Analysis Laboratory

Description: 1010B70-01E/injection Well

ate Sampled:10/25/2010 1020 Date Received: 10/29/2010

Laboratory ID: LJ29015-001

Matrix: Aqueous

**Prep Method** Batch **Analytical Method** Dilution **Analysis Date** Analyst **Prep Date** Run 46089 (Ignitability) 1010A 1 11/08/2010 1730 SAS 1 1 (pH) 9040C 1 10/30/2010 1251 SMH 45478 1 (Reactive Cya) 7.3.3 1 11/09/2010 1739 PMM 11/09/2010 1000 SNM 11/09/2010 1000 (Reactive Sul) 7.3.4 1 11/09/2010 1654 1

Parameter	CAS Number	Analytical Method	Result	Q PQL	MDL	Units	Run
Ignitability (Pensky-Martens Closed-Cup)		1010A	>140			°F	1
Hq		9040C	7.04	0.000	0.000	su	1
Reactive Cyanide		7.3.3	ND	50		mg/kg	1
Reactive Sulfide		7.3.4	ND	50		mg/kg	1

PQL = Practical quantitation limit

8 = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the MDL Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

J = Estimated result < PQL and > MOL

P = The RPD between two GC columns exceeds 40% N = Recovery is out of criteria

H = Out of holding time

aly Environmental Services, Inc.

Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.sheatylab.com

Page: 4 of 4

Level 1 Report v2.1

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10-25-10

Work Order:

1010B70

Analyte	Result	Units	PQL	SPK Va S	SPK ref	%Rec L	.owLimit H	ighLimit %RPD	RPDLimit Qual
Method: EPA Method 300.0:	Anions								
Sample ID: MB		MBLK				Batch ID:	R41922	Analysis Date:	11/2/2010 9:40:55 AM
Chloride	ND	mg/L	0.50						
Sulfate	ND	mg/L	0.50						
Sample ID: MB		MBLK				Batch ID:	R41922	Analysis Date:	11/2/2010 11:42:54 PM
Chloride	ND	mg/L	0.50						
Sulfate	ND	mg/L	0.50						
Sample ID: LCS		LCS				Batch ID:	R41922	Analysis Date:	11/2/2010 9:58:19 AN
Chloride	5.060	mg/L	0.50	5	0	101	90	110	
Sulfate	10.25	mg/L	0.50	10	0	102	90	110	
Sample ID: LCS		LCS				Batch ID:	R41922	Analysis Date:	11/3/2010 12:00:19 AN
Chloride	4.993	mg/L	0.50	5	0	99.9	90	110	
Sulfate	10.05	mg/L	0.50	10	0	101	90	110	
Method: SM 2320B: Alkalinit	y								
Sample ID: MB		MBLK				Batch ID:	R41937	Analysis Date:	11/3/2010 12:01:00 PN
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20						
Carbonate	ND	mg/L Ca	2.0						
Bicarbonate	ND	mg/L Ca	20						
Sample ID: MB-2		MBLK				Batch ID:	R41937	Analysis Date:	11/3/2010 5:04:00 PN
Alkalinity, Total (As CaCO3)	ND	mg/L Ca	20						
Carbonate	ND	mg/L Ca	2.0						•
Bicarbonate	ND	mg/L Ca	20						
Sample ID: LCS		LCS				Batch ID:	R41937	Analysis Date:	11/3/2010 12:07:00 PM
Alkalinity, Total (As CaCO3)	79.92	mg/L Ca	20	80	0	99.9	96.5	104	
Sample ID: LCS-2		LCS				Batch ID:	R41937	Analysis Date:	11/3/2010 5:10:00 PN
Alkalinity, Total (As CaCO3)	79.32	mg/L Ca	20	80	0	99.2	96.5	104	

Ons	ılifi	ers:

E Estimated value

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

J Analyte detected below quantitation limits

## **QA/QC SUMMARY REPORT**

lient: Project: Western Refining Southwest, Inc. Injection Well 4th QTR 10-25-10

Work Order:

1010B70.---

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec L	owLimit His	ghLimit	%RPD	RPDLimi	Qual
Method: EPA Method 8	260B: VOLATILES									
Sample ID: 5mL rb		MBLK			Batch ID:	R41845	Analysi	s Date:	10/28/2010	10:12:01 AN
Benzene	ND	μg/L	1.0							
Toluene	ND	μg/L	1.0							
Ethylbenzene	ND .	μg/L	1.0							
Methyl tert-butyl ether (MTB	E) ND	μg/L	1.0							
1,2,4-Trimethylbenzene	ND	µg/L	1.0							
1,3,5-Trimethylbenzene	ND	μg/L	1.0							
1,2-Dichloroethane (EDC)	ND	µg/L	1.0							
1,2-Dibromoethane (EDB)	ND	μg/L	1.0							
Naphthalene	ND	µg/L	2.0						,	
1-Methylnaphthalene	ND	μg/L	4.0							
2-Methylnaphthalene	ND	μg/L	4.0							
Acetone	ND	µg/L	10							
Bromobenzene	ND	μg/L	1.0							
Bromodichloromethane	ND	μg/L	1.0							
Bromoform	ND	µg/L	1.0							
Bromomethane	ND	µg/L	3.0							
2-Butanone	ND	μg/L	10							
Carbon disulfide	ND	μg/L	10							
arbon Tetrachloride	ND	μg/L	1.0							
nlorobenzene	ND	μg/L	1.0							
Chloroethane	ND	µg/L	2.0							
Chloroform	ND	μg/L	1.0							
Chloromethane	ND	µg/L	3.0							
2-Chlorotoluene	ND	µg/L	1.0							
4-Chlorotoluene	ND	µg/L	1.0							
cis-1,2-DCE	ND	µg/L	1.0							
cis-1,3-Dichloropropene	ND	µg/L	1.0							
1,2-Dibromo-3-chloropropand	e ND	μg/L	2.0							
Dibromochloromethane	ND	μg/L	1.0							
Dibromomethane	ND	μg/L	1.0							
1,2-Dichlorobenzene	ND	µg/L	1.0							
1,3-Dichiorobenzene	ND	µg/L	1.0							
1,4-Dichlorobenzene	ND	μg/L	1.0							
Dichlorodifluoromethane	ND	µg/L	1.0							
1,1-Dichloroethane	ND	μg/L	1.0							
1,1-Dichloroethene	ND	µg/L	1.0							
1,2-Dichloropropane	ND	µg/L	1.0	•						
1,3-Dichloropropane	ND	µg/L	1.0							
2,2-Dichloropropane	ND	µg/L	2.0							
1,1-Dichloropropene	ND	µg/L	1.0							
Hexachlorobutadiene	ND	μg/L	1.0							
2-Hexanone	ND	μg/L	10							
sopropylbenzene	ND	µg/L	1.0							
I-isopropyltoluene	ND	μg/L	1.0							

Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

Project: Injection Well 4th QTR 10-25-10

Work Order:

1010B70

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	owLimit Hi	ghLimit %F	RPD RPDLimit Qual
Method: EPA Method 8260E	: VOLATILES							
Sample ID: 5mL rb		MBLK			Batch ID:	R41845	Analysis Da	te: 10/28/2010 10:12:01 AN
4-Methyl-2-pentanone	ND	µg/L	10	•				
Methylene Chloride	ND	µg/L	3.0					ž
n-Butylbenzene	ND	μġ/L	1.0					
n-Propylbenzene	ND	μg/L	1.0					
sec-Butylbenzene	ND	μg/L	1.0					
Styrene	ND	μg/L	1.0					
tert-Butylbenzene	ND	μg/L	1.0					
1,1,1,2-Tetrachlorcethane	ND	μg/L	1.0					
1,1,2,2-Tetrachloroethane	ND	μg/L	2.0					
Tetrachlorcethene (PCE)	ND	μg/L	1.0					
trans-1,2-DCE	ND	µg/L	1.0					
trans-1,3-Dichloropropene	ND	μg/L	1.0					
1,2,3-Trichlorobenzene	ND	μg/L	1.0					
1,2,4-Trichlorobenzene	ND	μg/L	1.0					
1,1,1-Trichloroethane	ND	μg/L	1.0					
1,1,2-Trichloroethane	ND	μg/L	1.0					
Trichloroethene (TCE)	ND	μg/L	1.0					
Trichlorofluoromethane	ND	μg/L	1.0					
1,2,3-Trichloropropane	ND	µg/L	2.0					
Vinyl chloride	ND	μg/L	1.0					
Xylenes, Total	ND	μg/L	1.5					
Sample ID: 6ml rb		MBLK			Batch ID:	R41879	Analysis Dat	e: 10/29/2010 10:04:17 AM
Benzene	ND	μg/L	1.00					
Toluene	ND	μg/L	1.00					
Ethylbenzene	ND	µg/L	1.00					
Methyl tert-butyl ether (MTBE)	ND	μg/L	1.00					
1,2,4-Trimethylbenzene	ND	μg/L	1.00					
,3,5-Trimethylbenzene	ND	μg/L	1.00					
,2-Dichloroethane (EDC)	ND	μg/L	1.00					
I,2-Dibromoethane (EDB)	ND	μg/L	1.00					
Naphthalene	ND	μg/L	2.00					
-Methylnaphthalene	ND	μg/L	4.00					
?-Methylnaphthalene	ND	µg/L	4.00					
Acetone	ND	µg/L	10.0					
Bromobenzene	ND	μg/L	1.00					
Bromodichloromethane	ND	µg/L	1.00					
Bromoform	ND	µg/L	1.00					
romomethane	ND	µg/L	3.00					
-Butanone	ND	µg/L	10.0					
arbon disulfide	ND	µg/L	10.0					
arbon Tetrachloride	ND	µg/L	1.00					
hlorobenzene	ND	μg/L	1.00					
hloroethane	ND	µg/L	2.00					
hloroform	ND	μg/L	1.00					

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

Western Refining Southwest, Inc. Injection Well 4th QTR 10-25-10

Work Order:

1010B70

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec L	owLimit: H	ighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B	: VOLATILES									
Sample ID: 5ml rb		MBLK			Batch ID:	R41879	Analysi	s Date:	10/29/2010 1	0:04:17 AN
Chloromethane	ND	μg/L	3.00							
2-Chlorotoluene	· ND	μg/L	1.00							
4-Chlorotoluene	ND ⁻	µg/L	1.00							
cis-1,2-DCE	ND	μg/L	1.00							
cis-1,3-Dichloropropene	ND	μg/L	1.00							
1,2-Dibromo-3-chloropropane	ND	µg/L	2.00							
Dibromochloromethane	NĐ	µg/L	1.00							
Dibromomethane	ND	μg/L	1.00							
1,2-Dichlorobenzene	ND	µg/L	1.00							
1,3-Dichtorobenzene	ND	μg/L	1.00							
1,4-Dichlorobenzene	ND	µg/L	1.00							
Dichlorodifluoromethane	ND	μg/L	1.00							
1,1-Dichloroethane	ND	µg/L	1.00							
1,1-Dichloroethene	ND	μg/L	1.00							
1,2-Dichloropropane	ND	μg/L	1.00							
1,3-Dichloropropane	ND	μg/L	1.00							
2,2-Dichloropropane	ND	µg/L	2.00							
1,1-Dichloropropene	ND	µg/L	1.00							
achlorobutadiene	ND	μg/L	1.00							
ехапопе	ND	μg/L	10.0			•				
Isopropylbenzene	ND	μg/L	1.00							
4-Isopropyltoluene	ND	µg/L	1.00							
4-Methyl-2-pentanone	ND	μg/L	10.0							
Methylene Chloride	ND	μg/L	3.00							
n-Butylbenzene	ND	µg/L	1.00							
n-Propylbenzene	ND	μg/L	1.00							
sec-Butylbenzene	ND	μg/L	1.00							
Styrene	ND	μg/L	1.00							
tert-Butylbenzene	ND	µg/L	1.00							
1,1,1,2-Tetrachloroethane	ND	µg/L	1.00							
1,1,2,2-Tetrachloroethane	ND	μg/L	2.00							
Fetrachloroethene (PCE)	ND	μg/L	1.00							
rans-1,2-DCE	ND	μg/L	1.00							
rans-1,3-Dichloropropene	ND	μg/L	1.00							
1,2,3-Trichlorobenzene	ND	µg/L	1.00							
1,2,4-Trichlorobenzene	ND	μg/L	1.00							
,1,1-Trichloroethane	ND	μg/L	1.00							
1,1,2-Trichloroethane	ND	μg/L	1.00							
Frichloroethene (TCE)	ND	μg/L	1.00							
richlorofluoromethane	ND	μg/L	1.00							
,2,3-Trichloropropane	ND	µg/L	2.00							
/inyl chloride	ND	μg/L	1.00							
(ylenes, Total	ND	μg/L	1.50							
Sample ID: b6		MBLK			Batch ID:	R41901	Analysis	Date:	11/1/2010 4	:25:32 PM

ND

Estimated value E

J Analyte detected below quantitation limits Not Detected at the Reporting Limit

Н Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project: Injection Well 4th QTR 10-25-10

Work Order:

1010B70

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Analyte	Result	Units	PQL	SPK Va SPK ref್ಯಪ್ರಿಣ%Rec LowLimit HighLimi	t %RPD	RPDLimit	Qual
Method: EPA Method 8260B	: VOLATILES	, , , ,					
Sample ID: b6		MBLK		Batch ID: R41901 Anal	ysis Date:	11/1/2010	4:25:32 PN
Benzene	ND	µg/L	1.0				
Toluene	ND	μg/L	1.0				
Ethylbenzene	ND	μg/L	1.0				
Methyl tert-butyl ether (MTBE)	ND	µg/L	1.0				
1,2,4-Trimethylbenzene	ND	μg/L	1.0				
1,3,5-Trimethylbenzene	ND	μg/L	1.0				
1,2-Dichloroethane (EDC)	ND	μg/L	1.0				
1,2-Dibromoethane (EDB)	ND	μg/L	1.0				
Naphthalene	ND	µg/L	2.0				
1-Methylnaphthalene	ND	μg/L	4.0				
2-Methylnaphthalene	ND	μg/L	4.0				
Acetone	ND	µg/L	10				
Bromobenzene	ND	µg/L	1.0				
Bromodichloromethane	ND	μg/L	1.0			-	
Bromoform	ND	μg/L	1.0				
Bromomethane	ND	µg/L	3.0				\
2-Butanone	ND	μg/L	10				
Carbon disulfide	ND	μg/L	10				
Carbon Tetrachloride	ND	μg/L	1.0				
Chlorobenzene	ND	μg/L	1.0				•
Chloroethane	ND	µg/L	2.0				
Chloroform	ND	μg/L	1.0				
Chloromethane	ND	µg/L	3.0				
2-Chlorotoluene	ND	μg/L	1.0				
4-Chlorotoluene	ND	μg/L	1.0				
cis-1,2-DCE	ND	μg/L	1.0				
cis-1,3-Dichloropropene	ND	μg/L	1.0	•			
1,2-Dibromo-3-chloropropane	ND	µg/L	2.0				
Dibromochloromethane	ND	μg/L	1.0				
Dibromomethane	ND	µg/L	1.0				
1,2-Dichlorobenzene	ND	µg/L	1.0				
1,3-Dichlorobenzene	ND	µg/L	1.0				
1,4-Dichtorobenzene	ND	μg/L	1.0				
Dichlorodifluoromethane	ND	μg/L	1.0				
1,1-Dichloroethane	ND	pg/L	1.0				
1,1-Dichloroethene	ND	μg/L	1.0				
1,2-Dichloropropane	ND	µg/L	1.0				
1,3-Dichloropropane	ND	μg/L	1.0				
2,2-Dichloropropane	ND	μg/L	2.0				
1,1-Dichloropropene	ND	μg/L	1.0				
-lexachlorobutadiene	ND	μg/L	1.0				
2-Hexanone	ND	μg/L	1.0	·			
sopropylbenzene	ND	μg/L	1.0				
i-Isopropyltoluene	ND	µg/L	1.0				_



E Estimated value

J Analyte detected below quantitation limits
ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

# **QA/QC SUMMARY REPORT**

ient:
Project:

Western Refining Southwest, Inc.

Injection Well 4th QTR 10-25-10 Work Order: 1010B70

Analyte	Result	Units		SPK Va S	SPK ref	%Rec l	LowLimit H	ighLimlt %RI	PD RPDLimit Qual
Method: EPA Method 8260	B: VOLATILES								
Sample ID: b6		MBLK				Batch ID:	R41901	Analysis Date	: 11/1/2010 4:25:32 PI
4-Methyl-2-pentanone	ND	μg/L	10						
Methylene Chloride	ND	μg/L	3.0						
n-Butylbenzene	ND	μg/L	1.0						
n-Propylbenzene	ND	μg/L	1.0						
sec-Butylbenzene	ND	μg/L	1.0						
Styrene	ND	μg/L	1.0						
tert-Butylbenzene	ND	μg/L	1.0						
1,1,1,2-Tetrachloroethane	ND	μg/L	1.0						
1,1,2,2-Tetrachloroethane	ND	μg/L	2.0						
Tetrachloroethene (PCE)	ND	μg/L	1.0						
trans-1,2-DCE	ND	μg/L	1.0						
trans-1,3-Dichloropropene	ND	μg/L	1.0						
1,2,3-Trichlorobenzene	ND	µg/L	1.0						
1,2,4-Trichlorobenzene	Й	µg/L	1.0						
1,1,1-Trichloroethane	ND	µg/L	1.0						
1,1,2-Trichloroethane	ND	µg/L	1.0						
Trichloroethene (TCE)	ND	μg/L	1.0						
Trichlorofluoromethane	ND	µg/L	1.0						
3-Trichioropropane	ND	µg/L	2.0						
Inyl chloride	ND	μg/L	1.0						
Xylenes, Total	ND	μg/L	1.5						
Sample ID: 100ng Ics		LCS				Batch ID:	R41845	Analysis Date	: 10/28/2010 11:07:07 AM
Benzene	17.56	μg/L	1.0	20	0	87.8	84.6	109	
l'oluene	20.58	μg/L	1.0	20	0	103	81	114	
Chlorobenzene	20.71	μg/L	1.0	20	0	104	85.2	113	
I,1-Dichloroethene	18.74	µg/L	1.0	20	0	93.7	79.6	1 <b>24</b>	
Frichloroethene (TCE)	16.21	µg/L	1.0	20	0	81.0	78.3	102	
Sample ID: 100ng Ics		LCS				Batch ID:	R41879	Analysis Date	10/29/2010 10:59:20 AM
3enzene	18.52	μg/L	1.0	20	0	92.6	84.6	109	•
Toluene	20.62	µg/L	1.0	20	0	103	81	114	
Chlorobenzene	19.93	μg/L	1.0	20	0	99.7	85.2	113	
,1-Dichloroethene	17.62	μg/L	1.0	20	0	88.1	79.6	124	
richloroethene (TCE)	18.89	µg/L	1.0	20	0	94.5	78.3	102	
Sample ID: 100ng Ics		LCS				Batch ID:	R41901	Analysis Date	11/1/2010 3:58:01 PM
Benzene	18.85	μg/L	1.0	20	0	94.2	84.6	109	
oluene	21.15	µg/L	1.0	20	Ō	106	81	114	
Chlorobenzene	20.01	µg/L	1.0	20	0	100	85.2	113	
,1-Dichloroethene	21.46	µg/L	1.0	20	0	107	79.6	124	
richloroethene (TCE)	16.38	μg/L	1.0	20	0	81.9	78.3	102	



E Estimated value

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

J Analyte detected below quantitation limits

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

# **QA/QC SUMMARY REPORT**

Client:

Western Refining Southwest, Inc.

Project: Injection Well 4th QTR 10-25-10 Work Order:

1010B70

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	wLimit Hi	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C	: Semivolatii									
Sample ID: mb-24313		MBLK			Batch ID:	24313	Analys	is Date:	11/1/2010	9:03:09 A
Acenaphthene	ND	μg/L	10.0							
Acenaphthylene	ND	μg/L	10.0							
Aniline	ND	μg/L	10.0							
Anthracene	ND	µg/L	10.0							
Azobenzene	ND	μg/L	10.0							
Benz(a)anthracene	ND	µg/L	10.0							
Benzo(a)pyrene	ND	μg/L	10.0							
Benzo(b)fluoranthene	ND	μg/L	10.0							
Benzo(g,h,i)perylene	ND	µg/L	10.0							
Benzo(k)fluoranthene	ND	µg/L	10.0							
Benzoic acid	ND	μg/L	20.0							
Benzyl alcohol	ND	μg/L	10.0							
Bis(2-chloroethoxy)methane	ND	μg/L	10.0							
Bis(2-chloroethyl)ether	ND	µg/L	10.0							
Bis(2-chloroisopropyl)ether	ND	µg/L	10.0							
Bis(2-ethylhexyl)phthalate	ND	µg/L	10.0							
4-Bromophenyl phenyl ether	ND	μg/L	10.0							
Butyl benzyl phthelate	ND	μg/L	10.0							
Carbazole	ND	μg/L	10.0							
4-Chloro-3-methylphenol	ND	μg/L	10.0							
4-Chloroaniline	ND	μg/L	10.0							
2-Chloronaphthalene	ND	μg/L	10.0							
2-Chlorophenol	ND	µg/L	10.0							
1-Chlorophenyl phenyl ether	ND	μg/L	10.0							
Chrysene	ND	μg/L	10.0							
Di-n-butyl phthalate	ND	µg/L	10.0					•		
Di-n-octyl phthalate	ND	μg/L	10.0							
Dibenz(a,h)anthracene	ND	μg/L	10.0							
Dibenzofuran	ND	µg/L	10.0							
,2-Dichlorobenzene	ND	μg/L	5.00							
,3-Dichlorobenzene	ND	μg/L	10.0							
.4-Dichlorobenzene	ND	μg/L	5.00							
,3'-Dichlorobenzidine	ND .	μg/L	10.0							
Diethyl phthalate	ND	μg/L	10.0							
Dimethyl phthalate	ND	μg/L	10.0							
,4-Dichlorophenol	ND	μg/L	20.0							
,4-Dimethylphenol	ND	μg/L	10.0							
,6-Dinitro-2-methylphenol	ND	μg/L	20.0							
,4-Dinitrophenol	ND	μg/L	5.00							
,4-Dinitrotoluene	ND	µg/L	5.00							
,6-Dinitrotoluene	ND	μg/L	10.0							
luoranthene	ND	µg/L	10.0							
luorene	ND	μg/L	10.0							
exachlorobenzene	ND	μg/L	5.00							

Qualifiers:

ND

Estimated value

J Analyte detected below quantitation limits Not Detected at the Reporting Limit

Н Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

Project:

Western Refining Southwest, Inc. Injection Well 4th QTR 10-25-10

Work Order:

1010B70

Analyte	Paradia Result	Units	PQL	SPK Va SPK n	ef %Rec	LowLimit H	lighLimlt	%RPD	RPDLimit	Qual
Method: EPA Method	8270C: Semivolatiles									
Sample ID: mb-24313		MBLK			Batch II	D: <b>2431</b> 3	3 Analys	sis Date:	11/1/2010	9:03:09 AI
Hexachlorobutadiene	ND	μg/L	10.0							
Hexachlorocyclopentadien	e ND	μg/L	10.0	•						
Hexachloroethane	ND	μg/L	5.00							
Indeno(1,2,3-cd)pyrene	ND	μg/L	10.0							
Isophorone	ND	µg/L	10.0							
2-Methylnaphthalene	ND	μg/L	10.0							
2-Methylphenol	ND	μg/L	5.00							
3+4-Methylphenol	ND	μg/L	5.00							
N-Nitrosodi-n-propylamine	ND	μg/L	10.0							
N-Nitrosodimethylamine	ND	μg/L	10.0							
N-Nitrosodiphenylamine	ND	µg/L	10.0							
Naphthalene	ND	μg/L	10.0							
2-Nitroaniline	ND	μg/L	10.0							
3-Nitroaniline	ND	μg/L	10.0							
4-Nitroaniline	ND	µg/L	20.0							
Nitrobenzene	ND	µg/L	5.00							
2-Nitrophenol	ND	μg/L	10.0							
4-Nitrophenol	ND	μg/L	10.0							
entachlorophenol	ND	μg/L	5.00							
nenanthrene	ND	µg/L	10.0							
Phenol	ND	μg/L	10.0							
Pyrene	ND	µg/L	10.0							
Pyridine	ND	μg/L	5.00							
1,2,4-Trichlorobenzene	ND	µg/L	10.0							
2,4,5-Trichlorophenol	ND	μ <b>g/L</b>	10.0							
2,4,6-Trichlorophenol	ND	µg/L	10.0							
Sample ID: Ics-24313		LCS			Batch ID	24313	Analysi	s Date:	11/1/2010 10	:04:42 AN
Acenaphthene	61.28	μg/L	10.0	100 0	61.3	31	99.4			•
I-Chloro-3-methylphenol	60.38	µg/L	10.0	100 0	60.4	34.3	111			
2-Chlorophenol	59.32	μg/L	10.0	100 0	59.3	24.1	98.7			
,4-Dichlorobenzene	55.22	μg/L	10.0	100 0	55.2	20.6	85.6			
4-Dinitrotoluene	82.90	μg/L	10.0	100 0	82.9	26.6	126			
N-Nitrosodi-n-propylamine	60.08	µg/L	10.0	100 0	60.1	29.2	94.4			
-Nitrophenol	87.64	μg/L	10.0	100 0	67.6	9.87	86			
Pentachlorophenol	60.88	μg/L	20.0	100 0	60.9	20	97.8			
henol	50.20	μg/L	10.0	100 0	50.2	17.5	60.5			
yrene	57.70	μg/L	10.0	100 0	57.7	46.8	92.2			
,2,4-Trichlorobenzene	55.00	µg/L	10.0	100 0	55.0	25.2	92.3			
ample ID: Icsd-24313		LCSD			Batch ID:		Analysis	s Date:	11/1/2010 10	:34:07 AM
cenaphthene	60.02	μg/L	10.0	100 0	60.0	31	99.4	2.08	30	
-Chloro-3-methylphenol	64.00	μg/L	10.0	100 0	64.0	34.3	111	5.82	30.8	
-Chlorophenol	58.62	μg/L μg/L	10.0	100 0	58.6	34.3 24.1	98.7	5.62 1.19	30.6 31	
4-Dichlorobenzene	55.38		10.0	100 0						
,4-Dichloropenzene -4-Dinitrotoluene	55.38 81.68	μg/L			55.4	20.6	85.6	0.289	37	
-Dumotomana	01.00	μ <b>g/L</b>	10.0	100 0	81.7	26.6	126	1.48	34.5	•
Qualifiers:									· · · · · · · · · · · · · · · · · · ·	

ND

Ε Estimated value

J Analyte detected below quantitation limits Not Detected at the Reporting Limit

Н Holding times for preparation or analysis exceeded

Non-Chlorinated NC

RPD outside accepted recovery limits

## **QA/QC SUMMARY REPORT**

Client: Project: Western Refining Southwest, Inc.

Injection Well 4th QTR 10-25-10

Work Order: 1010B70

Analyte (Analyte )	Result	Units	PQL	SPK V	SPK ref	%Rec L	owLimit Hi	ghLimit	%RPD	RPDLimit (	Qual
Method: EPA Method 82700	C: Semivolatiles										
Sample ID: Icsd-24313		LCSD				Batch ID:	24313	Analysis	s Date:	11/1/2010 10:3	34:07 Al
N-Nitrosodi-n-propylamine	58.16	μg/L	10.0	100	0	58.2	29.2	94.4	3.25	30.8	
4-Nitrophenol	70.12	μ <b>g/L</b>	10.0	100	0	70.1	9.87	86	3.60	61.1	
Pentachlorophenol	60.28	μg/L	20.0	100	0	60.3	20	97.8	0.990	64.8	
Phenol	49.38	μg/L	10.0	100	0	49.4	17.5	60.5	1.65	31.4	
Pyrene	60.50	μg/L	10.0	100	0	60.5	46.8	92.2	4.74	29.8	
1,2,4-Trichlorobenzene	55.44	μg/L	10.0	100	0	55.4	25.2	92.3	0.797	30.9	
Method: EPA Method 7470:	Mercury										
Sample ID: MB-24361	•	MBLK				Batch ID:	24361	Analysis	Date:	11/3/2010 12:2	9:29 PA
Mercury	ND	mg/L	0.00020							•	
Sample ID: LCS-24361		LCS				Batch ID:	24361	Analysis	s Date:	11/3/2010 12:3	1:16 PN
Mercury	0.005075	mg/L	0.00020	0.005	0	102	80	120			
Sample ID: LCS-24361		LCS				Batch ID:	24361	Analysis	Date:	11/3/2010 12:3	3:04 PN
Mercury	0.005067	mg/L	0.00020	0.005	0	101	80	120	0.168	0	
								-,,			
Method: EPA 6010B: Total F Sample ID: MB-24343	Recoverable Met	ais MBLK				Batch ID:	24343	Analysis	Date:	11/2/2010 11:2	2:19 AN
Arsenic	ND	mg/L	0.020							,	
Barium	ND	mg/L	0.020								
Cadmium	ND	mg/L	0.0020								
Calcium	ND	mg/L	1.0								
Chromium	ND	mg/L	0.0060								
Lead	ND	mg/L	0.0050								
Magnesium	ND	mg/L	1.0								
Potassium	ND	mg/L	1.0								
Selenium	ND	mg/L	0.050								
Silver	ND	mg/L	0.0050								
Sodium	ND	mg/L	1.0								
Sample ID: LCS-24343		LCS				Batch ID:	24343	Analysis	Date:	11/2/2010 11:2	5:32 AN
Arsenic	0.5188	mg/L	0.020	0.5	0	104	80	120			
3arium	0.4969	mg/L	0.020	0.5	0	99.4	80	120			
Cadmium	0.5095	mg/L	0.0020	0.5	0	102	80	120			
Calcium	54.16	mg/L	1.0	50	0	108	80	120			
Chromium -	0.4998	mg/L	0.0060		0.0012	99.7	80	120			
.ead	0.5073	mg/L	0.0050	0.5	0	101	80	120	٠		
Magnesium	54.75	mg/L	1.0	50	0	110	80	120	•		
Potassium	57.52	mg/L	1.0	50	0	115	80	120			
Selenium	0.4797	mg/L	0.050	0.5	0	95.9	80	120			
Silver	0.5098	mg/L	0.0050	0.5	0	102	80	120			
Sodium	58.09	mg/L	1.0	50	0	116	80	120			

Oua	liffere.	,

ND

Estimated value

J Analyte detected below quantitation limits Not Detected at the Reporting Limit

Н Holding times for preparation or analysis exceeded

NC Non-Chlorinated

RPD outside accepted recovery limits R

## **QA/QC SUMMARY REPORT**

lent:

Western Refining Southwest, Inc. Injection Well 4th QTR 10-25-10

Work Order:

1010B70

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	owLimit Hi	ghLimit %RPD	RPDLimit Qual
Method: SM2540C MOD: To Sample ID: MB-24315	tal Dissolved S	Bolids MBLK			Batch ID:	24315	Analysis Date:	11/1/2010 7:37:00 AM
Total Dissolved Solids Sample ID: LCS-24315	ND	mg/L LCS	20.0		Batch ID:	24315	Analysis Date:	11/1/2010 7:37:00 AM
Total Dissolved Solids	1026	mg/L	20.0	1000 10	102	80	120	



E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

H Holding times for preparation or analysis exceeded

NC Non-Chlorinated

R RPD outside accepted recovery limits

#### Sample Receipt Checklist

Client Name WESTERN REFINING SOUT			Date Received	:	1	0/27/2010			
Work Order Number 1010B70			Received by:	LCD		۸_			
Checklist completed by:	·		Sample ID lat	oels checked		liials			
Signature  Matrix: Carrier name	UPS	Date							
	21.34								
Shipping container/cooler in good condition?	Yes	$\checkmark$	No 🗆	Not Present					
Custody seals intact on shipping container/cooler?	Yes	lacksquare	No 🗆	Not Present		Not Shipped			
Custody seals intact on sample bottles?	Yes		No 🗌	N/A	$\checkmark$				
Chain of custody present?	Yes	$\checkmark$	No 🗆						
Chain of custody signed when relinquished and received?	Yes	$\checkmark$	No 🗆						
Chain of custody agrees with sample labels?	Yes	$\checkmark$	No 🗆						
Samples in proper container/bottle?	Yes	<b>Y</b>	No 🗌						
Sample containers intact?	Yes	<b>V</b>	No 🗌						
Sufficient sample volume for indicated test?	Yes	V	No 🗆						
All samples received within holding time?	Yes	$\checkmark$	No 🗆			Number o	fpreserved		
Water - VOA vials have zero headspace? No VOA vials sub	mitted		Yes 🗹	No 🗆		bottles che pH:	ecked for		
Water - Preservation labels on bottle and cap match?	Yes	$\checkmark$	No 🗆	N/A	7	2 2			
Water - pH acceptable upon receipt?	Yes	$\checkmark$	No 🗆	N/A □	ح ک	<2()>12)uni	ess noted		
Container/Temp Blank temperature?	1.7	7°	<6° C Acceptable						
COMMENTS:			If given sufficient t	ime to cool.					
	===	:				====			
Client contacted Date contacted:	Date contacted:				Person contacted				
Contacted by: Regarding:				-					
Comments:									
				· · · · · · · · · · · · · · · · · · ·					
Corrective Action									
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	Turn-Around Time:	Standard	Project Name:	Injection 4111 4th OTR	Project #:		Project Manager:			Sampler: 186	Sample Temperatrii	Container Type and #	3-UDA	1-Liter	1-500ml	1-500m)	1-250m	-	1-50m			·		Roceived by:	Received by:
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# **Hall Environmental Analysis Laboratory**

# **QUALITY ASSURANCE PLAN**

Effective Date: February 2nd 2010

**Revision 9.2** 

www.hallenvironmental.com

Control Number: 0000095

Approved By:

Andy Freeman

**Laboratory Manager** 

Approved By:

Carolyn Swanson

Date

Quality Assurance/Quality Control Officer

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## Appendix C TCEQ Accreditation

Full list of approved analytes, methods, analytical techniques and fields of testing **Reserved, available upon request** 

# Appendix D Utah ELCP Accreditation

Full list of approved analytes, methods, analytical techniques and fields of testing **Reserved**, available upon request

## Appendix E ADHS Accreditation

Full list of approved analytes, methods, analytical techniques and fields of testing **Reserved**, available upon request

# Appendix F NMED-DWB Certification

Reserved, available upon request

# Appendix G NM DOH Certification

Reserved, available upon request

# Appendix H Terms and Definitions

Reserved, available upon request

# Appendix I Chain of Custody Record

Reserved, available upon request

## **Appendix J HEAL Forms**

Analyst Ethics and Data Integrity Agreement IDOC Certificate ADOCP Certificate Training Forms Corrective Action Report Reserved, available upon request

#### 3.0 Introduction

## **Purpose of Document**

The purpose of this Quality Assurance Plan is to formally document the quality assurance policies and procedures of Hall Environmental Analysis Laboratory, Inc. (HEAL), for the benefit of its employees, clients, and accrediting organizations. HEAL continually implements all aspects of this plan as an essential and integral part of laboratory operations in order to ensure that high quality data is produced in an efficient and effective manner.

## **Objectives**

The objective of HEAL is to achieve and maintain excellence in environmental testing. This is accomplished by developing, incorporating and documenting the procedures and policies specified by each of our accrediting authorities and outlined in this plan. A laboratory staff that is analytically competent, well qualified, and highly trained carries out these activities. An experienced management team, knowledgeable in their area of expertise, monitors them. Finally, a comprehensive quality assurance program governs laboratory practices and ensures that the analytical results are valid, defensible, reproducible, reconstructable and of the highest quality.

HEAL establishes and thoroughly documents its activities to ensure that all data generated and processed will be scientifically valid and of known and documented quality. Routine laboratory activities are detailed in method specific standard operating procedures (SOP). All data reported meets the applicable requirements for the specific method that is referenced, ORELAP, TCEQ, EPA, client specific requirements and/or State Bureaus. In the event that these requirements are ever in contention with each other, it is HEAL's policy to always follow the most prudent requirement available. For specific method requirements refer to HEAL's Standard Operating Procedures (SOP's), EPA methods, Standard Methods 20th edition, ASTM methods or state specific methods.

HEAL management ensures that this document is correct in terms of required accuracy, data reproducibility, and that the procedures contain proper quality control measures. HEAL management additionally ensures that all equipment is reliable, well maintained and appropriately calibrated. The procedures and practices of the laboratory are geared towards not only strictly following our regulatory requirements but also allowing the flexibility to conform to client specific specifications. Meticulous records are maintained for all samples and their respective analyses so that results are well documented and defensible in a court of law.

The HEAL Quality Assurance/Quality Control Officer (QA/QCO) and upper management are responsible for supervising and administering this quality assurance program, and ensuring each individual is responsible for its proper implementation. All HEAL management remains committed to the encouragement of excellence in analytical testing and will continue to provide the necessary resources and environment conducive to its achievement.

#### **Policies**

Understanding that quality cannot be mandated, it is the policy of this laboratory to provide an environment that encourages all staff members to take pride in the quality of their work. In addition to furnishing proper equipment and supplies, HEAL stresses the importance of continued training and professional development. Further, HEAL recognizes the time required for data interpretation. Therefore, no analyst should feel pressure to sacrifice data quality for data quantity. Each staff member must perform with the highest level of integrity and professional competence, always being alert to problems that could compromise the quality of their technical work.

Management and senior personnel supervise analysts closely in all operations. Under no circumstance is the willful act or fraudulent manipulation of analytical data condoned. Such acts must be reported immediately to HEAL management. Reported acts will be assessed on an individual basis and resulting actions could result in dismissal. The laboratory staff is encouraged to speak with lab managers or senior management if they feel that there are any undo commercial, financial, or other pressures, which might adversely affect the quality of their work; or in the event that they suspect that data quality has been compromised in any way. HEAL's Quality Assurance/Quality Control Officer is available if any analyst and/or manager wishes to anonymously report any suspected or known breaches in data integrity.

All proprietary rights and client information at HEAL (including national security concerns) are considered confidential. No information will be given out without the express verbal or written permission of the client. All reports generated will be held in the strictest of confidence.

This is a controlled document. Each copy is assigned a unique tracking number and when released to a client or accrediting agency the QA/QCO keeps the tracking number on file. This document is reviewed on an annual basis to ensure that it is valid and representative of current practices at HEAL.

## 4.0 Organization and Responsibility

## Company

HEAL is accredited in accordance with the 2003 NELAC standard (see NELAC accredited analysis list in the appendix), through ORELAP and TCEQ and by the Arizona Department of Health Services. Additionally, HEAL is qualified as defined under the State of New Mexico Water Quality Control Commission regulations and the New Mexico State Drinking Water Bureau. HEAL is a locally owned small business that was established in 1991. HEAL is a full service environmental analysis laboratory with analytical capabilities that include both organic and inorganic methodologies and has performed analyses of soil, water, air as well as various other matrices for many sites in the region. HEAL's client base includes local, state and federal agencies, private consultants, commercial industries as well as individual homeowners. HEAL has performed as a subcontractor to the state of New Mexico and to the New Mexico Department of Transportation. HEAL has been acclaimed by its customers as producing quality results and as being adaptive to client-specific needs.

The laboratory is divided into an organic section, and an inorganic section. Each section has a designated manager/technical director. The technical directors report directly to the laboratory manager, who oversees all operations.

#### Certifications

ORELAP - NELAC Oregon Primary accrediting authority.

TCEQ - NELAC Texas Secondary accrediting authority.

The Arizona Department of Health Services

The New Mexico Drinking Water Bureau

The New Mexico Department of Health

See appendix B-E for copies of current licenses and licensed parameters, or refer to our current list of certifications online at www.hallenvironmental.com.

In the event of a certification being revoked or suspended HEAL will notify, in writing, those clients that require the effected certification.

#### Personnel

HEAL management ensures the competence of all who operate equipment, perform environmental tests, evaluate results, and sign test reports. Personnel performing specific tasks shall be qualified on the basis of appropriate education, training, experience and /or demonstrated skills.

All personnel shall be responsible for complying with HEAL's quality assurance/quality control requirements that pertain to their technical function. Each technical staff member must have a combination of experience and education to adequately demonstrate specific knowledge of their particular function and a general knowledge of laboratory operations, test methods, quality assurance/quality control procedures and records management.

All employees training certificates and diplomas are kept on file with demonstrations of capability for each method they perform. An Organizational Chart can be found in Appendix A.

## **Laboratory Director**

The Laboratory Director is responsible for overall technical direction and business leadership of HEAL. The Laboratory Manager, the Project Manager and Quality Assurance/Quality Control Officer report directly to the Laboratory Director. Someone with a minimum of 7 years of directly related experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

## Laboratory Manager/Lead Technical Director

The Laboratory Manager shall exercise day—to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results. The Laboratory Manager shall be experienced in the fields of accreditation for which the laboratory is approved or seeking accreditation. The Laboratory Manager shall certify that personnel with appropriate educational and/or technical background perform all tests for which HEAL is accredited. Such certification shall be documented.

The Laboratory Manager shall monitor standards of performance in quality control and quality assurance and monitor the validity of the analyses performed and data generated at HEAL to assure reliable data.

The Laboratory Manager is responsible for the daily operations of the laboratory. The Laboratory Manager is the lead technical director of the laboratory and in conjunction with the section technical directors is responsible for coordinating activities within the laboratory with the overall goal of efficiently producing high quality data with in a reasonable time frame.

In events where employee scheduling or current workload is such that new work cannot be incorporated, with out missing hold times, the Laboratory Manager has authority to modify employee scheduling, re-schedule projects or, when appropriate, allocate the work to approved subcontracting laboratories.

Additionally, the laboratory manager reviews and approves new analytical procedures and methods, and performs a final review of most analytical results. The Laboratory Manager provides technical support to both customers and HEAL staff.

The Laboratory Manager also observes the performance of supervisors to ensure good laboratory practices and proper techniques are being taught and utilized, assisting in overall quality control implementation, and strategic planning for the future of the company. Other duties include assisting in establishing laboratory policies which lead to the fulfillment of requirements for various certification programs, assuring that all Quality Assurance and Quality Control documents are reviewed and approved, and assisting in conducting Quality Assurance Audits.

The laboratory manager addresses questions or complaints that cannot be answered by the section managers.

The Laboratory Manager shall have a bachelor's degree in a chemical, environmental, biological sciences, physical sciences or engineering field, and at least five years of experience in the environmental analysis of representative inorganic and organic analytes for which the laboratory seeks or maintains accreditation.

## **Quality Assurance Quality Control Officer**

The Quality Assurance/Quality Control Officer (QA/QCO) serves as the focal point for QA/QC and shall be responsible for the oversight and/or review of quality control data. The QA/QCO functions independently from laboratory operations and shall be empowered to halt unsatisfactory work and/or prevent the reporting of results generated from an out-of-control measurement system. The QA/QCO shall objectively evaluate data and perform assessments without any outside/managerial influence. The QA/QCO shall have direct access to the highest level of management at which decisions are made on laboratory policy and/or resources. The QA/QCO shall notify laboratory management of deficiencies in the quality system in periodic, independent reports.

The QA/QCO shall have general knowledge of the analytical test methods, for which data review is performed, have documented training and/or experience in QA/QC procedures and in the laboratory's quality system. The QA/QCO will have a minimum of a BS in a scientific or related field and a minimum of three years of related experience.

The QA/QCO shall schedule and conduct internal audits as per the Internal Audit SOP at least annually, monitor and trend Corrective Action Reports as per the Data Validation SOP, periodically review control charts for out of control conditions and initiate any appropriate corrective actions.

The QA/QCO shall oversee the analysis of proficiency testing in accordance with our standards and monitor any corrective actions issued as a result of this testing.

The QA/QCO reviews all standard operating procedures and statements of work in order to assure their accuracy and compliance to method and regulatory requirements.

The QA/QCO shall be responsible for maintaining and updating this quality manual.

## **Business/Project Manager**

The role of the business/project manager is to act as a liaison between HEAL and our clients. The project manager reviews reports, updates clients on the status of projects inhouse, prepares quotations for new work, and is responsible for HEAL's marketing effort.

All new work is assessed by the project manager and reviewed with the other managers so as to not exceed the laboratories capacity. In events where employee scheduling or current workload is such that new work cannot be incorporated with out missing hold times, the Project Manager has authority to re-schedule projects.

It is also the duty of the project manager to work with the Laboratory Manager and QA/QCO to insure that before new work is undertaken the resources required and accreditations requested are available to meet the client's specific needs.

Additionally, the Project Manager can initiate the review of the need for new analytical procedures and methods, and performs a final review of some analytical results. The Project Manager provides technical support to customers. Someone with a minimum of 2 years of directly related experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

### **Section Manager/Technical Directors**

The Section Manager/Technical Directors are full-time members of the staff at HEAL who exercise day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results for their department within HEAL. A Technical Director's duties shall include, but not be limited to, monitoring standards of performance in quality control and quality assurance; monitoring the validity of the analyses performed and the data generated in their sections to ensure reliable data, overseeing training and supervising departmental staff, schedule incoming work for their sections and monitor laboratory personnel to ensure that proper procedures and techniques are being utilized. They supervise and implement new Quality Control procedures as directed by the QA/QCO, update and maintain quality control records including, but not limited to, training forms, IDOCs, ADOCPs, MDLs and evaluate laboratory personnel in their Quality Control activities. In addition technical directors are responsible for upholding the spirit and intent of HEAL's data integrity procedures.

They are the technical director of the associated section and review analytical data to acknowledge that data meets all criteria set forth for good Quality Assurance practices. Someone with a minimum of 2 years of experience in the environmental analysis of

representative analytes for which HEAL seeks or maintains accreditation and a bachelor's degree in a scientific or related discipline should fill this position.

# Health and Safety / Chemical Hygiene Officer

Refer to the most recent version of the Health and Safety and Chemical Hygiene Plans for the rolls, responsibilities and basic requirements of the Health and Safety Officer (H&SO) and the Chemical Hygiene Officer (CHO). These jobs can be executed by the same employee.

### Chemist I, II and III

Chemists are responsible for the analysis of various sample matrices including, but not limited to, solid, aqueous, and air as well as the generation of high quality data in accordance with the HEAL SOPs and QA/QC guidelines in a reasonable time as prescribed by standard turnaround schedules or as directed by the Section Manager or Laboratory Manager.

Chemists are responsible for making sure all data generated is entered in the database in the correct manner and the raw data is reviewed, signed and delivered to the appropriate peer for review. A Chemist reports daily to the section manager and will inform them as to material needs of the section specifically pertaining to the analyses performed by the chemist. Additional duties may include preparation of samples for analysis, maintenance of lab instruments or equipment, cleaning and providing technical assistance to lower level laboratory staff.

The senior chemist in the section may be asked to perform supervisory duties as related to operational aspects of the section. The chemist may perform all duties of a lab technician.

The position of Chemist is a full or part time hourly position and is divided into three levels, Chemist I, II, and III. All employees hired into a Chemist position at HEAL must begin as a Chemist I and remain there at a minimum of three months regardless of their education and experience. Chemist I must have a minimum of an AA in a related field or equivalent experience (equivalent experience means years of related experience can be substituted for the education requirement). A Chemist I is responsible for analysis, instrument operation and data reduction. Chemist II must have a minimum of an AA in a related field or equivalent experience and must have documented and demonstrated aptitude to perform all functions of a Chemist II. A Chemist II is responsible for the full analysis of their test methods, routine instrument maintenance, purchase of consumables as dictated by their Technical Director, advanced data reduction and basic data review. Chemist II may also assist Chemist III in method development and, as dictated by their Technical Director, may be responsible for the review and/or revision of their method specific SOPs. Chemist III must have Bachelors degree or equivalent experience and must have documented and demonstrated aptitude to perform all functions of a Chemist III. Chemist III is responsible for all tasks completed by a Chemist I and II as well as advanced

data review, non-routine instrument maintenance, assisting their technical director in basic supervisory duties and method development.

## **Laboratory Technician**

A laboratory technician is responsible for providing support in the form of sample preparation, basic analysis, general laboratory maintenance, glassware washing, chemical inventories and sample kit preparation. This position can be filled by someone without the education and experience necessary to obtain a position as a chemist.

## Sample Control Manager

The sample control manager is responsible for receiving samples and reviewing the sample login information after it has been entered into the computer. The sample control manager also checks the samples against the chain-of-custody for any sample and/or labeling discrepancies prior to distribution.

The sample control manager is responsible for sending out samples to the sub-contractors along with the review and shipping of field sampling bottle kits. The sample control manager acts as a liaison between the laboratory and field sampling crew to ensure that the appropriate analytical test is assigned. If a discrepancy is noted the sample control manager or sample custodian will contact the customer to resolve any questions or problems. The sample control manager is an integral part of the customer service team.

This position should be filled by someone with a high school diploma and a minimum of 2 years of related experience and can also be filled by a senior manager.

#### Sample Custodians

Sample Custodians work directly under the Sample Control Manager. They are responsible for sample intake into the laboratory and into the LIMS. Sample Custodians take orders from our clients and prepare appropriate bottle kits to meet the client's needs. Sample Custodians work directly with the clients in properly labeling and identifying samples as well as properly filling out legal COCs. When necessary, Sample Custodians contact clients to resolve any questions or problems associated with their samples. Sample Custodians are responsible for distributing samples throughout the laboratory and are responsible for notifying analysts of special circumstances such as short holding times or improper sample preservation upon receipt.

## **Delegations in the Absence of Key Personnel**

Planned absences shall be preceded by notification to the Laboratory Manager. The appropriate staff members shall be informed of the absence. In the case of unplanned absences, the organizational superior shall either assume the responsibilities and duties or delegate the responsibilities and duties to another appropriately qualified employee.

In the event that the Laboratory Manager is absent for a period of time exceeding fifteen consecutive calendar days, another full-time staff member meeting the basic qualifications and competent to temporarily perform this function will be designated. If this absence exceeds thirty-five consecutive calendar days, HEAL will notify ORELAP in writing of the absence and the pertinent qualifications of the temporary laboratory manager.

## **Laboratory Personnel Qualification and Training**

All personnel joining HEAL shall undergo orientation and training. During this period the new personnel shall be introduced to the organization and their responsibilities, as well as the policies and procedures of the company. They shall also undergo on the job training and shall work with trained staff. They will be shown required tasks and be observed while performing them.

When utilizing staff undergoing training appropriate supervision shall be dictated and overseen by the appropriate section technical director. Prior to analyzing client samples, a new employee, or an employee new to a procedure, must meet the following basic requirements. The SOP and Method for the analysis must be read and signed by the employee indicating that they read, understood and intend to comply with the requirements of the documents. The employee must undergo documented training. conducted by a senior analyst familiar with the procedure and overseen by the section Technical Director. This training is documented by any means deemed appropriate by the trainer and section Technical Director, and kept on file in the employees file located in the QA/QCO's office. The employee must perform a successful Initial Demonstration of Proficiency (IDOC). See Appendix H for the training documents and checklists utilized at HEAL to ensure that all of these requirements are met. Once all of the above requirements are met it is incumbent upon the section Technical Director to determine at which point the employee can begin to perform the test unsupervised. A Certification to Complete Work Unsupervised (see Appendix H) is them filled out by the employee and technical director.

All IDOCs shall be documented through the use of the certification form which can be found in Appendix H. IDOCs are performed by analyzing four Laboratory Control Spikes (LCSs). Using the results of the LCSs the mean recovery is calculated in the appropriate reporting units and the standard deviations of the population sample (n-1) (in the same units) as well as the relative percent difference for each parameter of interest. When it is not possible or pertinent to determine mean and standard deviations HEAL assesses performance against establish and documented criteria dictated in the method SOP. The mean and standard deviation are compared to the corresponding acceptance criteria for

precision and accuracy in the test method (if applicable) or in laboratory-generated acceptance criteria. In the event that the HEAL SOP or test method fail to establish the pass/fail criteria the default limits of +/- 20% for calculated recovery and <20% relative percent difference based on the standard deviation will be utilized. If all parameters meet the acceptance criteria, the IDOC is successfully completed. If any one of the parameters do not meet the acceptance criteria, the performance is unacceptable for that parameter and the analyst must either locate and correct the source of the problem and repeat the test for all parameters of interest or repeat the test for all parameters that failed to meet criteria. Repeat failure, however, confirms a general problem with the measurement system. If this occurs the source of the problem must be identified and the test repeated for all parameters of interest.

New employees that do not have prior analysis experience will not be allowed to perform analysis until they have demonstrated attention to detail with minimal errors in the assigned tasks. To ensure a sustained level of quality performance among staff members, continuing demonstration of capability shall be performed at least once a year. These are as an Annual Documentation of Continued Proficiency (ADOCP).

At least once per year an ADOCP must be completed by: the acceptable performance of a blind sample (this is typically done using a PT sample but can be a single blind sample to the analyst), by performing another IDOC, or by summarizing the data of four consecutive laboratory control samples with acceptable levels of precision and accuracy (these limits are those currently listed in the LIMS for an LCS using the indicated test method.) ADOCPs are documented using a standard form and are kept on file in each analysts employee folder.

Each new employee shall be provided with data integrity training as a formal part of their new employee orientation. Each new employee will sign an ethics and data integrity agreement to ensure that they understand that data quality is our main objective. Every HEAL employee recognizes that although turn around time is important, quality is put above any pressure to complete the task expediently. Analysts are not compensated for passing QC parameters nor are incentives given for the quantity of work produced. Data Integrity and Ethics training are performed on an annual basis in order to remind all employees of HEAL's policy on data quality. Employees are required to understand that any infractions of the laboratory data integrity procedures will result in a detailed investigation that could lead to very serious consequences including immediate termination, debarment or civil/criminal prosecution.

Training for each member of HEAL's technical staff is further established and maintained through documentation that each employee has read, understood, and is using the latest version of this Quality Assurance Manual. Training courses or workshops on specific equipment, analytical techniques or laboratory procedures are documented through attendance sheets, certificates of attendance, training forms or quizzes. This training documentation is located in either analyst specific employee folders in the QA/QCO Office or in the current years group training folder, also located in the QA/QCO Office. On the front of all methods, SOPs and procedures for HEAL there is a signoff sheet that is signed by all pertinent employees, indicating that they have read, understood and agreed to perform the most recent version of the document.

# 5.0 Receipt and Handling of Samples

## Sampling

#### **Procedures**

HEAL does not provide field sampling for any projects. Sample kits are prepared and provided for clients upon request. The sample kits contain the appropriate sampling containers (with a preservative when necessary), labels, blue ice (The use of "blue ice" by anyone except HEAL personnel is discouraged because it generally does not maintain the appropriate temperature of the sample. If blue ice is used, it should be completely frozen at the time of use, the sample should be chilled before packing, and special notice taken at sample receipt to be certain the required temperature has been maintained.), a cooler, chain-of-custody forms, plastic bags, bubble wrap, and any special sampling instructions. Sample kits are reviewed prior to shipment for accuracy and completeness.

#### **Containers**

Containers which are sent out for sampling are purchased by HEAL from a commercial source. Glass containers are certified "EPA Cleaned" QA level 1. Plastic containers are certified clean when required. These containers are received with a Certificate of Analysis verifying that the containers have been cleaned according to the EPA wash procedure. Containers are used once and discarded. If the samples are collected and stored in inappropriate containers the laboratory may not be able to accurately quantify the amount of the desired components. In this case re-sampling may be required.

#### Preservation

If sampling for an analyte(s) requires preservation, the sample custodians fortify the containers prior to shipment to the field, or provide the preservative for the sampler to add in the field. The required preservative is introduced into the vials in uniform amounts and done so rapidly to minimize the risk of contamination. Vials that contain a preservative are labeled appropriately. If the samples are stored with inappropriate preservatives the laboratory may not be able to accurately quantify the amount of the desired components. In this case re-sampling may be required.

Refer to the current Login SOP and/or the current price book for detailed sample receipt and handling procedures, appropriate preservation and holding time requirements.

## **Sample Custody**

## Chain-of-Custody Form

A Chain-of-Custody (COC) form is used to provide a record of sample chronology from the field to receipt at the laboratory. HEAL's COC contains the client's name, address, phone and fax numbers, the project name and number, the project manager's name, and the field sampler's name. It also identifies the date and time of sample collection, sample matrix, field sample ID number, number/volume of sample containers, sample temperature upon receipt, and any sample preservative information.

There is also a space to record the HEAL ID number assigned to samples after they are received. Next to the sample information is a space for the client to indicate the desired analyses to be performed. There is a section for the client to indicate the data package level as well as any accreditation requirements. Finally, there is a section to track the actual custody of the samples. The custody section contains lines for signatures, dates and times when samples are relinquished and received. The COC form also includes a space to record special sample related instructions, sampling anomalies, time constraints, and any sample disposal considerations.

It is paramount that all COCs arrive at HEAL complete and accurate so that the samples can be processed and allocated for testing in a timely and efficient manor. A sample chain-of-custody form can be found in Appendix G or on line at www.hallenvironmental.com.

## **Receiving Samples**

Samples are received by authorized HEAL personnel. Upon arrival, the COC is compared to the respective samples. After the samples and COC have been determined to be complete and accurate, the sampler signs over the COC. The HEAL staff member in turn signs the chain-of-custody, also noting the current date, time and sample temperature. This relinquishes custody of the samples from the sampler and delegates sample custody to HEAL. The third (pink) copy of the COC form is given to the person who has relinquished custody of the samples.

#### Logging in Samples and Storage

Standard Operating Procedures have been established for the receiving and tracking of all samples (refer to the current HEAL Login SOP). These procedures ensure that samples are received and properly logged into the laboratory, and that all associated documentation, including chain of custody forms, are complete and consistent with the samples received. Each sample set is given a unique HEAL tracking ID number. Individual sample locations within a defined sample set are given a unique sample ID suffix-number. Labels with the HEAL numbers, and tests requested, are generated and

placed on their respective containers. The pH of preserved, non-volatile samples is checked and noted if out of compliance. Due to the nature of the samples, the pHs of volatiles samples are checked after analysis. Samples are reviewed prior to being distributed for analysis.

Samples are distributed for analysis based upon the requested tests. In the event that sample volume is limited and different departments at HEAL are required to share the sample, volatile work takes precedence and will always be analyzed first before the sample is sent to any other department for analysis.

Each project (sample set) is entered into the Laboratory Information Management System (LIMS) with a unique ID that will be identified on every container. The ID tag includes the Lab ID, Client ID, date and time of collection, and the analysis/analyses to be performed. The LIMS continually updates throughout the lab. Therefore, at any time, an analyst or manager may inquire about a project and/or samples status. For more information about the login procedures, refer to the Sample Login SOP.

### Disposal of Samples

Samples are held at HEAL for a minimum of thirty days and then transferred to the HEAL warehouse for disposal. Analytical results are used to characterize their respective sample contamination level(s) so that the proper disposal can be performed. These wastes will be disposed of according to their hazard as well as their type and level of contamination. Refer to the Hall Environmental Analysis Laboratory Chemical Hygiene Plan and current Sample Disposal SOP for details regarding waste disposal.

Waste drums are provided by an outside agency. These drums are removed by the outside agency and disposed of in a proper manner.

The wastes that are determined to be non-hazardous are disposed of as non-hazardous waste in accordance with the Chemical Hygiene Plan and Sample Disposal SOP.

## 6.0 Analytical Procedures

All analytical methods used at HEAL incorporate necessary and sufficient Quality Assurance and Quality Control practices. A Standard Operating Procedure (SOP) is used for each method to provide the necessary criteria to yield acceptable results. These procedures are reviewed at least annually and revised as necessary and are attached as a pdf file in the Laboratory Information Management System (LIMS) for easy access by each analyst. The sample is often consumed or altered during the analytical process. Therefore, it is important that each step in the analytical process be correctly followed in order to yield valid data.

When unforeseen problems arise, the analyst, technical director, and, when necessary, laboratory manager meet to discuss the factors involved. The analytical requirements are evaluated and a suitable corrective action or resolution is established. The client is notified in the case narrative with the final report or before, if the validity of their result is in question.

#### **List of Procedures Used**

Typically, the procedures used by HEAL are EPA approved methodologies or 20th edition Standard Methods. However, proprietary methods for client specific samples are sometimes used. The following tables list EPA and Standard Methods Method numbers with their corresponding analytes and/or instrument classification.

# Methods Utilized at HEAL Drinking Water(DW) Non-Potable Water (NPW) Solids (S)

	Matrix	Title of Method
120.1	NPW	"Conductance(Specific Conductance, uohms at 25 ° C)"
180.1	DW NPW	"Turbidity (Nephelometric)"
200.2	DW NPW	"Sample Preparation Procedure For Spectrochemical Determination of Total Recoverable Elements"
200.7	DW NPW	"Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry"
200.8	DW NPW	"Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry."
245.1	DW NPW	"Mercury (Manual Cold Vapor Technique)"
300.0	DW NPW S	"Determination of Inorganic Anions by Ion Chromatography"
413.2	NPW S	"Oil and Grease"
418.1	NPW S	"Petroleum Hydrocarbons (Spectrophotometric, Infrared)"
504.1	DW	"EDB, DBCP and 123TCP in Water by Microextraction and Gas Chromatography"

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505	DW	"Analysis of Organohalide Pesticides and Commercial Polychlorinated Biphenyl (PCB) Products in Water by Microextraction and Gas Chromatography"
515.1	DW	"Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron Capture Detector"
524.2	DW	"Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry"
531.1	DW	"Measurement of N-Methylcarbomoyloximes and N-Methylcarbamates in Water by Direct Aqueous Injection HPLC with Post Column Dervivatization"
547	DW	"Determination of Glyphosate in Drinking Water by Direct-Aqueous Injection HPLC, Post-Column Derivatization, and Fluorescence Detection"
552.1	DW	"Determination of Haloacetic Acids and Dalapon in Drinking Water by Ion-Exchange Liquid-Solid Extraction and Gas Chromatography with an Electron Capture Detector"
1311	S	"Toxicity Characteristic Leaching Procedure"
1311ZHE	s	"Toxicity Characteristic Leaching Procedure"
3005A	NPW	"Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by FLAA or ICP Spectroscopy"
3010A	S	"Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by FLAA or ICP Spectroscopy"
3050B	S	"Acid Digestion of Sediment, Sludge, and Soils"
3510C	DW NPW	"Separatory Funnel Liquid-Liquid Extraction"
3540	S	"Soxhlet Extraction"
3545	S	"Pressurized Fluid Extraction(PFE)"
3665	NPW S	"Sulfuric Acid/Permanganate Cleanup"
5030B	NPW *	"Purge-and-Trap for Aqueous Samples"
5035	S	"Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples"
6010B	NPW S	"Inductively Coupled Plasma-Atomic Emission Spectrometry"
6020	NPW S	"Inductively Coupled Plasma-Mass Spectrometry"
7470A	NPW	"Mercury in Liquid Waste (Manual Cold-Vapor Technique)"
7471A	S	"Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)"
8021B	NPW S	"Aromatic and Halogenated Volatiles By Gas Chromatography Using Photoionization and/or Electrolytic Conductivity Detectors"
8015B	NPW S	"Nonhalogenated Volatile Organics by Gas Chromatography" (Gasoline Range and Diesel Range Organics)

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8015AZ	S	"C10-C32 Hydrocarbons in Soil-8015AZ"
8081A	NPW S	"Organochlorine Pesticides by Gas Chromatography"
8082	NPW S	"Polychlorinated Biphenyls (PCBs) by Gas Chromatography"
8260B	NPW S	"Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)"
8270C	NPW S	"Semivolatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)"
8310	NPW S	"Polynuclear Aromatic Hydrocarbons"
9045C	S	"Soil and Waste pH"
9060	NPW	"Total Organic Carbon"
9067	NPW S	"Phenolics (Spectrophotometric, MBTH With Distillation)"
9095	S	Paint Filter
Walkley/Black	S	FOC/TOC WB
SM2320 B	DW NPW	"Alkalinity"
SM2540 B	NPW	"Total Solids Dried at 103-105° C"
SM2540 C	DW NPW	"Total Dissolved Solids Dried at 180° C"
SM2540 D	NPW	"Total Suspended Solids Dried at 103-105° C"
SM4500-H+B	DW NPW	"pH Value"
SM4500-NH3 C	NPW S	"4500-NH3" Ammonia
SM4500-Norg C	NPW S	"4500-Norg" Total Kjeldahl Nitrogen (TKN)
SM5310 B	DW	"5310" Total Organic Carbon (TOC)
8000B	NPW S	"Determinative Chromatographic Separations"
8000C	NPW S	"Determinative Chromatographic Separations"

# Criteria for Standard Operating Procedures

HEAL has Standard Operating Procedures (SOPs) for each of the test methods listed above. These SOPs are based upon the listed methods and detail the specific procedure and equipment utilized as well as the quality requirements necessary to prove the integrity of the data. SOPs are reviewed or revised every twelve months or sooner if necessary. The review/revision is documented in the Master SOP Logbook filed in the QA/QC Office. All SOPs are available in the LIMS linked under the specific test method. Administrative SOPs, which are not linked in the LIMS, are available on desktops throughout the laboratory in the link to administrative SOPs folder.

Each HEAL test method SOP shall include or reference the following topics where applicable:

Identification of the test method;

Applicable matrix or matrices;

Limits of detection and quantitation;

Scope and application, including parameters to be analyzed;

Summary of the test method;

Definitions:

Interferences;

Safety;

Equipment and supplies;

Reagents and standards;

Sample collection, preservation, shipment and storage;

Quality control parameters;

Calibration and standardization:

Procedure:

Data analysis and calculations;

Method performance;

Pollution prevention:

Data assessment and acceptance criteria for quality control measures;

Corrective actions for out-of-control data:

Contingencies for handling out-of-control or unacceptable data;

Waste management;

References: and

Any tables, diagrams, flowcharts and validation data.

#### 7.0 Calibration

All equipment and instrumentation used at HEAL are operated, maintained and calibrated according to manufacturers guidelines, as well as criteria set forth in applicable analytical methodology. Personnel who have been properly trained in their procedures perform operation and calibration. Brief descriptions of the calibration processes for our major laboratory equipment and instruments are found below.

#### **Thermometers**

The thermometers in the laboratory are used to measure the temperatures of the refrigerators/freezers, ovens, water baths, hot blocks, ambient laboratory conditions, TCLP Extractions, digestion blocks and samples at the time of log-in. All NIST traceable thermometers are either removed from use upon their documented expiration date or they are checked annually with a NIST certified thermometer and a correction factor is noted on each thermometer log. See the most current Login SOP for detailed procedures on this calibration procedure.

Dickson Data Loggers are used to record sample and standard storage refrigerators over the weekend when the appropriate staff is not available to record the temperatures. These data loggers are shipped back to the manufacturer once a year to be re-calibrated.

## Refrigerators/Freezers

Each laboratory refrigerator or freezer contains a thermometer capable of measuring to a minimum precision of 1°C. The thermometers are kept with the bulb immersed in liquid. Each workday, the temperatures of the refrigerators are recorded in a designated logbook to insure that the refrigerators are within the required designated range. Samples are stored separately from the standards to reduce the risk of contamination.

See the current catastrophic Failure SOP for the procedure regarding how to handle failed refrigerators or freezers.

#### Ovens

The ovens contain thermometers graduated by 1° C. The ovens are calibrated quarterly against NIST thermometers and checked daily as required and in which ever way is dictated by or appropriate for the method in use.

## **Analytical and Table Top Balances**

The table top balances are capable of weighing to a minimum precision of 0.01 grams. The analytical balances are capable of weighing to a minimum precision of 0.0001 grams. Records are kept of daily calibration checks for the balances in use. Working weights are used in these checks. The balances are annually certified by an outside source and the certifications are on file with the QA/QCO.

Balances, unless otherwise indicated by method specific SOPs, will be checked daily with at least two weights that will bracket the working range of the balance for the day. Daily balance checks will be done using working weights that are calibrated annually against Class S weights. Class S weights are calibrated as required by an external provider. The Class S weights are used once a year or more frequently if required, to assign values to the Working Weights. During the daily balance checks the working weights are compared to their assigned values and must pass in order to validate the calibration of the balance. The assigned values for the working weights, as well as the daily checks, are recorded in the balance logbook for each balance.

#### Instrument Calibration

An instrument calibration is the relationship between the known concentrations of a set of calibration standards introduced into an analytical instrument and the measured response they produce. Calibration curve standards are a prepared series of aliquots at various known concentrations levels from a primary source reference standard. Specific mathematical types of calibration techniques are outlined in SW-846 8000B and/or 8000C. The entire initial calibration must be performed prior to sample analyses.

The lowest standard in the calibration curve must be at or below the required reporting limit.

Refer to the current SOP to determine the minimum requirement for calibration points.

Most compounds tend to be linear and a linear approach should be favored when linearity is suggested by the calibration data. Non-linear calibration should be considered only when a linear approach cannot be applied. It is not acceptable to use an alternate calibration procedure when a compound fails to perform in the usual manner. When this occurs it is indicative of instrument issues or operator error.

If a non-linear calibration curve fit is employed, a minimum of six calibration levels must be used for second-order (quadratic) curves.

When more than 5 levels of standards are analyzed in anticipation of using second-order calibration curves, all calibration points MUST be used regardless of the calibration option employed. The highest or lowest calibration point may be excluded for the purpose of

narrowing the calibration range, and meeting the requirements for a specific calibration option. Otherwise, unjustified exclusion of calibration data is expressly forbidden.

Analytical methods vary in QC acceptance criteria. HEAL follows the method specific guidelines for QC acceptance. The specific acceptance criteria are outlined in the analytical methods and its corresponding SOP.

#### pH Meter

The pH meter measures to a precision of 0.01 pH units. The pH calibration logbook contains the calibration before each use, or each day, if used more than once per day. It is calibrated using a minimum of 3 certified buffers. Also available with the pH meter is a magnetic stirrer with a temperature sensor. See the current pH SOP (SM4500 H+ B) for specific details regarding calibration of the pH probe.

## Other Analytical Instrumentation and Equipment

The conductivity probe is calibrated as needed and checked daily when in use.

Eppendorf (or equivalent brands) pipettes are checked gravimetrically prior to use.

#### **Standards**

All of the source reference standards used are ordered from a reliable commercial vendor. A Certificate of Analysis (CoA), which verifies the quality of the standard, accompanies the standards from the vendor. The Certificates of Analysis are dated and stored on file by the Technical Directors or their designee. These standards are traceable to the National Institute of Standards (NIST). When salts are purchased and used as standards the certificate of purity must be obtained from the vendor and filed with the CoAs.

All standard solutions, calibration curve preparations, and all other quality control solutions are labeled in a manner that can be traced back to the original source reference standard. All source reference standards are entered into the LIMS with an appropriate description of the standard. Dilutions of the source reference standard (or any mixes of the source standards) are fully tracked in the LIMS. Standards are labeled with the date opened for use, and an expiration date.

As part of the quality assurance procedures at HEAL, analysts strictly adhere to manufacture recommendations for storage times/expiration dates and policies of analytical standards and quality control solutions.

## Reagents

HEAL ensures that the reagents used are of acceptable quality for their intended purpose. This is accomplished by ordering high quality reagents and adhering to good laboratory practices so as to minimize contamination or chemical degradation. All reagents must meet any specifications noted in the analytical method. Refer to the current Purchase of Consumables SOP for details on how this is accomplished and documented.

Upon receipt, all reagents are assigned a separate ID number, and logged into the LIMS. All reagents shall be labeled with the date received into the laboratory and again with the date opened for use. Recommended shelf life shall be documented and controlled. Dilutions or solutions prepared shall be clearly labeled, dated, and initialed. These solutions are traceable back to their primary reagents.

All gases used with an instrument shall meet specifications of the manufacturer. All safety requirements that relate to maximum and/or minimum allowed pressure, fitting types, and leak test frequency, shall be followed. When a new tank of gas is placed in use, it shall be checked for leaks and the date put in use will be written in the instrument maintenance logbook.

HEAL continuously monitors the quality of the reagent water and provides the necessary indicators for maintenance of the purification systems in order to assure that the quality of laboratory reagent water meets established criteria for all analytical methods.

Reagent blank samples are also analyzed to ensure that no contamination is present at detectable levels. The frequency of reagent blank analysis is typically the same as calibration verification samples. Refrigerator storage blanks are stored in the volatiles refrigerator for a period of one week and analyzed and replaced once a week.

#### 8.0 Maintenance

Maintenance logbooks are kept for each major instrument and all support equipment in order to document all repair and maintenance. In the front of the logbook, the following information is included:

Unique name of the item or equipment
Manufacturer
Type of Instrument
Model Number
Serial Number
Date received and date placed into service
Location of Instrument
Condition of instrument upon receipt

For routine maintenance, the following information shall be included in the log:

Maintenance Date
Maintenance Description
Maintenance Performed by Initials

A manufacturer service agreement (or equivalent) covers most major instrumentation to assure prompt and reliable response to maintenance needs beyond HEAL instrument operator capabilities.

Refer to the current Maintenance and Troubleshooting SOP for each section in the laboratory for further information.

# 9.0 Data Integrity

For HEAL's policy on ethics and data integrity see section 3.0 of this document. Upon being hired and annually there after, all employees at HEAL undergo documented data integrity training. All new employees sign an Ethics and Data Integrity Agreement, documenting their understanding of the high standards of integrity required at HEAL and outlining their responsibilities in regards to ethics and data integrity. See Appendix H for a copy of this agreement.

In instances of ethical concern analysts are required to report the known or suspected concern to their Technical Director, the Laboratory Manager or the QA/QCO. This will be done in a confidential and receptive environment, allowing all employees to privately discuss ethical issues or report items of ethical concern.

Once reported and documented the ethical concern will be immediately elevated to the Laboratory Manager and the need for an investigation, analyst remediation or termination will be determined on a case by case basis.

All reported instances of ethical concern will be thoroughly documented and handled in a manner sufficient to rectify any breaches in data integrity with an emphasis on preventing similar incidences from happening in the future.

## 10.0 Quality Control

## **Internal Quality Control Checks**

HEAL utilizes various internal quality control checks, including duplicates, matrix spikes, matrix spike duplicates, method blanks, laboratory control spikes, laboratory control spike duplicates, surrogates, internal standards, calibration standards, quality control charts, proficiency tests and calculated measurement uncertainty.

Refer to the current method SOP to determine the frequency and requirements of all quality controls. In the event that the frequency of analysis is not indicated in the method specific SOP, duplicate samples, laboratory control spikes (LCS), Method Blanks (MB) and matrix spikes and matrix spike duplicates (MS/MSD) are analyzed for every batch of twenty samples.

When sample volume is limited on a test that requires an MS/MSD an LCSD shall be analyzed to demonstrate precision and accuracy and when possible a sample duplicate will be analyzed.

Duplicates are identical tests repeated for the same sample or matrix spike in order to determine the precision of the test method. A Relative Percent Difference (RPD) is calculated as a measure of this precision. Unless indicated in the SOP, the default acceptance limit is </= 20%.

Matrix Spikes and Matrix Spike Duplicates are spiked samples (MS/MSD) that are evaluated with a known added quantity of a target compound. This is to help determine the accuracy of the analyses and to determine the matrix affects on analyte recovery. A percent recovery is calculated to assess the quality of the accuracy. In the event that the acceptance criteria is not outlined in the SOP, a default limits of 70-130% will be utilized. When an MSD is employed an RPD is calculated and when not indicated in the SOP shall be acceptable at </= 30%.

When appropriate for the method, a Method Blank should be analyzed with each batch of samples processed to assess contamination levels in the laboratory. MBs consist of all the reagents measured and treated as they are with samples, except without the samples. This enables the laboratory to ensure clean reagents and procedures. Guidelines should be in place for accepting or rejecting data based on the level of contamination in the blank. In the event that these guidelines are not dictated by the SOP or in client specific work plans, the MB should be less than the MDL reported for the analyte being reported.

A Laboratory Control Spike and Laboratory Control Spike Duplicate (LCS/LCSD) are reagent blanks, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. It is generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system. Guidelines are outlined in each

SOP for the frequency and pass fail requirements for LCS and LCSDs. These limits can be set utilizing control charts as discussed below.

Surrogates are utilized when dictated by method and are substances with properties that mimic the analytes of interest. The surrogate is an analyte that is unlikely to be found in environmental samples. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for surrogates.

Internal Standards are utilized when dictated by the method and are known amounts of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for Internal Standards.

Proficiency Test (PT) Samples are samples provided by an unbiased third party. They are typically analyzed twice a year, or at any other interval defined in the method SOP. They contain a pre-determined concentration of the target compound, which is unknown to HEAL. HEAL's management and all analysts shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates and other procedures as used when analyzing routine samples.

With regards to analyzing PT Samples HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seek accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall not attempt to obtain the assigned value of any PT sample from the PT Provider.

Calibration standards are standards run to calibrate. Once the calibration is established the same standards can be analyzed as Continuing Calibration Verifications (CCV), used to confirm the consistency of the instrumentation. Calibration standards can be utilized at the beginning and end of each batch, or more frequently as required. Typically Continuing Calibration Blanks (CCB) are run in conjunction with CCVs. Refer to the current method SOP for frequency and pass/fail requirements of CCVs and CCBs.

Control Limits are limits of acceptable ranges of the values of quality control checks. If a value falls outside the appropriate range, immediate evaluation and assessment of the procedure is required. Data generated with laboratory control samples that fall outside of the established control limits are judged to be generated during an "out-of-control" situation. These data are considered suspect and shall be repeated or reported with qualifiers.

Control limits should be established and updated according to the requirements of the method being utilized. When the method does not specify, and control limits are to be generated or updated for a test, the following guidelines shall be utilized.

Control Limits should be updated periodically and at least annually. The Limits should be generated utilizing the most recent 20-40 data values and Control Charts should be printed when these limits are updated in the LIMS. The data values used shall not reuse values that were included in the previous Control Limit update. The data values shall also be reviewed by the LIMS for any Grubbs Outliers, and if identified, the outliers must be removed prior to generating new limits. Once new Control Limits have been established and updated in the LIMS, the printed Control Chart shall be reviewed by the appropriate technical director and primary analyst performing the analysis for possible trends and compared to the previous Control Charts. The technical director initials the control charts, indicating that they have reviewed and determined the updated Limits to be accurate and appropriate. These initialed charts are then filed in the QA/QCO office.

Calculated Measurement Uncertainty is calculated annually using LCSs in order to determine the laboratory specific uncertainty associated with each test method. These uncertainty values are available to our clients upon request and are utilized as a trending tool internally to determine the effectiveness of new variables introduced into the procedure over time.

## Precision, Accuracy, Detection Levels

#### **Precision**

The laboratory uses sample duplicates, laboratory control spike duplicates and matrix spike duplicates to assess precision in terms of relative percent difference (RPD). HEAL requires the RPD to fall within the 99% confidence interval of established control charts or an RPD of less than 30% if control charts are not available. RPD's greater than these limits are considered out-of-control and require an appropriate response.

RPD = 2 x (Sample Result – Duplicate Result) X 100 (Sample Result + Duplicate Result)

#### Accuracy

The accuracy of an analysis refers to the difference between the calculated value and the actual value of a measurement. The accuracy of a laboratory result is evaluated by comparing the measured amount of QC reference material recovered from a sample and the known amount added. Control limits can be established for each analytical method and sample matrix. Recoveries are assessed to determine the method efficiency and/or the matrix effect.

Analytical accuracy is expressed as the percent recovery (%R) of an analyte or parameter. A known amount of analyte is added to an environmental sample before the sample is prepared and subsequently analyzed. The equation used to calculate percent recovery is:

%Recovery = {(concentration* recovered)/(concentration* added)} X 100

*or amount

HEAL requires that the Percent Recovery to fall within the 99 % confidence interval of established control limits. A value that falls outside of the confidence interval requires a warning and process evaluation. The confidence intervals are calculated by determining the mean and sample standard deviation. If control limits are not available, the range of 70 to 130% is used unless the specific method dictates otherwise. Percent Recoveries outside of this range mandate additional action such as analyses by Method of Standard Additions, additional sample preparation(s) where applicable, method changes, out-of-control action or data qualification.

#### **Detection Limit**

Current practices at HEAL define the Detection Limit (DL) as the smallest amount that can be detected above the baseline noise in a procedure within a stated confidence level.

HEAL presently utilizes an Instrument Detection Limit (IDL), a Method Detection Limit (MDL), and a Practical Quantitation Limit (PQL). The relationship between these levels is approximately

IDL: MDL: PQL = 1:5:5.

The IDL is a measure of the sensitivity of an analytical instrument. The IDL is the amount which, when injected, produces a detectable signal in 99% of the analyses at that concentration. An IDL can be considered the minimum level of analyte concentration that is detectable above random baseline noise.

The MDL is a measure of the sensitivity of an analytical method. An MDL determination (as required in 40CFR part 136 Appendix B) consists of replicate spiked samples carried through all necessary preparation steps. The spike concentration is three times the standard deviation of three replicates of spikes. At least seven replicates are spiked and analyzed and their standard deviation (s) calculated. Routine variability is critical in passing the 10 times rule and is best achieved by running the MDLs over different days and when possible over several calibration events. The method detection limit (MDL) can be calculated using the standard deviation according to the formula:

MDL = s * t (99%)

Where t (99%) is the student's t value for the 99% confidence interval. It depends on the number of trials used in calculating the sample standard deviation, so choose the appropriate value according to the number of trials.

Number of Trials	t(99%)
6	3.36
7	3.14
8	3.00
9	2.90

The calculated MDL must not be less than 10 times the spiked amount or the study must be performed again with a lower concentration.

The PQL is significant because different laboratories can produce different MDLs although they may employ the same analytical procedures, instruments and sample matrices. The PQL is about two to five times the MDL and represents a practical, and routinely achievable, reporting level with a good certainty that the reported value is reliable. It is often determined by regulatory limits. The reported PQL for a sample is dependent on the dilution factor utilized during sample analysis.

# **Quality Control Parameter Calculations**

#### Mean

The sample mean is also known as the arithmetic average. It can be calculated by adding all of the appropriate values together, and dividing this sum by the number of values.

Average = 
$$(\Sigma x_1) / n$$

 $x_i$  = the value x in the Ith trial n = the number of trials

#### Standard Deviation

The sample standard deviation, represented by s, is a measure of dispersion. The dispersion is considered to be the difference between the average and each of the values  $x_i$ . The variance,  $s^2$ , can be calculated by summing the squares of the

differences and dividing by the number of differences. The sample standard deviation, s, can be found by taking the square root of the variance.

Standard deviation = s = 
$$\left[\sum (x_1 - average)^2 / (n-1)\right]^{\frac{1}{2}}$$

# Percent Recovery (MS, MSD, LCS and LCSD)

#### **Control Limits**

Control Limits are calculated by the LIMS using the average percent recovery (x), and the standard deviation (s).

Upper Control Limit = x + 3sLower Control Limit = x - 3s

These control limits approximate a 99% confidence interval around the mean recovery.

# **RPD (Relative Percent Difference)**

Analytical precision is expressed as a percentage of the difference between the results of duplicate samples for a given analyst. Relative percent difference (RPD) is calculated as follows:

RPD = 
$$2 \times (Sample Result - Duplicate Result) \times 100$$
  
(Sample Result + Duplicate Result)

### **Uncertainty Measurements**

Uncertainty, as defined by ISO, is the parameter associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurement. Ultimately uncertainty measurements are used to state how good a test result is and to allow the end user of data to properly interpret their reported data. All procedures allow for some uncertainty. For most analyses the components and estimates of uncertainty are reduced by following well established test methods. To further reduce uncertainty, results are generally not reported below

the lowest calibration point (PQL) or above the highest calibration point (UQL). Understanding that there are many influence quantities affecting a measurement result, so many in fact that it is impossible to identify all of them, HEAL calculates measurement uncertainty at least annually using LCSs. These estimations of measurement uncertainty are kept on file in the method folders in the QA/QC office.

Measurement Uncertainty contributors are those that may be determined statistically. These shall be generated by estimating the overall uncertainty in the entire analytical process by measuring the dispersion of values obtained from laboratory control samples over time. At least 20 of the most recent LCS data points are gathered. The standard deviation (s) is calculated using these LCSs data points. Since it can be assumed that the possible estimated values of the spikes are approximately normally distributed with approximate standard deviation (s), the unknown value of the spike is believed to lie in 95% confidence interval, corresponding to an uncertainty range of +/- 2(s).

Calculate standard deviation (s) and 95% confidence interval according to the following formulae:

$$s = \sqrt{\frac{\sum (x - \overline{x})^2}{(n-1)}}$$

Where: s = standard deviation

x = number in series

 $\bar{x}$  = calculated mean of series n = number of samples taken

95% confidence =  $2 \times s$ 

Example: Assuming that after gathering 20 of the most recent LCS results for Bromide, we have calculated the standard deviations of the values and achieved a result of 0.0326, our measurement uncertainty for Bromide (at 95% confidence =  $2 \times 8$ ) is 0.0652.

#### **Calibration Calculations**

1. Response Factor or Calibration Factor:

$$RF = ((A_x)(C_{is}))/((A_{is})(C_x))$$

 $CF=(A_x)/(C_x)$ 

a. Average RF or CF

$$RF_{AVE} = \Sigma RF_i / n$$

b. Standard Deviation

$$s = SQRT \{ [\Sigma (RF_i - RF_{AVE})^2] / (n-1) \}$$

c. Relative Standard Deviation

Where:

 $A_x$  = Area of the compound

 $C_x$  = Concentration of the compound

A_{is} = Area of the internal standard

C_{is} = Concentration of the internal standard

n = number of pairs of data

RF_i = Response Factor (or other determined value)

RF_{AVE} = Average of all the response factors

 $\Sigma$  = the sum of all the individual values

2. Linear Regression

a. Slope (m)

$$m = (n\Sigma x_i y_i - (n\Sigma x_i)^* (n\Sigma y_i)) / (n\Sigma x_i^2 - (\Sigma x_i)^2)$$

b. Intercept (b)

$$b = y_{AVE} - m^*(x_{AVE})$$

c. Correlation Coefficient (cc)

CC (r) ={ 
$$\Sigma((x_i-x_{ave})^*(y_i-y_{ave}))$$
 } / {  $SQRT((\Sigma(x_i-x_{ave})^2)^*(\Sigma(y_i-y_{ave})^2))$  }

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Or CC (r) =[
$$(\Sigma w * \Sigma wxy) - (\Sigma wx * \Sigma wy)] / (sqrt( ( [(\Sigma w * \Sigma wx^2) - (\Sigma wx * \Sigma wx)] * [(\Sigma w * \Sigma wy^2) - (\Sigma wy * \Sigma wy)])))]$$

d. Coefficient of Determination

$$COD(r^2) = CC*CC$$

#### Where:

 $y = Response (Area) Ratio A_x/A_{ls}$ 

 $x = Concentration Ratio C_x/C_{is}$ 

m = slope

b = intercept

n = number of replicate x,y pairs

x_l = individual values for independent variable

y_i = individual values for dependent variable

 $\Sigma$  = the sum of all the individual values

 $x_{ave}$  = average of the x values

yave = average of the y values

w = weighting factor, for equal weighting w=1

3. Quadratic Regression

$$y = ax^2 + bx + c$$

a. Coefficient of Determination

COD (r²) = 
$$(\Sigma(y_i-y_{ave})^2 - \{[(n-1)/(n-p)] * [\Sigma(y_i-Y_i)^2]\}) / \Sigma(y_i-y_{ave})^2$$

#### Where:

 $y = Response (Area) Ratio A_x/A_{is}$ 

 $x = Concentration Ratio C_x/C_{is}$ 

 $a = x^2$  coefficient

b = x coefficient

c = intercept

y_i = individual values for each dependent variable

 $x_i$  = individual values for each independent variable

 $y_{ave}$  = average of the y values

n = number of pairs of data

p = number of parameters in the polynomial equation (l.e., 3 for third order, 2 for second order)

 $Y_i = ((2*a*(C_x/C_{is})^2)-b^2+b+(4*a*c))/(4a)$ 

#### b. Coefficients (a,b,c) of a Quadratic Regression

$$\mathsf{a} = \mathsf{S}_{(\mathsf{x}\mathsf{2}\mathsf{y})} \mathsf{S}_{(\mathsf{x}\mathsf{x})} \mathsf{-} \mathsf{S}_{(\mathsf{x}\mathsf{y})} \mathsf{S}_{(\mathsf{x}\mathsf{x}\mathsf{2})} \, / \, \mathsf{S}_{(\mathsf{x}\mathsf{x})} \mathsf{S}_{(\mathsf{x}\mathsf{2}\mathsf{x}\mathsf{2})} \mathsf{-} [\mathsf{S}_{(\mathsf{x}\mathsf{x}\mathsf{2})}]^2$$

$$b = S_{(xy)}S_{(x2x2)} - S_{(x2y)}S_{(xx2)} / S_{(xx)}S_{(x2x2)} - [S_{(xx2)}]^2$$

$$c = [(\Sigma yw)/n] - b^*[(\Sigma xw)/n] - a^*[\Sigma(x^2w)/n]$$

#### Where:

n = number of replicate x,y pairs

x = x values

y = y values

 $w = S^{-2} / (\Sigma S^{-2}/n)$ 

 $S_{(xx)} = (\Sigma x^2 w) - [(\Sigma x w)^2 / n]$ 

 $S_{(xy)} = (\Sigma xyw) - [(\Sigma xw)^*(\Sigma yw) / n]$ 

 $S_{(xx2)} = (\Sigma x^3 w) - [(\Sigma x w)^* (\Sigma x^2 w) / n]$ 

 $S_{(x2y)} = (\Sigma x^2 yw) - [(\Sigma x^2 w)^*(\Sigma yw) / n]$ 

 $S_{(x2x2)} = (\Sigma x^4 w) - [(\Sigma x^2 w)^2 / n]$ 

Or If unweighted calibration, w=1

S(xx) = (Sx2) - [(Sx)2 / n]

S(xy) = (Sxy) - [(Sx)*(Sy) / n]

S(xx2) = (Sx3) - [(Sx)*(Sx2) / n]

S(x2y) = (Sx2y) - [(Sx2)*(Sy) / n]

S(x2x2) = (Sx4) - [(Sx2)2 / n]

#### 11.0 Data Reduction, Validation, Reporting, and Record Keeping

All data reported must be of the highest possible accuracy and quality. During the processes of data reduction, validation, and report generation, all work is thoroughly checked to insure that error is minimized.

#### **Data Reduction**

The analyst who generated the data usually performs the data reduction. The calculations include evaluation of surrogate recoveries (where applicable), and other miscellaneous calculations related to the sample quantitation.

If the results are computer generated, then the formulas must be confirmed by hand calculations, at minimum, one per batch.

See the current Data Validation SOP for details regarding data reduction.

#### Validation

A senior analyst, most often the section supervisor, validates the data. All data undergoes peer review. If an error is detected it is brought to the analyst attention to rectify and further checks ensure that all data for that batch is sound. Previous and/or common mistakes are stringently monitored throughout the validation process. Data is reported using appropriate significant figure criteria. In most cases, two significant digits are utilized, but three significant digits can be used in QC calculations. Significant digits are not rounded until after the last step of a sample calculation. All final reports undergo a review by the laboratory manager, or the project manager or their designee, to provide a logical review of all results before they are released to the client.

If data is to be manually transferred from one medium to another, the transcribed data is checked by a peer. This includes data typing, computer data entry, chromatographic data transfer, data table inclusion to a cover letter, or when data results are combined with other data fields.

All hand written data from run logs, analytical standard logbooks, hand entered data logbooks, or on instrument generated chromatograms, are systematically archived should the need for future retrieval arise.

See the current Data Validation SOP for detail regarding data validation.

#### **Reports and Records**

All records at HEAL are retained and maintained through the procedures outlined in the most recent version of the Records Control SOP.

The reports are compiled by the Laboratory Information Management System (LIMS). Most data is transferred directly from the instruments to the LIMS. After being processed by the analyst and reviewed by a data reviewer, final reports are approved and signed by the senior laboratory management. A comparative analysis of the data is performed at this point. For example, if TKN and NH3 are analyzed on the same sample the NH3 result should never be greater than the TKN result. Lab results and reports are released only to appropriately designated individuals. Release of the data can be by fax, email, electronic deliverables or mailed hard copy.

When a project is completed, the project file folder is stored with a hard copy of the report, relevant supporting data, and the quality assurance/control worksheets. These folders are kept on file and are arranged by project number. Additionally, all electronic data is backed up daily on the HEAL main server. The backup includes raw data, chromatograms and report documents. Hard copies of chromatograms are stored separately according to the instrument and the analysis date. All records and analytical data reports are retained in a secure location as permanent records for a minimum period of five years (unless specified otherwise in a client contract). Access to archived information shall be documented with an access log. Access to archived electronic reports and data will be protected by a project manager password. In the event that HEAL transfers ownership or terminates business practices, complete records will be maintained or transferred according to the client's instructions.

After issuance, the original report shall remain unchanged. If a correction to the report is necessary, then an additional document shall be issued. This document shall have a title of "Addendum to Test Report or Correction to Original Report", or equivalent. Demonstration of original report integrity comes in two forms. First, the report date is included on each page of the final report. Second, each page is numbered in sequential order, making the addition or omission of any data page(s) readily detectable.

#### **12.0 Corrective Action**

Refer to the most recent version of the Data Validation SOP for the procedure utilized in filling out a Corrective Action Report. A blank copy of the corrective action report is available in the Appendix.

The limits that have been defined for data acceptability also form the basis for corrective action initiation. Initiation of corrective action occurs when the data generated from continuing calibration standard, sample surrogate recovery, laboratory control spike, matrix spike or sample duplicates exceed acceptance criteria. If corrective action is necessary, the analyst or the section supervisor will coordinate to take the following steps to determine and correct the measurement system deficiency:

Check all calculations and data measurements systems (Calibrations, reagents, instrument performance checks etc.).

Assure that proper procedures were followed.

Unforeseen problems that arise during sample preparation and/or sample analysis that lead to treating a sample differently from documented procedures shall be documented with a corrective action report. The section supervisor and laboratory manager shall be made aware of the problem at the time of the occurrence. See the appropriate SOP regarding departures from documented procedures.

Continuing calibration standards below acceptance criteria can not be used for reporting analytical data unless method specific criteria states otherwise.

Continuing calibration standards above acceptance criteria can be used to report data so long as the failure is isolated to a single standard and the corresponding samples are non-detect for the failing analyte.

Samples with non-compliant surrogate recoveries should be reanalyzed unless deemed unnecessary by the supervisor for matrix, historical data or other analysis related anomalies.

Laboratory and Matrix Spike acceptance criteria vary significantly depending on method and matrix. Analysts and supervisors meet and discuss appropriate corrective action measures as spike failures occur.

Sample duplicates with RPD values outside control limits require supervisor evaluation and possible reanalysis.

A second mechanism for initiation of corrective action is that resulting from Quality Assurance performance audits, system audits, inter and intra-laboratory comparison studies. Corrective Actions initiated through this mechanism will be monitored and coordinated by the laboratory QA/QCO.

All corrective action forms are entered in the LIMS and included with the raw data for peer review, signed by the technical director of the section and included in the case narrative to the client whose samples were affected. All Corrective action forms in the LIMS are reviewed by the QA/QCO.

#### 13.0 Quality Assurance Audits, Reports and Complaints

#### Internal/External Systems' Audits, Performance Evaluations, and Complaints

Several procedures are used to assess the effectiveness of the quality control system. One of these methods includes internal performance evaluations, which are conducted by the use of control samples, replicate measurements and control charts. Another method is external performance audits, which are conducted by the use of inter-laboratory checks, such as participation in laboratory evaluation programs and performance evaluation samples available from a NELAC accredited Proficiency Standard Vendor.

Proficiency samples will be obtained twice per year from an appropriate vendor for all tests and matrices for which we are accredited and for which there are PTs available. HEAL participates in soil, waste water, drinking water and underground storage tank PT studies. Copies of results are available upon request. HEAL's management and all analysts shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates and other procedures as used when analyzing routine samples.

With regards to analyzing PT Samples HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seeks accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall no attempt to obtain the assigned value of any PT sample from the PT Provider.

Internal Audits are performed annually by the QA/QCO in accordance with the current Internal Audit SOP. They are performed using the guidelines outlined below:

The system audit consists of a qualitative inspection of the QA system in the laboratory and an assessment of the adequacy of the physical facilities for sampling, calibration, and measurement. This audit includes a careful evaluation and review of laboratory quality control procedures. Including but not limited to:

- 1. Review of staff qualifications, demonstration of capability, and personnel training programs
- 2. Storage and handling of reagents, standards and samples
- 3. Standard preparation logbook and LIMS procedures
- 4. Extraction logbooks
- 5. Raw data logbooks
- Analytical logbooks or batch printouts and instrument maintenance logbooks

- 7. Data review procedures
- 8. Corrective action procedures
- 9. Review of data packages is performed regularly by the lab manager/QA Officer.

The QA/QCO will conduct these audits on an annual basis.

#### **Management Reviews**

HEAL management shall periodically, and at least annually, conduct a review of the laboratory's quality system and environmental testing activities to ensure their continuing suitability and effectiveness, and to introduce necessary changes or improvements. The review shall take account of:

- 1. the suitability and implementation of policies and procedures
- 2. reports from managerial and supervisory personnel
- 3. the outcome of recent internal audits
- 4. corrective and preventive actions
- 5. assessments by external bodies
- 6. the results of inter-laboratory comparisons or proficiency tests
- 7. changes in volume and type of work
- 8. client feed back
- 9. complaints
- 10. other relevant factors, such as laboratory health and safety, QC activities, resources and staff training.

Findings from management reviews and the actions that arise from them shall be recorded and any corrective actions that arise shall be completed in an appropriate and agreed upon timescale.

#### Complaints

Complaints from clients are documented and given to the laboratory manager. The lab manager shall review the information and contact the client. If doubt is raised concerning the laboratories policies or procedures, then an audit of the section or sections may be performed. All records of complaints and subsequent actions shall be maintained in the client compliant logbook for 5 years unless otherwise stated.

#### **Internal and External Reports**

The QA/QCO is responsible for preparation and submission of quality assurance reports to the appropriate management personnel as problems and issues arise. These reports include the assessment of measurement systems, data precision and accuracy, and the results of performance and system audits. Additionally, they also include significant QA problems, corrective actions, and recommended resolution measures. Reports of these Quality Assurance Audits describe the particular activities audited, procedures utilized in the examination and evaluation of laboratory records, and data validation procedures. Finally, there are procedures for evaluating the performance of Quality Control and Quality Assurance activities, and laboratory deficiencies and the implementation of corrective actions with the review requirements.

#### References (Analytical Protocols Utilized at HEAL)

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- 5. <u>Diagnosis & Improvement of Saline & Alkali Soils.</u> Agriculture Handbook No. 60, USDA, 1954
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- 7. <u>Field and Laboratory Methods Applicable to Overburdens and Mine Soils, USEPA, EPA-600/2-78-054, March 1978</u>
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- 9. <u>Soil Testing Methods Used at Colorado State University for the Evaluation of Fertility,</u>
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- 11. <u>Sampling Procedures and Chemical Methods in Use at the U.S. Salinity Laboratory for Characterizing Salt-Affected Soils and Water.</u> USDA Salinity Laboratory.
- 12. <u>Procedures for Collecting Soil Samples and Methods of Analysis for Soil Survey.</u> USDA Soil Conservation Service, SSIR No. 1.
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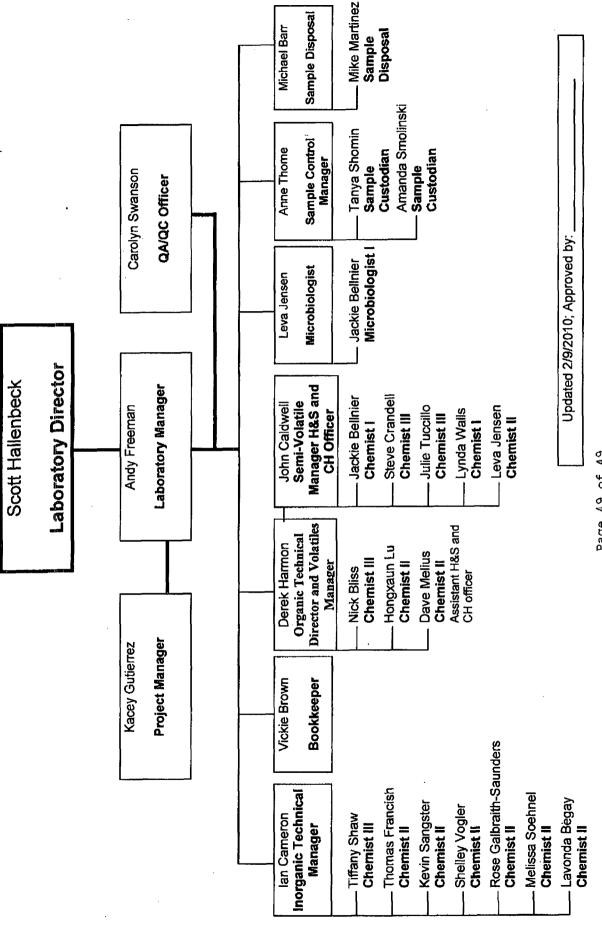
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# Appendix A

Personnel Chart / Organizational Structure

Page 48 of 49 Quality Assurance Plan 9.2 Effective February 2nd 2010

# Diagram of Organizational Structure



Page 49 of 49 Quality Assurance Plan 9.2 Effective February 2nd 2010



#### **OREGON**

# **Environmental Laboratory Accreditation Program**



**NELAP Recognized** 

Hall Environmental Analysis Laboratory, Inc. NM100001

4901 Hawkins Rd. NE, Suite D Albuquerque,NM 87109

IS GRANTED APPROVAL BY ORELAR UNDER THE 2003 NELAC STANDARDS, TO PERFORM ANALYSES ON ENVIRONMENTAL SAMPLES IN MATRICES AS LISTED BELOW:

Air Drinking Water Water Chem. Waste Tissue

Chemistry Chemistry

Chemistry

AND AS RECORDED IN THE LIST OF APPROVED ANALYTICS METHODS, ANALYTIC TECHNIQUES, AND NELDS OF TESTING ISSUED CONCURRENTLY WITH THIS PERTIFICATE AND REVISED AS NECESSARY.

ACCREDITED STATUS DEPENDS ON SUCCESSFUL ONGOING PARTICIPATION IN THE PROGRAM AND CONTINUED COMPUSNOE WITH THE STANDARDS.

CUSTOMERS ARE URGED TO VERIFY THE LABORATORY'S CURRENT ACCREDITATION STATUS

Irene E. Ronning Ph.D.

Oregon State Public Health Laboratory

**ORELAP Administrator** 

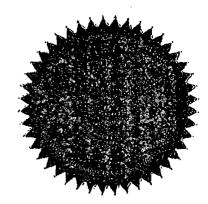
3150 NW. 229th Ave, Suite 100

Hillsboro, OR 97124

ISSUE DATE: 03/01/2010

EXPIRATION DATE: 02/28/2011

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#### Oregon

#### **Environmental Laboratory Accreditation Program**



Department of Agriculture, Laboratory Division Department of Environmental Quality, Laboratory Division

Department of Human Services, Public Health Laboratory

**NELAP Recognized** 

#### **ORELAP Fields of Accreditation**

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ORELAPID: NM100001

EPA CODE: NM00035

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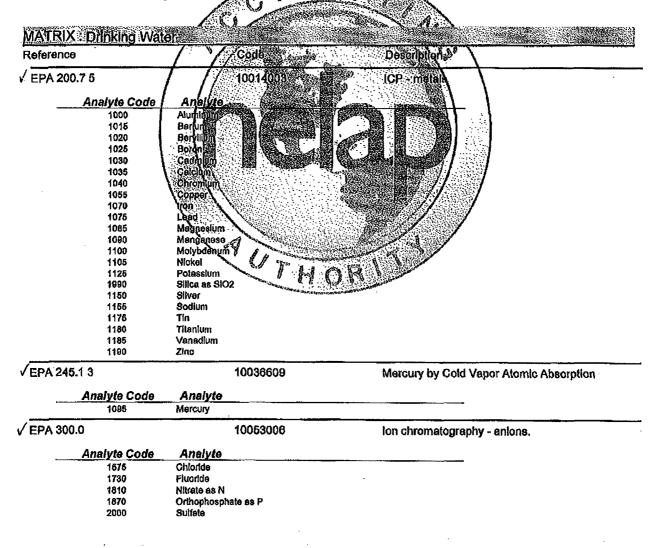
NM 87109

Issue Date:

Expiration Date: 02/28/2011

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Customers. PLease verify the current accreditation standing with ORELAP.

VEPA 5030B 10153409 Purge and trap for aqueous samples Analyte Code Analyte Extraction/Preparation 125 VEPA 504.1 10083008 EDB/DBCP/TCP micro-extraction, GC/ECD Analyte Code Analyte 4670 1,2-Dibromo-3-chloropropane (DBCP) 1,2-Dibromoethane (EDB, Ethylene dibromide) 4585 ✓ EPA **524.2 4.1** 10088809 olatile Organic Compounds GC/MS Capillary Analyte Code Analyté. 1,1,1,8 Tetrachtorosinana; 1,1,1-Trichlorosinana; 1,1,2,2,7 strachtorosinana; 1,1,2-Trichlorosthana; 6105 6160 5110 6165 1,1-Dichloroethane 1,1-Dichloroethylene 4830 4640 4670 1,1-Dichloropropend 6150 5180 5155 **6210** 4610 4635 1.2 Dictiorpropine 1:3.5 Unitelly/benzene 1:3. Dictiorpenzene 1:3. Dictiorpropine 1:4. Dictioropenzene 4665 6215 4615 4660 4620 4535 2-Ghlorojoluene 4-Chilorotoluen 4640 4375 Banzaña, Bromobenzene 4385 4390 Bromochloromethania 4395 Bromodichlorometrane 4400 **Bromoform** 4455 Cerbon tetrachloride 4476 Chlorobenzene 4675 Chlorodibromomethane 4465 Chloroethane (Ethyl chloride) 4605 Chloroform 4645 cls-1,2-Dichloroethylene 4660 cls-1,3-Dichloropropens 4595 Dibromomethane (Methylene bromide) 4765 Ethylbenzene 4835 Hexachlorobutadiene 4900 Isopropylbenzene 4950 Methyl bromide (Bromomethane) Methyl chloride (Chloromethane) 4960 8000 Methyl tert-butyl ether (MTBE) 4975 Methylene chloride (Dichtoromethene) 4435 n-Butylbenzene 5090 n-Propylbenzene 4440 sec-Butylbenzene **5100** Styrene 4445 tert-Bulylbenzene 5115 Tetrachioroethylene (Perchioroethylene) 5140 Toluene

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Analyte Code	Analyte				
4700	trans-1,2-Dichloroethylene				
4685	trans-1,3-Dichloropropylene .				
5170	Trichloroethene (Trichloroethylene)				
<b>6176</b>	Trichlorofluoromethane (Fluorot	richloromethane, Freon 11)			
6235	Vinyl chloride				
5280	Xylene (total)				
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03/01/2010

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Reference		Code	Description
EPA 300	.0	10053006	ion chromatography - anions.
_	Analyte Code	Analyte	
	1540	Bromide	
	1575	Chloride	• •
	1730	Fluoride	
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	Analyte Code	Arlalyte	
	125	Extraction/Preparation	
EPA 503	OB.	10153209	Purge and trap for aqueous samples
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	1090	Manganese	
	1100	Molybdenum	
	1105	Nickel	
	1125	Potassium	•
	1140	Selenium	
	1150	Silver	
	1155	Sodium	•
	1165	Thallium	
	1176	Tin	
	1180	Tilanium	
	3035	Uranium	
	1185	Vanadium	
	1190	Zino	

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EPA 7470A	•	10165807	Mercury In Liquid Waste by Cold Vapor Atomic Absorption
An	alyte Code	Analyte	
	1095	Mercury	
EPA 8016B		10173601	Non-halogenated organics using GC/FID
An	alyte Code	Analyte	
	9369	Diesel range organics (DRO)	
	9408 9499	Gasoline range organics (GRO) Motor Oll	the more representations
EPA 8021B		101748081	Aromatic and Halogenated Volatiles by GC with RID and/oxECD Purge & Trap
An	alyte Code	Analyte's	
	5210	1,2,4-Irimelhylbenzene	
	5215	1,6,5-Yamelhylbenzene	
	4375 4768	Benzene Ethylbenzene	Jan /
	4765 6240	m+p-xylene	
	5000 j	Methyl tert-bulyl ether (MTBB)	
	5250	o-Xyjene	P. WINDS
	6140	Toluene	
	5260	Xylene ((Olal)	
EPA 8081A		101/8606	Organochie ine Pesticides by GC/ECD
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	7355	(44 D)D)	
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	7025	Aldrin	
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	8895	Aroclor-1242 (PGB-1242)	
	8900	Aroclor-1248 (PCB-1248)	
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An	alyte Code 5105	Analyte 1,1,1,2-Tetrachloroethane	
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ORELAP ID: NM100001

EPA CODE: NM00036

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Analyte Code	Analyte
5160	1,1,1-Trichloroethane
5110	1,1,2,2-Tetrachloroethane
5165	1,1,2-Trichloroethane
4630	1,1-Dichloroethane
4640	1,1-Dichloroethylene
4670	1,1-Dichloropropene
5150	1,2,3-Trichlorobenzene
5180·	1,2,3-Trichloropropane
5155	1,2,4-Trichlorobenzene
5210	1,2,4-Trimethylbenzene
4570	1,2-Dibromo-3-chjoropene (DBCP)
4585	1,2-Dibromoetkane (EDB Ethylene dibromide)
4610	1,2-Dichlorobenzene
4635	1,2-Dichlordeinane (Ethylane dichloride)
4655	1,2-Dichloropropage
5215	A OF The All Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control
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4540	4-Chicololuene
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4316 4376	Acelone
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4395	Bromodichioromethana
4400	Bromotorm S
4450 4455	Carbon disulfide
4475	Chlorobenzene
4475 4576	Chlorodibromomethane
4485	Chloroethane (Ethyl chloride)
4505	Chloroform
4646	cis-1,2-Dichloroethylene
4680	cls-1,3-Dichloropropene
4595	Dibromomethane (Methylene bromide)
4626	Dichlorodifluoromethane (Freon-12)
4765	Ethylbenzene
4835	Hexachlorobutadiene
4900	isopropyibenzene
5240	m+p-xylene
4950	Methyl bromide (Bromomethane)
4960	Methyl chloride (Chloromethane)
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4975	Methyl tert-butyl ether (MTBE) Methylene chloride (Dichloromethane)
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4435	n-Bulylbenzene
5090	n-Propylbenzene
5250	o-Xylene
4440	sec-Butylbenzene
5100	Styrene
4445	terl-Butylbenzene
B115	Tetrachlorosthylene (Perchlorosthyleno)

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4901 Hawkins Rd. NE, Suite D Albuquerque NM 87109

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Expiration Date: 02/28/2011

As of 03/01/2010

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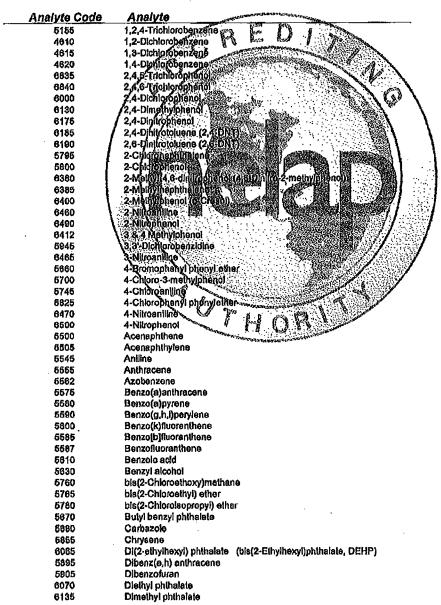
Customers. PLease verify the current accreditation standing with ORELAP.

Analyte C	Code Analyte
4700	trans-1,2-Dichioroethylene
4686	trans-1,3-Dichloropropylene
6170	Trichloroethene (Trichloroethylene)
5175	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)
<b>623</b> 5	Vinyl chloride
5260	Xylene (total)

✓EPA 8270C

10185805

Semivolatile Organic compounds by GC/MS



ORELAP ID: NM100001

EPA CODE: NM00035

Certificate: NM100001 - 007

#### Hall Environmental Analysis Laboratory, Inc.

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NM 87109

Issue Date:

03/01/2010

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Analyte Code	Analyte	
6925	DI-n-butyl phthalate	
8200	Di-n-octyl phthalate	
6266	Fluoranthene	·
6270	Fluorene	·
6275	Hexachiorobenzene	
4635	Hexachlorobutadiens	•
6265	Hexachlorocyclopentadiene	
4840	Hexachloroethane	
6316	Indeno(1,2,3-cd) pyrene	
6320	Isophorone	was a resident water and the second
5005	Naphthalene Nitrobenzene	
6015		
6546	n-Nitrosodi-n-prohylaming	
6536	n-Nitrosodiphenylamine	
8605	Pentachlorophenol	
6615	Phenanthrene Phenois	
6625	Phenois,	110
6665	Pyrene	
5095	Pyriding	
EPA 8310	/ / 10187807	Polynuclear Aromatic Hydrocarbons by
EFA 65 IV		TOIVINGE AND INCOME OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PRO
Analyte Carlo		HRUGUVXVIA
Analyte Code	Analyte va	
6380	1-Methylhephthalene	
5500	Acenaphinene Acenaphinene	
5505	Acenaphinylene	
5555	Anthlacene	
5576	Benzo(a)anthracene	
<b>5580</b>	Denzo(e)pyrene	
5590	Renzo(g)b.l)perylene	
5600	Henzo(k)filoranthene Benzo(b)filoranthene	
5586	Reuzololitnotauruena	
5855	Chrysene	
5895	Dibenz(e,h), afilhracene	
6265	Fluorenthene	
6270 6315	Fluorene Indeno(1,2,3-cd) pyrene	
8005		
	Naphthalene	translation of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the
8615 8665	Phenenthrene	
0000	Pyrene	
EPA 9060A	10244801	Total Organic Carbon
Analyte Code	Analyte	
2040	Total organic carbon	
· · · · · · · · · · · · · · · · · · ·		
8M 2540 C 20th ED	20050004	Total Dissolved Solids
Analyte Code	Analyte	
1955	Residue-filterable (TDS)	
SM 4500-H+ B 20th ED	20104807	pH by Probe
	_	
Analyte Code	Analyte	
1900	pH	
	· · · · · · · · · · · · · · · · · · ·	
SM 4500-NH3 C 20th ED	20106405	Ammonia Nitrogen by Titration
		- •
Analyte Code	Analyte	
1815	Ammonia as N	
		Page 8 of 14

ORELAP ID: NM100001

EPA CODE: NM00035

Certificate: NM100001 - 007

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√ SM 4500-Norg C 20th ED

20119602

Nitrogen (Organic) by Semi-micro Kjeldahl

Method

Analyte Code

Analyte

1795

Kjeldahl nitrogen - total



ORELAP ID: NM100001

EPA CODE: NM00035

Hall Environmental Analysis Laboratory, Inc.

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Reference	Code	Description
EPA 3050B	10135601	Acid Digestion of Sediments, Sludges, and soils
Analyte Code	Analyte	,
125	Extraction/Preparation	400
EPA 3540C	10140202	Soxhiet Extraction
Analyte Code	Analyte Ka	S ROSE OF A CONTRACT OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PAR
125	Extraction/Preparation	
EPA 3546A	10141001	Pressurized Fluid Extraction (PFE)
Analyte Code	Analyte /	
125	extraclipnie reparation	
EPA 5035	// 10154004	Olosed System Purge-and-Trap and Extraction for Volatile Organics in Soll and Waste Samples
Analyte Code	Analyte	ior voisule digames in soil and waste samples
125	Extraction/Preparation 2007	
ÆPA 6010B	10/(45809	ICR-AES
Analyte Code		
1000 1006	Aluminium Ass	
1010	Arsenio	
1015	\Bartum \	
1020	Beryllium	
1025	Bolon	
1030	Cadmium	
1035	Catclum	
1040	Chickling 4 /2 & **Start 12	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon
1050		
1055 1070	Copper	
1078	Lead	ASSESSED FOR THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE P
1085	Magnesium	
1090	Manganese	
1100	Molybdenum	
1105	Nickol	
1125	Potessium	
1140	Selenium	
1150	Sliver	
11 <del>55</del>	Sodium	
1166	Thaillum	
1175	Tin	
1180	Titenlum	
3035	Uranium	•
1185	Vanadium	
1,190	Zinc	
EPA 7471A	10166208	Mercury in Solid Waste by Cold Vapor Atomic Absorption
4 4 . 4 6 4	Accordents	· indothing
Analyte Code	Analyte	

ORELAPID: NM100001

EPA CODE: NM00035

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EPA 8015B	10173601	Non-halogenated organics using GC/FID		
Analyte Code	Analyte			
9369	Diesel range organics (DRO)			
9408	Gasoline range organics (GRO)			
9499	Motor Oll			
EPA 8021B	10174808	Aromatic and Halogenated Volatiles by GC with		
Analyte Code	Analyte	PID and/or ECD Purge & Trap		
4375	Benzene Mine Mine	Andrew of the San San San San San San San San San San		
4785	Ethyloenzene			
5240	m+D-xy(effe)			
5000	Methyl terf bulyl ether (MTBE)			
<b>525</b> 0 5140	o-Xylene ( ) Toluene			
5260	Xylene (lotal)			
EPA 8081A	/ //10/78606	Organochlorine Pasticides by GC/ECD		
Analyte Code 7355	Anelyte 4.4'-PDD	<del></del>		
7360 7360	44.6			
7385	4,4 D T			
7025	Aldrin			
7110	alpha-BHC (alpha Hexachigrocycloffexane)			
71 <b>1</b> 5	beta BHC (beta Hexacil procyclonexene)			
7105	delia/dHC			
7470	Dialduo			
7610 7615	Endosulan II			
7520	Endosolian sulfate			
7540	Entido			
7530	Endin sidehyde			
7120	gamma BHC (Lindana gamma Hexachloro	yclohexanE) (V		
7685	Heptachlo			
7690	Heptachlor epoxide			
7810	Methoxychlor	A CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR		
EPA 8082	10179007	Polychlorinated Biphenyls (PCBs) by GC/ECD		
Analyte Code	Analyte			
8880	Aroclor-1016 (PCB-1018)			
8885	Arodor-1221 (PCB-1221)	•		
8890	Aroclor-1232 (PCB-1232)			
8895 8900	Aroclor-1242 (PCB-1242) Aroclor-1248 (PCB-1248)			
8905	Arocior-1264 (PCB-1264)			
8910	Arocior-1280 (PCB-1280)			
	10184802	Volatile Organic Compounds by purge and trap		
EPA 8260B	(V1040VZ			
EPA 8260B		GC/MS		
Analyte Code	Analyte	GC/MS		
Analyte Code	Analyte 1,1,1,2-Tetrachloroethane	GC/MS		
<u>Analyte Code</u> 5105 5160	Analyte 1,1,1,2-Tetrachloroethane 1,1,1-Trichtoroethane	GC/MS		
Analyte Code 5105 5160 5110	Analyte 1,1,1,2-Tetrachloroethane 1,1,1-Trichloroethane 1,1,2,2-Tetrachloroethane	GC/MS		
<u>Analyte Code</u> 5105 5160	Analyte 1,1,1,2-Tetrachloroethane 1,1,1-Trichtoroethane	GC/MS		
Analyte Code 5105 5160 5110 5165	Analyte 1,1,1,2-Tetrachloroethane 1,1,1-Trichloroethane 1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane	GC/MS		
Analyte Code 5105 5160 5110 5165 4630	Analyte 1,1,1,2-Tetrachloroethane 1,1,1-Trichloroethane 1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane 1,1-Dichloroethane	GC/MS		

ORELAPID: NM100001

EPA CODE: NM00035

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Analyte Code	Analyte
5180	1,2,3-Trichloropropane
5155	1,2,4-Trichlorobanzene
5210	1,2,4-Trimethylbenzene
4570	1,2-Dibromo-3-chioropropane (DBCP)
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)
4810	1,2-Dichlorobenzene
4635	1,2-Dichloroethane (Ethylene dichloride)
4855	1,2-Dichioropropane
5215	1,3,6-Trimethylbenzene
4615	1,3-Dichlorobenzene
4660	
•	1,3-Dichloropropane
4620	1,4-Dichlorobenzene
6380	1-Methylpaphthalene
4685	2,2-Dichloropropana
4410	2-Bulanone (Methyl ethyl retone, MEK)
4535	2-Chlorotolueno
4860	2-Hexahone /
6385	/2-Methyjnaphthalane
4540	4-Chlopotolulene
4910	4-Isopropylioluene (o-Cymene)
4995	4-Methyl-2-panlanone (MIBIK)
4315	Acelones waste.
4376	Benzene
4385	Bromdpenzene
4390	Bromogujoromeliju in
4395	Bromodichloromelliane
4400	Bronkloim
'	Carlotte Charles
4450	Carpon disulfide
4465	Carpon tetrachloride
4475	Chlorobenzene
4676	Chlorodiblomomethane
4485	Chloroethana (Ethyl chloride)
4605	Chloroform
4645	cls-1,2-Dichlogielitylene
4680	cls-1,3-Dichlolopropana
4595	Dibromomethane (Methylane bromide)
4625	Dichlorodifluoromethane (Freen 12)
4765	Ethylbenzene
4835	Hexachiorobuladiens
4900	Isopropylbenzene
5240	m+p-xylene
4950	Methyl bromide (Bromomethane)
4960	Methyl chloride (Chloromethane)
5000	Methyl tert-butyl ether (MTBE)
4975	Methylene chloride (Dichloromethane)
5005	Nephihalene
4435	n-Bulyibenzene
5090	n-Propyibenzene
5250	o-Xylene
4440	sec-Butylbenzene
6100 4445	Styrene tert-Rutulhenzone
4445	tert-Butylbenzene Tetrachloroethylene (Perchloroethylene)
5115	
5140	Toluene
4700	trans-1,2-Dichloroethylene
4685	trans-1,3-Dichloropropylene
5170	Trichloroethene (Trichloroethylene)
51 <b>75</b>	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)
5235	Vinyl chloride
	Xylene (total)

ORELAP ID: NM100001

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Semivolatile Organic compounds by GC/MS 10185805 /EPA 8270C **Analyte Code** Analyte 1,2,4-Trichlorobenzene 5155 4610 1,2-Dichlorobenzene 1,3-Dichlorobenzene 4615 1,4-Dichlorobenzene 4820 2,4,6-Trichlorophenol 6835 6840 2,4,6-Trichlorophenol 2,4-Dichlorophenol 8000 6130 2,4-Dimethylphenol 2,4-Dinitrophengle 6175 2,4-Dinitrotoluene (2,4-DNT) 2,6-Dinitrotoluene (2,6-DNT) 2-Chloronephihalene 6185 6190 5795 2-Chloropherol 2-Methyr-4,8-dinitrophenol (4,8-Dinitro-2-methyrphenol 2-Methylpephhelene 2-Methylphenol (ö-Crasol) 5800 6360 6365 6400 6460 2-Nitrol 6490 2-Nitropheno 3 & 4 Methylphenol 9,3' politiciation and 6412 5945 8465 6660 phenyl 5700 6745 4 Ohlorophenyl 4 Nitrophenyl A Nitrophenyl Acenaphthene Acenaphthylen 5625 6470 8500 5500 **6505** Añiline 6545 Anthracene 6555 5562 Azobehzene* 8675 Benzo(a) animace fie 5580 Benzo(a)pyrene Benzo(g,h,i)perylene. Benzo(k)fluoranthene 5590 5600 Benzo[b]fluoranthene 6686 5610 Benzolc acid 5030 Benzyl elcohol bis(2-Chloroethoxy)methane 6760 bis(2-Chloroethyl) ether 5765 bis(2-Chiorolsopropyl) ether 6780 6670 **Bulyl benzyl phthalate** Cerbazole 5680 8855 Chrysene Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP) 6065 5895 Dibenz(a,h) anihracene Dibenzofuran 5905 Diethyl phthalate 6070 6135 Dimethyl phthalate Di-n-butyl phthalate 5925 DI-n-octyl phthalate 6200 6265 Fluoranthene 6270 Fluorene Hexachlorobenzene 8275 Hexachlorobutadiene 4835 6285 Hexachlorocyclopentadiene

Hexachloroethane

4840

ORELAP ID: NM100001

EPA CODE: NM00035

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Analyte Code	Analyte
6315	Indeno(1,2,3-cd) pyrene
6320	isophorone
5005	Naphthalene
5015 ·	Nitrobenzene
6530	n-Nitrosodimethylamine
8545	n-Nilrosodi-n-propylamina
6535	n-Nitrosodiphanylamine
6605	Pentachloropheno!
6615	Phenanthrene
6625	Phenol
6665	Pyrene
5095	Pyridine Pyridine
EPA 8310	10187607 Rolyhuclear Aromatic Hydrocarbons by
Analyte Code	Ahelyte HPLC/UV/VIB
6380	1 Methylneighthalene
8385	2-Methylhaphthateness
5500	Acenaphthene
5605	Acengon(hylene )
5555	Anthracene Anthracene
5575	Benzo(a)artifiagene
5580	Benzolaj pyrenaga
5590	Benzolgih, i) perylen essees
5600	Benzo(K)tivoren(ng)
5585	Béntoli) huoran liene
6855	Chipheile Dibent (a, h) enthracene
5895	Dibent(é,h) anthracene
6265	/ Hugganinana
6270	\Fluorene \ /
6315	lodeno(1,2,3-od) pyrane
6005	Naphthaleno
. 6615	Phenenthrens
6665	Pyrene



# State of New Mexico ENVIRONMENT DEPARTMENT Water & Wastewater Infrastructure Development Division DRINKING WATER BUREAU

525 Camino de Los Marquez, Suite 4
Santa Fe, New Mexico 87505
Phone (505) 476-8620 • Fax (505) 476-8656
Toll Free 1-877-654-8720
www.nmeny.state.nm.us/dwb



RON CURRY Secretary

Sarah Cottrell
Deputy Secretary

Karen E. Gallegos
Director

June 17, 2010

Andy Freeman
Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109

Dear Mr. Freeman:

The Drinking Water Bureau of the New Mexico Environment Department (NMED-DWB) has received and reviewed your NELAP certification /accreditation information from the state of Oregon. The documentation is acceptable and your New Mexico certification is now valid through February 28, 2011.

This certification is to perform drinking water analysis in compliance with the Federal Safe Drinking Water Act, pursuant to 40CFR Part 141, and the New Mexico Environment Department Drinking Water Regulations for the Primary Regulated contaminants, including contaminants as listed in your Oregon Scope Accreditation.

You must advise NMED-DWB of any change in your accreditation by the State of Oregon and continue to provide this office with performance evaluation results. You are also required to provide evidence of renewal of accreditation by the state of Oregon to continue certification past February 28, 2011.

Laboratories certified by New Mexico can be purged from the list if there is no evidence that they are performing drinking water compliance sample analysis for public water supply systems in New Mexico.

If you have any questions or require additional information, please contact me at 505-476-8648.

Sincerely,

Oneva Rivera

Data/ Lab Coordinator

oneva.rivera@state.nm.us



State of Utah
GARY R HERBERT
Governor
GREGORY S BELL
Lieutenant Governor

#### Utah Department of Health

David N. Sundwall, MD

Executive Director

#### **Disease Control and Prevention**

Patrick F. Luedtke, MD, MPH.

Director Unified State Labs: Public Health

**Bureau of Laboratory Improvement** 

David B Mendenhall, MPA, MT (ASCP)

Bureau Director



### STATE OF UTAH DEPARTMENT OF HEALTH

## ENVIRONMENTAL LABORATORY CERTIFICATION PROGRAM CERTIFICATION

is hereby granted to

#### Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE Albuquerque NM 87109-4337

Scope of accreditation is limited to the State of Utah Accredited Fields of Accreditation Which accompanies this Certificate

Continued accredited status depends on successful Ongoing particitpation in the program

EPA Number:

NM00035

Expiration Date: 2/28/2011

Patrick F. Luedtke, MD, MPH

Director Unified State Laboratories: Public Health





State of Utah
GARY R HERBERT
Governor
GREGORY S BELL
Lieutenant Governor

Utah Department of Health

David N. Sundwall, MD Executive Director

#### **Disease Control and Prevention**

Patrick F. Luedtke, MD, MPH.

Director Unified State Laboratories: Public Health

**Bureau of Laboratory Improvement** 

David B Mendenhall, MPA, MT (ASCP)

Bureau Director



3/11/2010

Hall Environmental Analysis Laboratory, Inc. Andy Freeman 4901 Hawkins Rd. NE Albuquerque NM 87109-4337 ID# HEAL EPA ID: NM00035

Director.

In recognition of your NELAP accreditation and in compliance with the ELCP requirements, the laboratory listed is certified for environmental monitoring under the Clean Water Act and authorized to perform the following methods, for the analytes and matrix listed:

#### Non-Potable Water

#### **Inorganics and Metals**

300.0 [1993]	Bromide
300.0 [1993]	Chloride
300.0 [1993]	Fluoride
300.0 [1993]	Nitrate
300.0 [1993]	Nitrite
300.0 [1993]	ortho-Phosphate
300.0 [1993]	Sulfate :
300.0 [1993]	Nitrate/Nitrite

The effective date of this certificate letter is: 3/1/2010.

The analytes by method which a laboratory is authorized to perform at any given time will be those indicated in the most recent certificate letter. The most recent certification letter supersedes all previous certification or authorization letters. It is the certified laboratory's responsibility to review this letter for discrepancies. The certified laboratory must document any discrepancies in this letter and send notice to this bureau within 15 days of receipt. This certificate letter will be recalled in the event your laboratory's certification is revoked.

Respectfully,

Patrick F. Luedtke, MD, MPH.

Director Unified State Laboratories: Public Health





State of Utah
GARY R HERBERT
Governor
GREGORY S BELL
Lieutenant Governor

Utah Department of Health

David N. Sundwall, MD Executive Director

**Disease Control and Prevention** 

Patrick F. Luedtke, MD, MPH.

Director Unified State Labs: Public Health

Bureau of Laboratory Improvement David B Mendenhall, MPA, MT (ASCP)

Bureau Director



3/11/2010

Hall Environmental Analysis Laboratory, Inc. Andy Freeman 4901 Hawkins Rd. NE Albuquerque NM 87109-4337

ID# HEAL EPA ID: NM00035

Director,

in recognition of your NELAP accreditation and in compliance with the ELCP requirements, the laboratory listed is certified for environmental monitoring under the Resource Conservation and Recovery Act and authorized to perform the following methods, for the analytes and matrix listed:

<u>Metal Dige</u>	stion		
		Non-	
		Potable	
•	Solid	Water	
3005 A		$\checkmark$	Acid Digestion Total Recoverable or Dissolved Metals
<u>Metals</u>			
-		Non-	
		Potable Water	
	Solid		
6010 B		$\checkmark$	Aluminum
6010 B			Antimony
6010 B		$\checkmark$	Arsenic
6010 B		$\checkmark$	Barlum
6010 B		$\checkmark$	Beryllium
6010 B		$\checkmark$	Boron
6010 B		$\checkmark$	Cadmium
6010 B		$\mathbf{Z}$	Calcium
6010 B		$\checkmark$	Chromium
6010 B		$ \mathbf{V} $	Cobalt
6010 B		$\checkmark$	Iron
6010 B		V	Lead
6010 B			Magnesium
6010 B		$\checkmark$	Manganese
6010 B		$\checkmark$	Molybdenum
6010 B		✓	Nickel
6010 B		$\checkmark$	Potassium
6010 B			Selenium
6010 B		$\checkmark$	Silver
6010 B		$\checkmark$	Sodium
6010 B		$\checkmark$	Thallium
6010 B		$\checkmark$	Tin
6010 B		$\overline{\mathbf{V}}$	Titanlum
6010 B		$\checkmark$	Vanadium



Half Environmental Analysis Laboratory, Inc. Resource Conservation and Recovery Act

Page 2 01				
<u>Metals</u>		Non-		
		Potable		
	Solid	Water		
6010 B		$\checkmark$	Zinc	
Organic I	xtractic			•
		Non- Potable		
	Solid	Water		
3510 C	Solid	<b>V</b>	Separatory Funnel Liquid-Liquid Extractions	
Organic I	Ll Doževena		Separatory Furnier Enquire Entractions	
<u>Organiic i</u>	natiuthe	Non-		
		Potable		
	Solid	Water		
8015 B		$\checkmark$	Diesel Range Organics (DROs)	
8015 B		$ \mathbf{Z} $	Gasoline Range Organics (GROs)	
8260 B		lacksquare	1,1,1,2-Tetrachloroethane	
8260 B		$ \mathbf{Z} $	1,1,1-Trichloroethane	
8260 B		lacksquare	1,1,2,2-Tetrachloroethane	
8260 B			1,1,2-Trichloroethane	
8260 B		V	1,1-Dichloroethane	
3260 B			1,1-Dichloroethylene (-ethene)	
8260 B		$\checkmark$	1,1-Dichloropropene	
8260 B		$\checkmark$	1,2,3-Trichlorobenzene	
3260 B		$\mathbf{Z}$	1,2,3-Trichloropropane	
8260 B		✓	1,2,4-Trichlorobenzene	
8260 B		$\checkmark$	1,2,4-Trimethylbenzene	
8260 B			1,2-Dibromo-3-chloropropane (DBCP, Dibromochloropropane)	
8260 B		$\checkmark$	1,2-Dibromoethane (EDB, Ethylene dibromide)	
8260 B		$\checkmark$	1,2-Dichlorobenzene	
8260 B		$\checkmark$	1,2-Dichloroethane	
8260 B		$\checkmark$	1,2-Dichloropropane	
8260 B		$\checkmark$	1,3,5-Trimethylbenzene	
8260 B			1,3-Dichlorobenzene	
8260 B		$\checkmark$	1,3-Dichloropropane	
8260 B			1,4-Dichlorobenzene	
8260 B		$\checkmark$	2,2-Dichloropropane	
8260 B			2-Chlorotoluene	
8260 B		$\checkmark$	2-Hexanone	
8260 B		$\checkmark$	2-Methylnaphthalene	
8260 B		$\checkmark$	4-Chlorotoluene	
8260 B		$\checkmark$	4-Methyl-2-pentanone (MIBK, Isopropylacetone, Hexone)	
8260 B			Acetone	
8260 B		$\checkmark$	Benzene	
3260 B		V	Bromobenzene	
8260 B		V	Bromochloromethane	
8260 B		V	Bromodichloromethane	
8260 B		$\checkmark$	Bromoform	
8260 B		$\checkmark$	Carbon Disulfide	
8260 B		$\mathbf{Z}$	Carbon Tetrachloride	
8260 B	$-\bar{\Box}$	$ \mathbf{Z} $	Chlorobenzene	
8260 B	一	$\overline{\mathbf{V}}$	Chlorodibromomethane [Dibromochioromethane]	
3260 B	ī	$\overline{\mathbf{Z}}$	Chloroethane	
9260 B	$\equiv$		Chloroform	
3260 B		$\overline{\mathbf{Z}}$	cis-1,2-Dichloroethene (-ethylene)	_
	=	$\overline{\mathbf{Z}}$	cis-1,3-dichloropropene	
8260 B	<u>:</u>	<b>Y</b> .	сь- г,э-чистиогоргорепа	•



Hall Environmental Analysis Laboratory, Inc. Resource Conservation and Recovery Act

Page 3 of 5

Organic In		Non-	
	0.84	Potable Water	
0000 B	Solid	<b>V</b>	Dibromomethane
8260 B	Н	<b>V</b>	Dichlorodifluoromethane
8260 B	$\Box$		Dichloromethane (DCM, Methylene chloride)
8260 B 8260 B		Z	Ethylbenzene
	H	V	Hexachlorobutadiene
8260 B 8260 B	H		Isopropylbenzene
		<b>Y</b>	Methyl bromide [Bromomethane]
8260 B 8260 B	H		Methyl chloride [Chloromethane]
8260 B	ī	V	Methyl Ethyl Ketone (MEK, 2-Butanone)
8260 B	H	$\overline{\mathbf{Z}}$	Methyl-t-Butyl Ether (MTBE)
8260 B	Ħ	Z	Naphthalene
8260 B	ī	V	n-Butylbenzene
8260 B	ī	V	n-Propylbenzene
8260 B	$\Box$	V	ortho-Xylene
8260 B	$\overline{\Box}$	V	p-lsopropyltoluene
8260 B	П	$\overline{\mathbf{Z}}$	sec-Butylbenzene
8260 B	Ħ	V	Styrene
8260 B	$\Box$	$\overline{\mathbf{Z}}$	tert-Butylbenzene
8260 B	H	$\overline{\mathbf{Z}}$	Tetrachloroethylene (Perchloroethylene -ethene)
8260 B	$\Box$	<b>V</b>	Toluene
8260 B	$\Box$	<b>Z</b>	trans-1,2-Dichloroethylene (-ethene)
8260 B	ñ	$\overline{\mathbf{Z}}$	trans-1,3-Dichloropropylene (-propene)
8260 B	$\overline{\sqcap}$	V	Trichloroethene (Trichloroethylene)
8260 B	$\Box$	$\overline{\mathbf{V}}$	Trichlorofluoromethane
8260 B	一 一	$\overline{\mathbf{Z}}$	Vinyl Chloride
8260 B		$\overline{\mathbf{Z}}$	Volatile Organic Compounds
8260 B	$\overline{\Box}$		Xylenes, Total
8270 C	F	V	1,2,4-Trichlorobenzene
8270 C	$\overline{\Box}$	$\overline{\mathbf{Z}}$	1,2-Dichlorobenzene
8270 C		$\checkmark$	1,3-Dichlorobenzene
8270 C	$\Box$	<b>V</b>	1,4-Dichlorobenzene
8270 C	$\overline{\Box}$	<b>V</b>	2,4,5-Trichlorophenol
8270 C		¥	2,4,6-Trichlorophenol
8270 C		V	2.4-Dichlorophenol
8270 C		<b>V</b>	2,4-Dimethylphenol
8270 C		$\checkmark$	2,4-Dinitrophenol
8270 C			2,4-Dinitrotoluene (2,4-DNT)
8270 C		V	2,6-Dinitrotoluene (2,6-DNT)
8270 C		$\checkmark$	2-Chloronaphthalene
8270 C		$\checkmark$	2-Chlorophenol
8270 C		V	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)
8270 C		$\checkmark$	2-Methylnaphthalane
8270 C		$\checkmark$	2-Methylphenol (o-cresol, 2-Hydroxytoluene)
8270 C		$\mathbf{Y}$	2-Nitroaniline
8270 C		$\checkmark$	2-Nitrophenol
8270 C		$\checkmark$	3,3'-Dichlorobenzidine
8270 C		$\checkmark$	3-Nitroaniline
8270 C		$\mathbf{Y}$	4-Bromophenyl Phenyl Ether
8270 C		V	4-Chloro-3-methylphenol
8270 C		$\overline{\mathbf{Z}}$	4-Chloroaniline
8270 C		~	4-Chiorophenyi Phenyi Ether



Organic I	Instrume		
Non-		Non- Potable	
	Solid	Water	
8270 C		V	4-Nitroaniline
8270 C		$\overline{\mathbf{V}}$	4-Nitrophenol
8270 C			Acenaphthene
8270 C		$\overline{\mathbf{V}}$	Acenaphthylene
8270 C		$\checkmark$	Aniline
8270 C		$\checkmark$	Anthracene
8270 C	· 🔲	$\checkmark$	Azobenzene
8270 C		$\overline{\checkmark}$	Benzo(a)anthracene
8270 C		$\checkmark$	Benzo(a)pyrene
8270 C		$\checkmark$	Benzo(b)fluoranthene
8270 C		$\checkmark$	Benzo(g,h,i)perylene
8270 C		$\checkmark$	Benzo(k)fluoranthene
8270 C		$\checkmark$	Benzolc Acid
8270 C		$ \mathcal{L} $	Benzyl alcohol
8270 C		$\checkmark$	bis(2-chloroethoxy)methane
8270 C		$\checkmark$	bis(2-Chloroethyl)ether
8270 C		V	bis(2-chloroisopropyl)ether
8270 C		$\checkmark$	bis(2-Ethylhexyl) phthalate (DEHP)
8270 C		$\checkmark$	Butyl Benzyl Phthalate
8270 C		V	Carbazole
8270 C		$\checkmark$	Chrysene
8270 C		V	Dibenzo(a,h)anthracene
8270 C		$\checkmark$	Dibenzofuran
8270 C		V	Diethyl Phthalate
8270 C			Dimethyl Phthalate
8270 C		$ \mathbf{Z} $	Di-n-butyl phthalate
8270 C		lacksquare	Di-n-octyl Phthalate
8270 C		$\checkmark$	Fluoranthene
8270 C		$\checkmark$	Fluorene
8270 C		V	Hexachlorobenzene
8270 C		Z	Hexachlorobutadiene
8270 C		V	Hexachlorocyclopentadiene
8270 C	닐	V	Hexachloroethane
8270 C		$\mathbf{Z}$	Indeno(1,2,3-cd)pyrene
8270 C		V	Isophorone
8270 C			Naphthalene
8270 C			Nitrobenzene
8270 C		<b>Y</b>	n-Nitroso-di-n-Propylamine
8270 C		Z	n-Nitrosodiphenylamine
8270 C 8270 C		<b>V</b>	Pentachlorophenol Phenanthrene
8270 C	<u></u>	Z	Phenol
8270 C		<b>Y</b>	
8270 C 8270 C			Pyrene Pyridine
8270 C			Semivolatile Organic Compounds
Volatile O	urania 15		
TOIR C		Non-	<del>21</del>
		Potable	
		Water	
5030 B		$\checkmark$	Purge-and-Trap for Aqueous Samples



Hall Environmental Analysis Laboratory, Inc. Resource Conservation and Recovery Act Page 5 of 5



The effective date of this certificate letter is: 3/1/2010.

The analytes by method which a laboratory is authorized to perform at any given time will be those indicated in the most recent certificate letter. The most recent certification letter supersedes all previous certification or authorization letters. It is the certified laboratory's responsibility to review this letter for discrepancies. The certified laboratory must document any discrepancies in this letter and send notice to this bureau within 15 days of receipt. This certificate letter will be recalled in the event your laboratory's certification is revoked.

Respectfully,

Patrick F. Luedtke, MD, MPH.

Director Unified State Laboratories: Public Health





# ENVIRONMENTAL LABORATORY LICENSE

Issued to:

Laboratory Director: Scott Hallenbeck

Owner/Representative: Andy Freeman

# Hall Environmental Analysis Laboratory AZ0682

is in compliance with Environmental Laboratory's applicable standards for the State of Arizona and maintains on file a List of Parameters for which the laboratory is certified to perform analysis.

PERIOD OF LICENSURE FROM: 10/20/2010 TO: 10/19/2011



Steven 'D'. Baker, Chief Office of Laboratory Services Bureau of State Laboratory Services

#### Page:

#### 1

### Arizona Department of Health Services Office of Laboratory Licensure, Certification & Training 250 North 17th Avenue, Phoenix, AZ 85007

Wednesday, September 22 2010

AZ License: AZ0682

Lab Director: Mr. Scott Hallenbeck

Lab Name: Hall Environmental Analysis Laboratory,

Phone: (505) 345-3975

Fax: (505) 345-4107

rogram	HW					
	Parameter	EPA Method	Billing Code	Cert Date		
	Aluminum	EPA 6010B	MTL3	10/20/05		
	Aromatic & Halogenated Vocs By Gc	EPA 8021B	OC8	10/20/05		
	Arsenic	EPA 6010B	MTL3	10/20/05		
	Barium	EPA 6010B	MTL3	10/20/05		
	Beryllium	EPA 6010B	MTL3	10/20/05		
	C10-C32 Hydrocarbons	8015AZ1	OC4	03/21/07		
	Cadmium	EPA 6010B	MTL3	10/20/05		
	Calcium	EPA 6010B	MTL3	10/20/05		
•	Chromium, Total	EPA 6010B	MTL3	10/20/05		
	Closed System Purge And Trap Extract. Vocs	EPA 5035A	PREP2	12/05/06		
	Copper	EPA 6010B	MTL3	10/20/05		
	Dissolved In Water	EPA 3005A	PREP1	08/21/08		
	Iron	EPA 6010B	MTL3	10/20/05		
	Lead	EPA 6010B	MTL3	10/20/05		
	Magnesium	EPA 6010B	MTL3	10/20/05		
	Manganese '	EPA 6010B	MTL3	10/20/05		
	Mercury	EPA 7470A	MTL5	10/20/05		
	Mercury	EPA 7471A	MTL5	10/20/05		
	Nickel	EPA 6010B	MTL3	10/20/05		
	Pahs	EPA 8310	OC13	03/21/07		
	Pcbs By Gc	EPA 8082	OC9	03/21/07		
	Potassium	EPA 6010B	MTL3	10/20/05		
	Pressurized Fluid Extraction	EPA 3545	PREP2	12/05/06		
	Purge And Trap For Aqueous Samples	EPA 5030C	PREP2	12/05/06		
	Sediments, Sludges And Soils	EPA 3050B	PREP1	06/05/07		
	Selenium	EPA 6010B	MTL3	09/06/06		
	Semivolatile Compounds By Gc/Ms	EPA 8270C	OC16	07/26/07		
	Separatory Funnel Liquid-Liquid Extraction	EPA 3510C	PREP2	06/05/07		
	Silver	EPA 6010B	MTL3	10/20/05		
	Sodium	EPA 6010B	MTL3	10/20/05		
	Vocs By Gc/Ms	EPA 8260B	OC8	10/20/05		
	Zinc	EPA 6010B	MTL3	10/20/05		
otal Licens	ed Parameters in this Program: 32					
rogram	SDW					
	Parameter	EPA Method	Billing Code	Cert Date		
	Alkalinity	SM 2320B	NIA1	02/26/08		
	Antimony	EPA 200.8	MTL7	09/22/10		
	Arsenic	EPA 200.8	MTL7	09/22/10		

#### **Arizona Department of Health Services** Office of Laboratory Licensure, Certification & Training 250 North 17th Avenue, Phoenix, AZ 85007

Wednesday, September 22 2010

cense: AZ0682

Lab Name: Hall Environmental Analysis Laboratory,

Program	SDW				
	Parameter	EPA Method	Billing Code	Cert Date	
	Copper	EPA 200.8	MTL7	09/22/10	
•	Edb/Dbcp	EPA 504.1 (1.1)	OC4	06/20/08	
	Edb/Dbcp - Additional	EPA 504.1 (1.1)	OC34	06/20/08	
	Lead	EPA 200.8	MTL7	09/22/10	
	Selenium	EPA 200.8	MTL7	09/22/10	
	Thallium	EPA 200.8	MTL7	09/22/10	
	Uranium	EPA 200.8	MTL7	09/22/10	
Total Licen	sed Parameters in this Program: 10	L) A200.0	WITE		
	sed Parameters in this Program: 10				
	sed Parameters in this Program: 10  WW  Parameter	EPA Method	Billing Code	Cert Date	
	sed Parameters in this Program: 10  WW  Parameter  Alkalinity, Total	EPA Method SM 2320B	Billing Code NIA1		
	sed Parameters in this Program: 10  WW  Parameter	EPA Method	Billing Code	Cert Date	
	sed Parameters in this Program: 10  WW  Parameter  Alkalinity, Total	EPA Method SM 2320B	Billing Code NIA1	Cert Date 07/26/07	
	sed Parameters in this Program: 10  WW  Parameter  Alkalinity, Total Chloride	EPA Method SM 2320B EPA 300.0	Billing Code NIA1 NIIIA1	Cert Date 07/26/07 07/26/07	
	sed Parameters in this Program: 10  WW  Parameter  Alkalinity, Total  Chloride  Fluoride	EPA Method SM 2320B EPA 300.0 EPA 300.0	Billing Code NIA1 NIIIA1 NIIIA1	Cert Date 07/26/07 07/26/07 07/26/07	
	sed Parameters in this Program: 10  WW  Parameter  Alkalinity, Total  Chloride  Fluoride  Nitrate (As N)	EPA Method SM 2320B EPA 300.0 EPA 300.0 EPA 300.0	Billing Code NIA1 NIIIA1 NIIIA1 NIIIA1	Cert Date 07/26/07 07/26/07 07/26/07	
	sed Parameters in this Program: 10  WW  Parameter  Alkalinity, Total  Chloride  Fluoride  Nitrate (As N)  Nitrite (As N)	EPA Method SM 2320B EPA 300.0 EPA 300.0 EPA 300.0 EPA 300.0	Billing Code NIA1 NIIIA1 NIIIA1 NIIIA1 NIIIA1	Cert Date 07/26/07 07/26/07 07/26/07 07/26/07 07/26/07	
	sed Parameters in this Program: 10  WW  Parameter  Alkalinity, Total  Chloride  Fluoride  Nitrate (As N)  Nitrite (As N)  Orthophosphate	EPA Method SM 2320B EPA 300.0 EPA 300.0 EPA 300.0 EPA 300.0	Billing Code NIA1 NIIIA1 NIIIA1 NIIIA1 NIIIA1 NIIIA1	Cert Date 07/26/07 07/26/07 07/26/07 07/26/07 07/26/07	

Instruments	Quantity	Date
GAS CHROMATOGRAPH/MASS SPECTROMETER	3	08/11/08
GAS CHROMATOGRAPH	2	09/06/06
HIGH PERFORMANCE LIQUID CHROMATOGRAPH	2	08/11/08
ION CHROMATOGRAPH	2	08/11/08
INDUCTIVELY COUPLED PLASMA SPECTROMETER	1	08/11/05
INDUCTIVELY COUPLED PLASMA/MASS SPECTROMETER	1	09/15/10
MERCURY ANALYZER	1	08/11/05

#### **Softwares**

**VARIAN STAR - GCMS** 

**PERKIN ELMER - ICP** 

**PERKIN ELMER - ICP/MS** 

VARIAN GALAXIE AND CUSTOM WRITTEN-GC



Bryan W. Shaw, Ph.D., Chairman
Buddy Garcia, Commissioner
Carlos Rubinstein, Commissioner
Mark R. Vickery, P.G., Executive Director



#### TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 30, 2010

CERTIFIED MAIL

91 7108 2199 3995 2006 9293

Ms. Carolyn Swanson
Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

Dear Ms. Swanson:

I am writing to congratulate you and the staff of Hall Environmental Analysis Laboratory, Inc. Based on your application and primary NELAP accreditation from the State of Oregon, pursuant to authorization from the Executive Director of the Texas Commission on Environmental Quality, the Program Manager of the Quality Assurance Section has issued your laboratory secondary NELAP accreditation according to the attached Fields of Accreditation.

I am enclosing the accreditation certificate and Fields of Accreditation listing. Please review the enclosures for accuracy and completeness. Your laboratory's accreditation is valid for one year, contingent on continued compliance with the requirements of the State of Texas as well as those of your primary Accreditation Authority.

If I may be of further assistance, please contact me at (512) 239-3754 or e-mail at fiamison@tceq.state.tx.us.

Sincerely,

Frank Jamison
Records Specialist

Enclosures



NELAP-Recognized Laboratory Accreditation is hereby awarded to



# Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Road NE, Suite D Albuquerque, NM 87109-4337

in accordance with Texas Water Code Chapter 5, Subchapter R, Title 30 Texas Administrative Code Chapter 25, and the National Environmental Laboratory Accreditation Program.

The laboratory's scope of accreditation includes the fields of accreditation that accompany this certificate. Continued accreditation depends upon successful ongoing participation in the program. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses

Certificate Number: T104704424-10-1

Effective Date: 7/1/2010

Expiration Date: 6/30/2011

Executive Director Texas Commission on Environmental Quality

Marria



#### **NELAP - Recognized Laboratory Fields of Accreditation**



Certificate:

T104704424-10-1

**Expiration Date:** 

6/30/2011

Issue Date:

7/1/2010

4901 Hawkins Road NE, Suite D

Hall Environmental Analysis Laboratory, Inc.

Albuquerque, NM 87109-4337

Method EPA 200.7		,	
Analyte	AB	Analyte ID	Method ID
Aluminum	OR	1000	10013806
Barium	OR	1015	10013806
Beryllium	OR	1020	10013806
Boron	OR	1025	10013806
Cadmium	OR	1030	10013806
Calcium	OR	1035	10013806
Chromium	OR	1040	10013806
Copper	OR	1055	10013806
tron	OR	1070	10013806
Lead	OR	1075	10013806
Magnesium	OR	1085	10013806
Manganese	OR	1090	10013806
Molybdenum	OR	1100	10013806
Nicket	OR	1105	10013806
Potassium	OR	1125	10013806
Silver	OR	1150	10013806
Sodium	OR	1155	10013806
Tin	OR	1175	10013806
Titanium	OR	1180	10013806
Vanadium	OR	1185	10013806
Zinc	OR	1190	10013806
flethod EPA 245.1			
Analyte	AB	Analyte ID	Method ID
Mercury	OR	1095	10036609
flethod EPA 300.0			
Analyte	AB	Analyte ID	Method ID
Chloride	OR	1575	10053006
Fluoride	OR	1730	10053006
Nitrate as N	OR	1810	10053006





#### **NELAP - Recognized Laboratory Fields of Accreditation**

Certificate:

T104704424-10-1

**Expiration Date:** 

6/30/2011

Issue Date:

7/1/2010

4901 Hawkins Road NE, Suite D Albuquerque, NM 87109-4337

Hall Environmental Analysis Laboratory, Inc.

Orthophosphate as P         OR         1870         10053006           Sulfate         OR         2000         10053006           Method EPA 504.1         Analyte         AB         Analyte ID         Method ID           1,2-Dibromo-3-chloropropane (DBCP)         OR         4570         10082801           1,2-Dibromoethane (EDB, Ethylene dibromide)         OR         4585         10082801	Matrix: Drinking Water		···.	
Sulfate         OR         2000         10053006           Method         EPA 504.1         AB         Analyte ID         Method ID           1,2-Dibromo-3-chloropropane (DBCP)         OR         4570         10082801           1,2-Dibromoethane (EDB, Ethylene dibromide)         OR         4585         10082801           Method EPA 524.2         AB         Analyte ID         Method ID           Analyte         OR         5160         10089006           1,1,2-Trichloroethane         OR         5165         10089006           1,1,2-Trichloroethylene (1,1-Dichloroethene)         OR         4640         10089006           1,2-Dichlorobenzene         OR         4610         10089006           1,2-Dichlorobenzene         OR         4635         10089006           1,2-Dichloropropane         OR         4655         10089006           1,2-Dichlorobenzene         OR         4655         10089006           Benzene         OR         4375         10089006           Carbon tetrachloride         OR         4475         10089006           Chlorobenzene         OR         4645         10089006           Cis-1,2-Dichloroethylene         OR         4765         10089006      <	Nitrite as N	OR	1840	10053006
Method EPA 504.1         AB (1,2-Dibromo-3-chloropropane (DBCP)         AB (2,2-Dibromo-3-chloropropane (DBCP)         AB (3,2-Dibromo-3-chloropropane (DBCP)         Method ID (3,2-Dibromo-3-chloropropane (DBCP)         OR (3,585)         10082801           Method EPA 524.2         Analyte         AB (3,2-Dibromo-3-chloropropane)         AB (3,2-Dibromo-3-chloropropane)         Method ID (3,1-1-Trichloroethane)         OR (3,165)         10089006           1,1,2-Trichloroethane         OR (3,165)         10089006         1,1-2-Trichloroethylene (1,1-Dichloroethane)         OR (4640)         10089006           1,2-Trichlorobenzene         OR (3,155)         10089006         1,2-Dichlorobenzene         OR (4610)         10089006           1,2-Dichloroethane         OR (4635)         10089006         1,2-Dichloropropane         OR (4635)         10089006           1,2-Dichloropropane         OR (4620)         10089006         10089006           1,4-Dichlorobenzene         OR (4620)         10089006         10089006           2-Dichloropethylene         OR (4655)         10089006         10089006           3-Dichloropethylene         OR (4655)         10089006         10089006           4-Dichloropethylene         OR (4650)         10089006         10089006         10089006         10089006         10089006         10089006         10089006	Orthophosphate as P	OR	1870	10053006
Analyte         AB         Analyte ID         Method ID           1,2-Dibromo-3-chloropropane (DBCP)         QR         4570         10082801           1,2-Dibromoethane (EDB, Ethylene dibromide)         QR         4585         10082801           Method EPA 524.2         Total to the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the common of the co	Sulfate	OR	2000	10053006
1,2-Dibromo-3-chloropropane (DBCP)         OR         4570         10082801           1,2-Dibromoethane (EDB, Ethylene dibromide)         OR         4585         10082801           Method EPA 524.2         Analyte         AB         Analyte ID         Method ID           1,1,1-Trichloroethane         OR         5160         10089006           1,1,2-Trichloroethane         OR         5165         10089006           1,1-Dichloroethylene (1,1-Dichloroethene)         OR         4640         10089006           1,2-Trichlorobenzene         OR         4610         10089006           1,2-Dichloroethylene (1,1-Dichloroethene)         OR         4610         10089006           1,2-Dichloropropane         OR         4635         10089006           1,2-Dichloropropane         OR         4655         10089006           1,4-Dichlorobenzene         OR         4655         10089006           1,4-Dichloroethylene         OR         4375         10089006           Chlorobenzene         OR         4455         10089006           Chlorobenzene         OR         4475         10089006           Cis-1,2-Dichloroethylene         OR         4650         10089006           Ethylbenzene         OR         51	Method EPA 504.1			
1,2-Dibromoethane (EDB, Ethylene dibromide)       OR       4585       10082801         Method EPA 524.2       AB       Analyte ID       Method ID         1,1,1-Trichloroethane       OR       5160       10089006         1,1,2-Trichloroethane       OR       5165       10089006         1,1,2-Trichloroethylene (1,1-Dichloroethene)       OR       4640       10089006         1,2-Trichlorobenzene       OR       4610       10089006         1,2-Dichloroethane       OR       4635       10089006         1,2-Dichloropropane       OR       4655       10089006         1,2-Dichloroethane       OR       4655       10089006         1,2-Dichloropropane       OR       4655       10089006         1,4-Dichlorobenzene       OR       4620       10089006         Carbon tetrachloride       OR       4375       10089006         Carbon tetrachloride       OR       4475       10089006         Chlorobenzene       OR       4475       10089006         Cis-1,2-Dichloroethylene       OR       4650       10089006         Dichloromethane (DCM, Methylene chloride)       OR       4765       10089006         Ethylbenzene       OR       5100       10089006	Analyte		•	Method ID
Method EPA 524.2         AB Jite         AB Jite         Analyte ID Jite         Method ID Jite           1,1,1-Trichloroethane         OR 5160         10089006           1,1,2-Trichloroethane         OR 5165         10089006           1,1,2-Trichloroethylene (1,1-Dichloroethene)         OR 4640         10089006           1,2,4-Trichlorobenzene         OR 5155         10089006           1,2-Dichloroethane         OR 4610         10089006           1,2-Dichloroethane         OR 4635         10089006           1,2-Dichloropropane         OR 4655         10089006           1,4-Dichlorobenzene         OR 4620         10089006           1,4-Dichlorobenzene         OR 4620         10089006           Carbon tetrachloride         OR 4455         10089006           Carbon tetrachloride         OR 4455         10089006           Chlorobenzene         OR 4475         10089006           cis-1,2-Dichloroethylene         OR 4650         10089006           Dichloromethane (DCM, Methylene chloride)         OR 4650         10089006           Styrene         OR 5100         10089006           Tetrachloroethylene (Perchloroethylene)         OR 5115         10089006           Toluene         OR 5140         10089006	1,2-Dibromo-3-chloropropane (DBCP)		4570	10082801
Analyte         AB         Analyte ID         Method ID           1,1,1-Trichloroethane         OR         5160         10089006           1,1,2-Trichloroethane         OR         5165         10089006           1,1-Dichloroethylene (1,1-Dichloroethene)         OR         4640         10089006           1,2-Trichlorobenzene         OR         5155         10089006           1,2-Dichloroethane         OR         4610         10089006           1,2-Dichloropropane         OR         4635         10089006           1,2-Dichloropropane         OR         4655         10089006           1,4-Dichlorobenzene         OR         4620         10089006           8enzene         OR         4375         10089006           Carbon tetrachloride         OR         4455         10089006           Chlorobenzene         OR         4475         10089006           cis-1,2-Dichloroethylene         OR         4650         10089006           Dichloromethane (DCM, Methylene chloride)         OR         4765         10089006           Styrene         OR         5100         10089006           Tetrachloroethylene (Perchloroethylene)         OR         5140         10089006	1,2-Dibromoethane (EDB, Ethylene dibromide)	OR	4585	10082801
1,1,1-Trichloroethane       OR       5160       10089006         1,1,2-Trichloroethane       OR       5165       10089006         1,1-Dichloroethylene (1,1-Dichloroethene)       OR       4640       10089006         1,2-Trichlorobenzene       OR       4610       10089006         1,2-Dichlorobenzene       OR       4635       10089006         1,2-Dichloropropane       OR       4655       10089006         1,2-Dichloropropane       OR       4655       10089006         1,4-Dichlorobenzene       OR       4620       10089006         Benzene       OR       4375       10089006         Carbon tetrachloride       OR       4455       10089006         Chlorobenzene       OR       4475       10089006         cis-1,2-Dichloroethylene       OR       4650       10089006         Dichloromethane (DCM, Methylene chloride)       OR       4650       10089006         Styrene       OR       5100       10089006         Tetrachloroethylene (Perchloroethylene)       OR       5115       10089006         Toluene       OR       5140       10089006         Trichloroethylene (Trichloroethylene)       OR       5170       10089006	Method EPA 524.2			
1,1,2-Trichloroethane       OR       5165       10089006         1,1-Dichloroethylene (1,1-Dichloroethene)       OR       4640       10089006         1,2-Dichlorobenzene       OR       5155       10089006         1,2-Dichlorobenzene       OR       4610       10089006         1,2-Dichloropropane       OR       4635       10089006         1,2-Dichloropropane       OR       4655       10089006         1,4-Dichlorobenzene       OR       4620       10089006         1,4-Dichlorobenzene       OR       4375       10089006         Carbon tetrachloride       OR       4455       10089006         Chlorobenzene       OR       4475       10089006         Cis-1,2-Dichloroethylene       OR       4645       10089006         Dichloromethane (DCM, Methylene chloride)       OR       4650       10089006         Ethylbenzene       OR       4765       10089006         Styrene       OR       5100       10089006         Tetrachloroethylene (Perchloroethylene)       OR       5140       10089006         Toluene       OR       5140       10089006         Trichloroethene (Trichloroethylene)       OR       5170       10089006	· · · · · · · · · · · · · · · · · · ·		-	
1,1-Dichloroethylene (1,1-Dichloroethene)       OR       4640       10089006         1,2-4-Trichlorobenzene       OR       5155       10089006         1,2-Dichlorobenzene       OR       4610       10089006         1,2-Dichloroethane       OR       4635       10089006         1,2-Dichloropropane       OR       4655       10089006         1,4-Dichlorobenzene       OR       4620       10089006         Benzene       OR       4375       10089006         Carbon tetrachloride       OR       4455       10089006         Chlorobenzene       OR       4475       10089006         Cis-1,2-Dichloroethylene       OR       4650       10089006         Dichloromethane (DCM, Methylene chloride)       OR       4650       10089006         Ethylbenzene       OR       5100       10089006         Styrene       OR       5100       10089006         Tetrachloroethylene (Perchloroethylene)       OR       5115       10089006         Trichloroethene (Trichloroethylene)       OR       5140       10089006         Trichloroethene (Trichloroethylene)       OR       5170       10089006         Vinyl chloride       OR       5235       10089006				
1,2,4-Trichlorobenzene       OR       5155       10089006         1,2-Dichlorobenzene       OR       4610       10089006         1,2-Dichloroethane       OR       4635       10089006         1,2-Dichloropropane       OR       4655       10089006         1,4-Dichlorobenzene       OR       4620       10089006         Benzene       OR       4375       10089006         Carbon tetrachloride       OR       4475       10089006         Chlorobenzene       OR       4475       10089006         Cis-1,2-Dichloroethylene       OR       4645       10089006         Dichloromethane (DCM, Methylene chloride)       OR       4650       10089006         Ethylbenzene       OR       4765       10089006         Styrene       OR       5100       10089006         Tetrachloroethylene (Perchloroethylene)       OR       5115       10089006         Toluene       OR       5140       10089006         Trichloroethene (Trichloroethylene)       OR       5170       10089006         Vinyl chloride       OR       5235       10089006	• •			
1,2-Dichlorobenzene       OR       4610       10089006         1,2-Dichloroethane       OR       4635       10089006         1,2-Dichloropropane       OR       4655       10089006         1,4-Dichlorobenzene       OR       4620       10089006         Benzene       OR       4375       10089006         Carbon tetrachloride       OR       4455       10089006         Chlorobenzene       OR       4475       10089006         Cis-1,2-Dichloroethylene       OR       4645       10089006         Dichloromethane (DCM, Methylene chloride)       OR       4650       10089006         Ethylbenzene       OR       4765       10089006         Styrene       OR       5100       10089006         Tetrachloroethylene (Perchloroethylene)       OR       5115       10089006         Toluene       OR       5140       10089006         trans-1,2-Dichloroethylene       OR       5170       10089006         Trichloroethene (Trichloroethylene)       OR       5170       10089006         Vinyl chloride       OR       5235       10089006	1,1-Dichloroethylene (1,1-Dichloroethene)		4640	10089006
1,2-Dichloroethane       OR       4635       10089006         1,2-Dichloropropane       OR       4655       10089006         1,4-Dichlorobenzene       OR       4620       10089006         Benzene       OR       4375       10089006         Carbon tetrachloride       OR       4455       10089006         Chlorobenzene       OR       4475       10089006         cis-1,2-Dichloroethylene       OR       4645       10089006         Dichloromethane (DCM, Methylene chloride)       OR       4650       10089006         Ethylbenzene       OR       4765       10089006         Styrene       OR       5100       10089006         Tetrachloroethylene (Perchloroethylene)       OR       5115       10089006         Toluene       OR       5140       10089006         trans-1,2-Dichloroethylene       OR       5170       10089006         Trichloroethene (Trichloroethylene)       OR       5170       10089006         Vinyl chloride       OR       5235       10089006	1,2,4-Trichlorobenzene	OR	5155	10089006
1,2-Dichloropropane       OR       4655       10089006         1,4-Dichlorobenzene       OR       4620       10089006         Benzene       OR       4375       10089006         Carbon tetrachloride       OR       4455       10089006         Chlorobenzene       OR       4475       10089006         Cis-1,2-Dichloroethylene       OR       4645       10089006         Dichloromethane (DCM, Methylene chloride)       OR       4650       10089006         Ethylbenzene       OR       4765       10089006         Styrene       OR       5100       10089006         Tetrachloroethylene (Perchloroethylene)       OR       5115       10089006         Troluene       OR       5140       10089006         Trichloroethylene (Trichloroethylene)       OR       5170       10089006         Trichloroethene (Trichloroethylene)       OR       5170       10089006         Vinyl chloride       OR       5235       10089006	1,2-Dichlorobenzene	OR ·	4610	10089006
1,4-Dichlorobenzene       OR       4620       10089006         Benzene       OR       4375       10089006         Carbon tetrachloride       OR       4455       10089006         Chlorobenzene       OR       4475       10089006         cis-1,2-Dichloroethylene       OR       4645       10089006         Dichloromethane (DCM, Methylene chloride)       OR       4650       10089006         Ethylbenzene       OR       4765       10089006         Styrene       OR       5100       10089006         Tetrachloroethylene (Perchloroethylene)       OR       5115       10089006         Toluene       OR       5140       10089006         trans-1,2-Dichloroethylene       OR       4700       10089006         Trichloroethene (Trichloroethylene)       OR       5170       10089006         Vinyl chloride       OR       5235       10089006	1,2-Dichloroethane	OR	4635	10089006
Benzene         OR         4375         10089006           Carbon tetrachloride         OR         4455         10089006           Chlorobenzene         OR         4475         10089006           Cis-1,2-Dichloroethylene         OR         4645         10089006           Dichloromethane (DCM, Methylene chloride)         OR         4650         10089006           Ethylbenzene         OR         4765         10089006           Styrene         OR         5100         10089006           Tetrachloroethylene (Perchloroethylene)         OR         5115         10089006           Toluene         OR         5140         10089006           trans-1,2-Dichloroethylene         OR         4700         10089006           Trichloroethene (Trichloroethylene)         OR         5170         10089006           Vinyl chloride         OR         5235         10089006	1,2-Dichloropropane	OR	4655	10089006
Carbon tetrachloride         OR         4455         10089006           Chlorobenzene         OR         4475         10089006           cis-1,2-Dichloroethylene         OR         4645         10089006           Dichloromethane (DCM, Methylene chloride)         OR         4650         10089006           Ethylbenzene         OR         4765         10089006           Styrene         OR         5100         10089006           Tetrachloroethylene (Perchloroethylene)         OR         5115         10089006           Toluene         OR         5140         10089006           trans-1,2-Dichloroethylene         OR         4700         10089006           Trichloroethene (Trichloroethylene)         OR         5170         10089006           Vinyl chloride         OR         5235         10089006	1,4-Dichlorobenzene	OR	4620	10089006
Chlorobenzene         OR         4475         10089006           cis-1,2-Dichloroethylene         OR         4645         10089006           Dichloromethane (DCM, Methylene chloride)         OR         4650         10089006           Ethylbenzene         OR         4765         10089006           Styrene         OR         5100         10089006           Tetrachloroethylene (Perchloroethylene)         OR         5115         10089006           Toluene         OR         5140         10089006           trans-1,2-Dichloroethylene         OR         4700         10089006           Trichloroethene (Trichloroethylene)         OR         5170         10089006           Vinyl chloride         OR         5235         10089006	Benzene	OR	4375	10089006
cis-1,2-Dichloroethylene       OR       4645       10089006         Dichloromethane (DCM, Methylene chloride)       OR       4650       10089006         Ethylbenzene       OR       4765       10089006         Styrene       OR       5100       10089006         Tetrachloroethylene (Perchloroethylene)       OR       5115       10089006         Toluene       OR       5140       10089006         trans-1,2-Dichloroethylene       OR       4700       10089006         Trichloroethene (Trichloroethylene)       OR       5170       10089006         Vinyl chloride       OR       5235       10089006	Carbon tetrachloride	OR	4455	10089006
Dichloromethane (DCM, Methylene chloride)         OR         4650         10089006           Ethylbenzene         OR         4765         10089006           Styrene         OR         5100         10089006           Tetrachloroethylene (Perchloroethylene)         OR         5115         10089006           Toluene         OR         5140         10089006           trans-1,2-Dichloroethylene         OR         4700         10089006           Trichloroethene (Trichloroethylene)         OR         5170         10089006           Vinyl chloride         OR         5235         10089006	Chlorobenzene	OR	4475	10089006
Ethylbenzene       OR       4765       10089006         Styrene       OR       5100       10089006         Tetrachloroethylene (Perchloroethylene)       OR       5115       10089006         Toluene       OR       5140       10089006         trans-1,2-Dichloroethylene       OR       4700       10089006         Trichloroethene (Trichloroethylene)       OR       5170       10089006         Vinyl chloride       OR       5235       10089006	cis-1,2-Dichloroethylene	OR	4645	10089006
Styrene         OR         5100         10089006           Tetrachloroethylene (Perchloroethylene)         OR         5115         10089006           Toluene         OR         5140         10089006           trans-1,2-Dichloroethylene         OR         4700         10089006           Trichloroethene (Trichloroethylene)         OR         5170         10089006           Vinyl chloride         OR         5235         10089006	Dichloromethane (DCM, Methylene chloride)	OR	4650	10089006
Tetrachloroethylene (Perchloroethylene)         OR         5115         10089006           Toluene         OR         5140         10089006           trans-1,2-Dichloroethylene         OR         4700         10089006           Trichloroethene (Trichloroethylene)         OR         5170         10089006           Vinyl chloride         OR         5235         10089006	Ethylbenzene	OR	4765	10089006
Toluene         OR         5140         10089006           trans-1,2-Dichloroethylene         OR         4700         10089006           Trichloroethene (Trichloroethylene)         OR         5170         10089006           Vinyl chloride         OR         5235         10089006	Styrene	OR	5100	10089006
trans-1,2-Dichloroethylene         OR         4700         10089006           Trichloroethene (Trichloroethylene)         OR         5170         10089006           Vinyl chloride         OR         5235         10089006	Tetrachloroethylene (Perchloroethylene)	OR	5115	10089006
Trichloroethene (Trichloroethylene)  Vinyl chloride  OR 5170 10089006  OR 5235 10089006	Toluene	OR	5140	10089006
Vinyl chloride OR 5235 10089006	trans-1,2-Dichloroethylene	OR	4700	10089006
7000y00	Trichloroethene (Trichloroethylene)	OR	5170	10089006
Xylene (total) OR 5260 10089006	Vinyl chloride	OR	5235	10089006
	Xylene (total)	OR	5260	10089006







Certificate:

T104704424-10-1

**Expiration Date:** 

6/30/2011

Issue Date:

7/1/2010

4901 Hawkins Road NE, Suite D Albuquerque, NM 87109-4337

Hall Environmental Analysis Laboratory, Inc.

Matrix: Drinking Water				
Method SM 2540 C			•	
Analyte	AB	Analyte ID	Method ID	
Residue-filterable (TDS)	OR	1955	20004404	* *



#### **NELAP - Recognized Laboratory Fields of Accreditation**



Certificate:

T104704424-10-1

**Expiration Date:** 

6/30/2011

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7/1/2010

4901 Hawkins Road NE, Suite D Albuquerque, NM 87109-4337

Hall Environmental Analysis Laboratory, Inc.

Matrix: Non Potable Water	,		
Method EPA 300.0			
Analyte	AB	Analyte ID	Method ID
Bromide	OR	1540	10053006
Chloride	OR	1575	10053006
Fluoride	OR	1730	10053006
Nitrate as N	OR	1810	10053006
Nitrite as N	OR	1840	10053006
Orthophosphate as P	OR	1870	10053006
Sulfate	OR	2000	10053006
Method EPA 6010			
Analyte	AB	Analyte ID	Method ID
Aluminum	OR	1000	10155201
Antimony	OR	1005	10155201
Arsenic	OR	1010	10155201
Barium	OR	1015	10155201
Beryllium	OR	1020	10155201
Boron	OR	1025	10155201
Cadmium	OR	1030	10155201
Calcium	OR	1035	10155201
Chromium	OR	1040	10155201
Cobalt	OR	1050	10155201
Iron	OR	1070	10155201
Lead	QR	1075	10155201
Magnesium	OR	1085	10155201
Manganese	OR	1090	10155201
Molybdenum	OR	1100	10155201
Nickel	OR	1105	10155201
Potassium	OR	1125	10155201
Selenium	OR	1140	10155201
Silver	OR	1150	10155201
Sodium	OR	1155	10155201





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Hall Environmental Analysis Laboratory, Inc.

Matrix: Non Potable Water			
Thallium	ÓR	1165	10155201
Tin	OR	1175	10155201
Titanium	OR	11 <b>80</b>	10155201
Vanadium	OR-	1185	10155201
Zinc	OR	1190	10155201
Method EPA 7470			
Analyte	AB	Analyte ID	Method ID
Mercury	OR	1095	10165603
Method EPA 8015			
Analyte	AB	Analyte ID	Method ID
Diesel range organics (DRO)	OR	9369	10173203
Gasoline range organics (GRO)	OR	9408	10173203
Method EPA 8021			
Analyte	AB	Analyte ID	Method ID
1,2,4-Trimethylbenzene	OR	5210	10174400
1,3,5-Trimethylbenzene	OR	5215	10174400
Benzene	OR	4375	10174400
Ethylbenzene	OR ·	4765	10174400
m+p-xylene	OR	5240	10174400
Methyl tert-butyl ether (MTBE)	OR	5000	10174400
o-Xylene	OR	5250	10174400
Toluene	OR	5140	10174400
Xyiene (total)	OR	5260	10174400
Method EPA 8081			
Analyte	AB	Analyte ID	Method ID
4,4'-DDD	OR	7355	10178402
4,4'-DDE	OR	7360	10178402
4,4'-DDT	OR	7365	10178402
Aldrin	OR	7025	10178402
alpha-BHC (alpha-Hexachlorocyclohexane)	OR	7110	10178402
beta-BHC (beta-Hexachlorocyclohexane)	OR	7115	10178402



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Hall Environmental Analysis Laboratory, Inc.

Matrix: Non Potable Water			
delta-BHC (delta-Hexachlorocyclohexane)	ÓR	7105	10178402
Dieldrin	OR	7470	10178402
Endosulfan I	OR	7510	10178402
Endosulfan II	OR	7515	10178402
Endosulfan sulfate	OR	7520	10178402
Endrin	OR	7540	10178402
Endrin aldehyde	OR	7530	10178402
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	OR	7120	10178402
Heptachlor	OR	7685	10178402
Heptachlor epoxide	OR	7690	10178402
Methoxychlor	OR	7810	10178402
Method EPA 8082			
Analyte	AB	Analyte iD	Method ID
Aroclor-1016 (PCB-1016)	OR	8880	10179007
Aroclor-1221 (PCB-1221)	OR	8885	10179007
Aroclor-1232 (PCB-1232)	OR	8890	10179007
Aroclor-1242 (PCB-1242)	OR	8895	10179007
Aroclor-1248 (PCB-1248)	OR	8900	10179007
Aroclor-1254 (PCB-1254)	OR	8905	10179007
Aroclor-1260 (PCB-1260)	OR	8910	10179007
Method EPA 8260			
Analyte	AB	Analyte ID	Method ID
1,1,1,2-Tetrachloroethane	OR	5105	10184404
1,1,1-Trichloroethane	OR	5160	10184404
1,1,2,2-Tetrachloroethane	OR	5110	10184404
1,1,2-Trichloroethane	OR	5165	10184404
1,1-Dichloroethane	OR	4630	10184404
1,1-Dichloroethylene (1,1-Dichloroethene)	OR	4640	10184404
1,1-Dichloropropene	OR	4670	10184404
1,2,3-Trichlorobenzene	OR	5150	10184404
1,2,3-Trichloropropane	OR	5180	10184404





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Albuquerque, NM 87109-4337

Matrix: Non Potable Water			
1,2,4-Trichlorobenzene	OR	5155	10184404
1,2,4-Trimethylbenzene	OR	5210	10184404
1,2-Dibromo-3-chloropropane (DBCP)	OR	4570	10184404
1,2-Dibromoethane (EDB, Ethylene dibromide)	OR	4585	10184404
1,2-Dichlorobenzene	OR	4610	10184404
1,2-Dichloroethane	OR	4635	10184404
1,2-Dichloropropane	OR	4655	10184404
1,3,5-Trimethylbenzene	OR	5215	10184404
1,3-Dichlorobenzene	OR	4615	10184404
1,3-Dichloropropane	OR	4660	10184404
1,4-Dichlorobenzene	OR	4620	10184404
2,2-Dichloropropane	OR	4665	10184404
2-Butanone (Methyl ethyl ketone, MEK)	OR	4410	10184404
2-Chlorotoluene	OR	4535	10184404
2-Hexanone	OR	4860	10184404
4-Chlorotoluene	OR	4540	10184404
4-Isopropyltoluene	OR	4915	10184404
4-Methyl-2-pentanone (MIBK)	OR	4995	10184404
Acetone	OR	4315	10184404
Benzene	OR	4375	10184404
Bromobenzene	OR	4385	10184404
Bromochloromethane	OR	4390	10184404
Bromodichloromethane	OR	4395	10184404
Bromoform	OR	4400	10184404
Bromomethane (Methyl bromide)	OR	4950	10184404
Carbon disulfide	OR	4450	10184404
Carbon tetrachloride	OR	4455	10184404
Chlorobenzene	OR	4475	10184404
Chloroethane	OR	4485	10184404
Chloroform	OR	4505	10184404





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trix: Non Potable Water			
Chloromethane (Methyl chloride)	OR	4960	10184404
cis-1,2-Dichloroethylene	OR	4645	10184404
cis-1,3-Dichloropropylene	OR	4680	10184404
Dibromochloromethane	OR	4575	10184404
Dibromomethane	OR	4595	10184404
Dichlorodifluoromethane	OR	4625	10184404
Ethylbenzene	OR	4765	10184404
Hexachlorobutadiene	OR	4835	10184404
Isopropylbenzene	OR	4900	10184404
m+p-xylene	OR	5240	10184404
Methyl tert-butyl ether (MTBE)	OR	5000	10184404
Methylene chloride	OR	4975	10184404
Naphthalene	OR	5005	10184404
n-Butylbenzene	OR	4435	10184404
n-Propylbenzene	OR	5090	10184404
o-Xylene	OR	5250	10184404
sec-Butylbenzene	OR	4440	10184404
Styrene	OR	5100	10184404
tert-Butylbenzene	OR	4445	10184404
Tetrachloroethylene (Perchloroethylene)	OR	5115	10184404
Toluene	OR	5140	10184404
trans-1,2-Dichloroethylene	OR	4700	10184404
trans-1,3-Dichloropropylene	OR	4685	10184404
Trichloroethene (Trichloroethylene)	OR	5170	10184404
Trichlorofluoromethane	OR	5175	10184404
Vinyl chloride	OR	5235	10184404
Xylene (total)	OR	5260	10184404
nod EPA 8270			
nalyte	AB	Analyte ID	Method ID
1,2,4-Trichlorobenzene	OR	5155	10185203
1,2-Dichlorobenzene	OR	4610	10185203



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1,3-Dichlorobenzene	OR	4615	10185203
,4-Dichlorobenzene	OR	4620	10185203
2,4,5-Trichlorophenol	OR	6835	10185203
2,4,6-Trichlorophenol	OR	6840	10185203
2,4-Dichlorophenol	OR	6000	10185203
2,4-Dimethylphenol	OR	6130	10185203
2,4-Dinitrophenol	OR	6175	10185203
2,4-Dinitrotoluene (2,4-DNT)	OR	6185	10185203
2,6-Dinitrotoluene (2,6-DNT)	OR	6190	10185203
2-Chloronaphthalene	OR	5795	10185203
2-Chlorophenol	OR	5800	10185203
2-Methyl-4,6-dinitrophenol	OR	6360	10185203
2-Methylnaphthalene	OR	6385	10185203
2-Methylphenol (o-Cresol)	OR	6400	10185203
2-Nitroaniline	OR	6460	10185203
2-Nitrophenol	OR	6490	10185203
3,3'-Dichlorobenzidine	OR	5945	10185203
3-Methylphenol (m-Cresol)	OR	6405	10185203
3-Nitroaniline	OR	6465	10185203
4-Bromophenyl phenyl ether	OR	5660	10185203
4-Chloro-3-methylphenol	OR	5700	10185203
4-Chloroaniline	OR	5745	10185203
4-Chlorophenyl phenylether	OR	5825	10185203
4-Methylphenol (p-Cresol)	OR	6410	10185203
4-Nitroaniline	OR	6470	10185203
4-Nitrophenol	OR	6500	10185203
Acenaphthene	OR	5500	10185203
Acenaphthylene	OR	5505	10185203
Aniline	OR	5545	10185203
Anthracene	OR	5555	10185203





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Azobenzene	OR	5562	10185203
Benzo(a)anthracene	OR	5575	10185203
Benzo(a)pyrene	OR	5580	10185203
Benzo(b)fluoranthene	OR	5585	10185203
Benzo(g,h,i)perylene	OR	5590	10185203
Benzo(k)fluoranthene	OR	5600	10185203
Benzoic acid	OR	5610	10185203
Benzyl alcohol	OR	5630	10185203
bis(2-Chloroethoxy)methane	OR	5760	10185203
bis(2-Chloroethyl) ether	OR	5765	10185203
bis(2-Chloroisopropyl) ether	OR	5780	10185203
bis(2-Ethylhexyl) phthalate (DEHP)	OR	6255	10185203
Butyl benzyl phthalate	OR	5670	10185203
Carbazole	OR	5680	10185203
Chrysene	OR	5855	10185203
Dibenz(a,h) anthracene	OR	5895	10185203
Dibenzofuran	OR	5905	10185203
Diethyl phthalate	OR	6070	10185203
Dimethyl phthalate	OR	6135	10185203
Di-n-butyl phthalate	OR	5925	10185203
Di-n-octyl phthalate	OR	6200	10185203
Fluoranthene	OR	6265	10185203
fluorene	OR	6270	10185203
lexachlorobenzene	OR	6275	10185203
łexachlorobutadien <del>e</del>	OR	4835	10185203
lexachlorocyclopentadiene	OR	6285	10185203
lexachloroethane	OR	4840	10185203
ndeno(1,2,3-cd) pyrene	OR	6315	10185203
sophorone	OR	6320	10185203
laphthalene	OR	5005	10185203







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Matrix: Non Potable Water			
Nitrobenzene	OR	5015	10185203
n-Nitrosodi-n-propylamine	OR	6545	10185203
n-Nitrosodiphenylamine	OR	6535	10185203
Pentachlorophenol	OR	6605	10185203
Phenanthrene	OR	6615	10185203
Phenol	OR	6625	10185203
Pyrene	OR	6665	10185203
Pyridine	OR	5095	10185203
hod EPA 8310			
Analyte	AB	Analyte ID	Method ID
Acenaphthene	OR	5500	10187607
Acenaphthylene	OR	5505	10187607
Anthracene	OR	5555	10187607
Benzo(a)anthracene	OR	5575	10187607
Benzo(a)pyrene	OR	5580	10187607
Benzo(b)fluoranthene	OR	5585	10187607
Benzo(g,h,i)perylene	OR	5590	10187607
Benzo(k)fluoranthene	OR	5600	10187607
Chrysene	OR	5855	10187607
Dibenz(a,h) anthracene	OR	5895	10187607
Fluoranthene	OR	6265	10187607
Fluorene	OR	6270	10187607
Indeno(1,2,3-cd) pyrene	OR	6315	10187607
Naphthalene	OR	5005	10187607
Phenanthrene	OR	6615	10187607
Pyrene	OR	6665	10187607



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latrix: Solid & Hazardous Material			
Method EPA 6010			
Analyte	AB	Analyte ID	Method II
Aluminum	OR	1000	10155201
Antimony	OR .	1005	10155201
Arsenic	OR	1010	10155201
Barium	OR	1015	10155201
Beryllium	OR	1020	10155201
Boron	OR	1025	10155201
Cadmium	OR	1030	10155201
Calcium	OR	1035	10155201
Chromium	OR	1040	10155201
Cobalt	OR	1050	10155201
Copper	OR	1055	10155201
Iron	OR	1070	10155201
Lead	OR	1075	10155201
Magnesium	OR	1085	10155201
Manganese	OR	1090	10155201
Molybdenum	OR	1100	10155201
Nickel	OR	1105	10155201
Potassium	OR	1125	10155201
Selenium	OR	1140	10155201
Silver	OR	1150	10155201
Sodium	OR	1155	10155201
Thallium	OR	1165	10155201
Tin	. OR	1175	10155201
Titanium	OR	1180	10155201
Vanadium	OR	1185	10155201
Zinc	OR	1190	10155201
thod EPA 7471			
Analyte	AB	Analyte ID	Method ID
Mercury	OR	1095	10166004





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Matrix: Solid & Hazardous Material			
Method EPA 8015			
Analyte	AB	Analyte ID	Method ID
Diesel range organics (DRO)	OR	9369	10173203
Gasoline range organics (GRO)	OR	9408	10173203
Method EPA 8021			
Analyte	AB	Analyte ID	Method ID
Benzene	OR	4375	10174400
Ethylbenzene	OR	4765	10174400
m+p-xylene	OR	5240	10174400
Methyl tert-butyl ether (MTBE)	OR	5000	10174400
o-Xylene	OR	5250	10174400
Toluene	OR	5140	10174400
Xylene (total)	OR	5260	10174400
Method EPA 8081			•
Analyte	AB	Analyte ID	Method ID
4,4'-DDD	OR	7355	10178402
4,4'-DDE	OR	7360	10178402
4,4'-DDT	OR	7365	10178402
Aldrin	OR	7025	10178402
alpha-BHC (alpha-Hexachlorocyclohexane)	OR	7110	10178402
beta-BHC (beta-Hexachlorocyclohexane)	OR	7115	10178402
delta-BHC (delta-Hexachlorocyclohexane)	OR	7105	10178402
Dieldrin	OR	7470	10178402
Endosulfan I	OR	7510	10178402
Endosulfan II	OR	7515	10178402
Endosulfan sulfate	OR	7520	10178402
Endrin	OR	7540	10178402
Endrin aldehyde	OR	7530	10178402
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	OR	7120	10178402
Heptachlor	OR	7685	10178402
Heptachlor epoxide	OR '	7690	10178402
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Methoxychlor	OR	7810	10178402
Method EPA 8082			-
Analyte	AB	Analyte ID	Method ID
Aroclor-1016 (PCB-1016)	OR	8880	10179007
Aroclor-1221 (PCB-1221)	OR	8885	10179007
Aroclor-1232 (PCB-1232)	OR	8890	10179007
Aroclor-1242 (PCB-1242)	OR	8895	10179007
Aroclor-1248 (PCB-1248)	OR	8900	10179007
Aroclor-1254 (PCB-1254)	OR	8905	10179007
Aroclor-1260 (PCB-1260)	OR	8910	10179007
lethod EPA 8260			
Analyte	AB	Analyte ID	Method ID
1,1,1,2-Tetrachloroethane	OR	5105	10184404
1,1,1-Trichloroethane	OR	5160	10184404
1,1,2,2-Tetrachloroethane	OR	5110	10184404
1,1,2-Trichloroethane	OR	5165	10184404
1,1-Dichloroethane	OR	4630	10184404
1,1-Dichloroethylene (1,1-Dichloroethene)	OR	4640	10184404
1,1-Dichloropropene	OR	4670	10184404
1,2,3-Trichlorobenzene	OR	5150	10184404
1,2,3-Trichloropropane	OR	5180	10184404
1,2,4-Trichlorobenzene	OR	5155	10184404
1,2,4-Trimethylbenzene	OR	5210	10184404
1,2-Dibromo-3-chloropropane (DBCP)	OR	4570	10184404
1,2-Dibromoethane (EDB, Ethylene dibromide)	OR	4585	10184404
1,2-Dichlorobenzene	OR	4610	10184404
1,2-Dichloroethane	OR	4635	10184404
1,2-Dichloropropane	OR	4655	10184404
1,3,5-Trimethylbenzene	OR	5215	10184404
1,3-Dichlorobenzene	OR	4615	10184404
1,3-Dichloropropane	OR	4660	10184404



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1,4-Dichlorobenzene	OR	4620	10184404
2,2-Dichloropropane	OR	4665	10184404
2-Butanone (Methyl ethyl ketone, MEK)	OR	4410	10184404
2-Chlorotoluene	OR	4535	10184404
2-Hexanone	OR	4860	10184404
4-Chlorotoluene	OR	4540	10184404
4-Isopropyltoluene	OR	4915	10184404
4-Methyl-2-pentanone (MIBK)	OR	4995	10184404
Acetone	OR	4315	10184404
Benzene	OR	4375	10184404
Bromobenzene	OR	4385	10184404
Bromochloromethane	OR	4390	10184404
Bromodichloromethane	OR	4395	10184404
Bromoform	OR	4400	10184404
Bromomethane (Methyl bromide)	OR	4950	10184404
Carbon disulfide	OR ´	4450	10184404
Carbon tetrachloride	OR	4455	10184404
Chlorobenzene	OR	4475	10184404
Chloroethane	OR	4485	10184404
Chloroform	OR	4505	10184404
Chloromethane (Methyl chloride)	OR	4960	10184404
cis-1,2-Dichloroethylene	OR	4645	10184404
cis-1,3-Dichloropropylene	OR	4680	10184404
Dibromochloromethane .	OR	4575	10184404
Dibromomethane	OR	4595	10184404
Dichlorodifluoromethane	OR	4625	10184404
Ethylbenzene	OR	4765	10184404
Hexachlorobutadiene	OR	4835	10184404
sopropylbenzene	OR	4900	10184404
n+p-xylene	OR	5240	10184404



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Matrix: Solid & Hazardous Material				
Methyl tert-butyl ether (MTBE)	OR	5000	10184404	
Methylene chloride	OR	4975	10184404	
Naphthalene	OR	5005	10184404	
n-Butylbenzene	OR	4435	10184404	
n-Propylbenzene	OR	5090	10184404	
o-Xylene	OR	5250	10184404	
sec-Butylbenzene	OR	4440	10184404	
Styrene:	OR	5100	10184404	
tert-Butylbenzene	OR	4445	10184404	4
Tetrachloroethylene (Perchloroethylene)	OR	5115	10184404	
Toluene	OR	5140	10184404	
trans-1,2-Dichloroethylene	OR	4700	10184404	
trans-1,3-Dichloropropylene	OR	4685	10184404	
Trichloroethene (Trichloroethylene)	OR	5170	10184404	
Trichlorofluoromethane	OR	5175	10184404	
Vinyl chloride	OR	5235	10184404	
Xylene (total)	OR	5260	10184404	
Method EPA 8270				
Analyte	AB	Analyte ID	Method ID	
1,2,4-Trichlorobenzene	OR	5155	10185203	
1,2-Dichlorobenzene	OR	4610	10185203	
1,3-Dichlorobenzene	OR	4615	10185203	
1,4-Dichlorobenzene	OR	4620	10185203	
2,4,5-Trichlorophenol	OR	6835	10185203	
2,4,6-Trichlorophenol	OR	6840	10185203	
2,4-Dichlorophenol	OR	6000	10185203	
2,4-Dimethylphenol	OR	6130	10185203	
2,4-Dinitrophenol	OR	6175	10185203	_
2,4-Dinitrotoluene (2,4-DNT)	OR	6185	10185203	
2,6-Dinitrotoluene (2,6-DNT)	OR	6190	10185203	
2-Chloronaphthalene	OR	5795	10185203	





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trix: Solid & Hazardous Material	·	<del></del>	
2-Chlorophenol	OR	5800	10185203
2-Methyl-4,6-dinitrophenol	OR	6360	10185203
2-Methylnaphthalene	OR	6385	10185203
2-Methylphenol (o-Cresol)	OR	6400	10185203
2-Nitroaniline	OR.	6460	10185203
2-Nitrophenol	OR	6490	10185203
3,3'-Dichlorobenzidine	OR	5945	10185203
3-Methylphenol (m-Cresol)	OR	6405	10185203
3-Nitroaniline	OR	6465	10185203
4-Bromophenyl phenyl ether	OR	5660	10185203
4-Chloro-3-methylphenol	OR	5700	10185203
4-Chloroaniline	OR	5745	10185203
4-Chlorophenyl phenylether	OR	5825	10185203
4-Methylphenol (p-Cresol)	OR	6410	10185203
4-Nitroaniline	OR	6470	10185203
4-Nitrophenol	OR	6500	10185203
Acenaphthene	OR	5500	10185203
Acenaphthylene	OR	5505	10185203
Aniline	OR	5545	10185203
Anthracene	OR	5555	10185203
Azobenzene	OR	5562	10185203
Benzo(a)anthracene	OR	5575	10185203
Benzo(a)pyrene	OR	5580	10185203
Benzo(b)fluoranthene	OR	5585	10185203
Benzo(g,h,i)perylene	OR	5590	10185203
Benzo(k)fluoranthene	OR	5600	10185203
Benzoic acid	OR	5610	10185203
Benzyl alcohol	OR	5630	10185203
bis(2-Chloroethoxy)methane	OR	5760	10185203
bis(2-Chloroethyl) ether	OR	5765	10185203



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is(2-Chloroisopropyl) ether	OR	5780	10185203
bis(2-Ethylhexyl) phthalate (DEHP)	OR	6255	10185203
Butyl benzyl phthalate	OR	5670	10185203
Carbazole	OR	5680	10185203
Chrysene	OR	5855	10185203
Dibenz(a,h) anthracene	OR	5895	10185203
Dibenzofuran	OR	5905	10185203
Diethyl phthalate	OR	6070	10185203
Dimethyl phthalate	OR	6135	10185203
Di-n-butyl phthalate	OR	5925	10185203
Di-n-octyl phthalate	ÓR	6200	10185203
Fluoranthene	OR	6265	10185203
Fluorene	OR	6270	10185203
Hexachlorobenzene	OR	6275	10185203
Hexachlorobutadiene	OR	4835	10185203
Hexachlorocyclopentadiene	OR	6285	10185203
Hexachloroethane	OR	4840	10185203
Indeno(1,2,3-cd) pyrene	OR	6315	10185203
Isophorone	OR	6320	10185203
Naphthalene	OR	5005	10185203
Nitrobenzene	OR	5015	10185203
n-Nitrosodimethylamine	OR	6530	10185203
n-Nitrosodi-n-propylamine	OR	<b>654</b> 5	10185203
n-Nitrosodiphenylamine	OR	6535	10185203
Pentachlorophenol	OR	6605	10185203
^o henanthren <del>e</del>	OR	6615	10185203
Phenol	OR	6625	10185203
⁻ yrene	OR	6665	10185203
Pyridine	OR	5095	10185203
hod EPA 8310			
nalyte	AB	Analyte ID	Method ID





#### **NELAP - Recognized Laboratory Fields of Accreditation**

Certificate:

T104704424-10-1

**Expiration Date:** 

6/30/2011

Issue Date:

7/1/2010

4901 Hawkins Road NE, Suite D Albuquerque, NM 87109-4337

Hall Environmental Analysis Laboratory, Inc.

Matrix: Solid & Hazardous Material			
Acenaphthene	OR	5500	10187607
Acenaphthylene	OR	5505	10187607
Anthracene	OR	5555	10187607
Benzo(a)anthracene	OR	5575	10187607
Benzo(a)pyrene	OR	5580	10187607
Benzo(b)fluoranthene	OR	5585	10187607
Benzo(g,h,i)perylene	OR	5590	10187607
Benzo(k)fluoranthene	OR	5600	10187607
Chrysene	OR	5855	10187607
Dibenz(a,h) anthracene	OR	5895	10187607
Fluoranthene	OR	6265	101 <b>87</b> 607
Fluorene	OR	6270	10187607
Indeno(1,2,3-cd) pyrene	OR	6315	10187607
Naphthalene	OR	5005	10187607
Phenanthrene	OR	6615	10187607
Pyrene	ÓR	6665	10187607

#### Chavez, Carl J, EMNRD

From:

Chavez, Carl J, EMNRD

Sent:

Tuesday, December 07, 2010 7:52 AM

To: Cc: 'Gibson, Dan'; Moore, Darrell; 'Lackey, Johnny'; Schmaltz, Randy; McDaniel, Vic Sanchez, Daniel J., EMNRD; Jones, William V., EMNRD; VonGonten, Glenn, EMNRD

Subject:

UIC Class I Disposal Well 2011 Annual Report Reminder

Gentlemen:

Good morning.

This is a reminder of your OCD discharge permit reporting obligations for your Underground Injection Control (UIC) disposal well(s).

Please plan on meeting the Annual Report submittal dates in January of 2011 as failure to submit the report will constitute a violation under the Federal UIC Program and reporting to the United States Environmental Protection Agency, which could result in the shut-in and/or plug and abandonment of your Class I disposal well(s), etc.

Please contact me if you have questions. Thank you in advance for your cooperation.

File: OCD Online "Annual Report" thumbnail

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: <a href="http://www.emnrd.state.nm.us/ocd/">http://www.emnrd.state.nm.us/ocd/</a> index.htm (Pollution Prevention Guidance is under "Publications")





BLOOMFIELD REFINERY

Carl Chavez
New Mexico Oil Conservation Division
Environmental Bureau
1220 South St. Francis Dr
Santa Fe, NM 87505

Certified Mail: 7008 1300 0001 3402 7183

January 28, 2010

RE: Western Refining Southwest, Inc. - Bloomfield Refinery 2009 Annual Class I Well Report Non-Hazardous Injection Well Permit # - UIC-CL-009 API # - 30- 45-29002

Mr. Chavez,

Bloomfield Refinery submits the *Annual Class I Well Report January – December 2009* as requested in the September 25, 2009 e-mail from NMOCD – Santa Fe. The well is located in the NE/4, SE/4 of Section 27, Township 29 North, Range 11West, NMPM, San Juan County, New Mexico and is operated by Western Refining Southwest, Inc.

RECEIVED OCD 2010 FEB - 1 A 11: 39

If you need more information, please contact me at (505) 632-4171.

Sincerely,

βames R. Schmaltz

☑nvironmental Manager

Western Refining Southwest, Inc. - Bloomfield Refinery

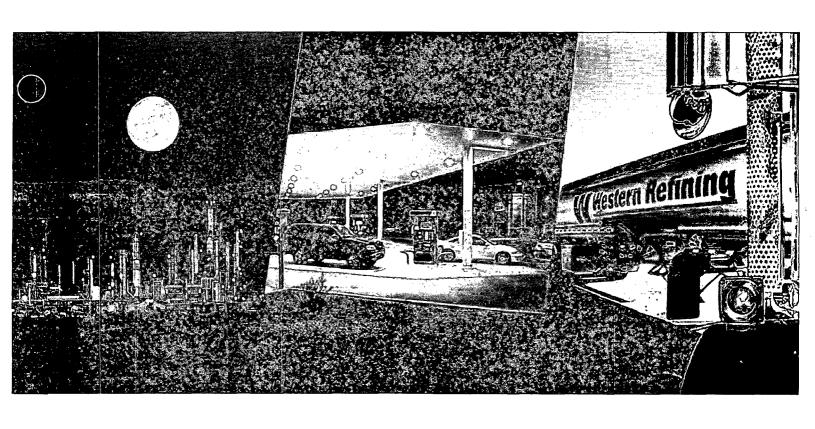
Cc: Kelly G. Roberts – NMOCD Aztec District Office V.R. McDaniel – Bloomfield Refinery Site Manager Allen Hains – Western Refining – El Paso

#### ANNUAL CLASS I WELL REPORT

Waste Disposal Well #1 January – December 2009

Western Refining Southwest, Inc. Bloomfield Refinery Bloomfield, New Mexico Permit # - UIC-CL1-009 API # - 30-45-29002

January 2010



#### ANNUAL CLASS I WELL REPORT

#### Waste Disposal Well #1 January – December 2009

Western Refining Southwest, Inc. Bloomfield Refinery Bloomfield, New Mexico Permit # - UIC-CL1-009 API # - 30-45-29002

January 28, 2010

Prepared by:

Cindy Murtado

**Environmental Coordinator** 

Reviewed by:

James R. Schmaltz

Environmental Manager

#### Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

V. R. McDaniel

Site Manager

#### **Executive Summary**

This report provides a summary of activities conducted throughout 2009 on Waste Disposal Well #1 (WDW-#1) at the Bloomfield Refinery. The following is a summary of conclusions and recommendations developed from well activities performed in 2009.

#### **Conclusions**

**Injection Volume** - The volume injected into the disposal well during 2009 was 34,042,355 gallons. Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation. Due to the reduced water usage caused by this suspension, injection flow rates have decreased to less than 50% or less than 60 gpm during December 2009.

**Sampling and Chemical Analyses** - Injection fluid samples were collected on a quarterly basis for chemical analysis. Analytical results did not exhibit characteristics of hazardous waste.

Maintenance Operations - During 2009, maintenance operations included well cleanout, well stimulation, well acidization, and installation of an injection fluids filter. Down hole flow rate improved to approximately 100 gpm after each procedure and the average injection pressure decreased from 1,111 psia in January to 1,025 psia in November.

**Mechanical Integrity Tests** - The 2009 well testing program included a Radioactive Tracer Test, high-pressure shutdown test, Bradenhead Test, Mechanical Integrity Test, bottom hole pressure survey and pressure Falloff Test. All tests were successfully completed and results indicate no problems with the mechanical integrity of the well.

Well Evaluation - Bloomfield Refinery retained William M Cobb & Associates, Inc to evaluate available well information and present recommendations to improve the injectivity of the injection well. Bloomfield Refinery followed the recommendations to clean out/stimulate/acidize the well and to filter the injection fluids. Western believes that the well stimulation procedures were successful as indicated by the results of the Radioactive Tracer Test and the Falloff Test; fracture treatment of the lower interval is not being considered at this time.

**Area of Review (AOR)** - No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of Disposal Well #1.

#### Recommendations

In 2010, Western will continue the routine operating, monitoring, maintenance and testing programs which will include quarterly chemical analysis of injection fluids, annual MIT, Bradenhead testing, and the annual pressure Falloff Test. Western will continue to utilize the maximum operating injection pressure at the wellhead of 1150 psi as allowed in the amended Administrative Order SWD-528 in order to optimize potential fluctuations in the dewatering activities associated with groundwater remediation and to accommodate any changes in operation of the facility.

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Table 1: Monthly Injection Well Report

Table 2: Area of Review

#### 1.0 Introduction

This report provides a summary of activities conducted during 2009 on Waste Disposal Well #1 (WDW #1). The disposal well is part of the Bloomfield Refinery operations. The refinery is located immediately south of Bloomfield, New Mexico in San Juan County. The well location is depicted in Figure 1. The physical address is #50 Road 4990, Bloomfield, New Mexico 87413.

The Bloomfield Refinery is located on approximately 263 acres. Bordering the facility is a combination of federal and private properties. Public property managed by the Bureau of Land Management lies to the south. The majority of undeveloped land in the vicinity of the facility is used extensively for oil and gas production and, in some instances, grazing. U.S. Highway 44 is located approximately one-half mile west of the facility. The topography of the main portion of the site is generally flat with steep bluffs to the north where the San Juan River intersects Tertiary terrace deposits.

The Waste Disposal Well #1 is owned by Western Refining Southwest, Inc., which is a wholly owned subsidiary of Western Refining Company, and it is operated by Western Refining Southwest, Inc. – Bloomfield Refinery.

#### 1.1 Well Information

Well Name & Number:

OCD UIC:

OCD Discharge Plan Permit Number:

Well Classification:

API Number:

Legal Location: Physical Address:

Waste Disposal Well #1

UIC-CL1-009

GW-130

Class I Non-hazardous

30-045-29002

1250 FEL, 2442FSL, I Sec 27 T29S R11E #50 Road 4990, Bloomfield, NM 87413

#### 2.0 Summary of Activities

The following list of the activities were conducted throughout 2009 on Disposal Well #1 at Western's Bloomfield Refinery.

•	01/28/09	1 st Quarterly Sampling Event
8	04/14/09	2 nd Quarterly Sampling Event
0	04/28/09	Coil Tubing Well Cleanout/Acidization Procedure
		(See Form C-103 in Appendix A)
G	07/01/09	3 rd Quarterly Sampling Event
0	07/07/09	Well Stimulation/Acidization Procedure
		(See Form C-103 in Appendix A)
•	09/15/09	Well Stimulation/Acidization Procedure
		(See Form C-103 in Appendix A)
0	09/23/09	Radioactive Tracer Test
		(See Form C-103 in Appendix A)
•	09/24/09	Mechanical Integrity Test
		(See Form C-103 in Appendix A)
0	09/28/09	Pressure Fall-off Test
9	10/01/09	4 th Quarterly Sampling Event
0	12/23/09	Filter Installation

#### 3.0 Injection Volume

The Monthly Injection Well Report summarizing injection volumes and well performance parameters is presented as Table 1.

#### 3.1 Injection Volume

The volume injected into the disposal well during 2009 was 34,042,355 gallons. Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation. Due to the reduced water usage caused by this suspension, injection flow rates have decreased to less than 50% or less than 60 gpm during December 2009.

#### 3.2 Injection Well Down-Time

The Injection Well was down a total of 682 hours in 2009. The down-times are directly correlated with performing well testing procedures and maintenance. Well testing procedures include the Radioactive Tracer Test and the Annual Falloff Test. The maintenance procedures that contributed to downtime were the well stimulation/acidization procedures, the cartridge filter installation and 108 hours in November due to repair of pump pistons.

#### 4.0 Sampling and Chemical Analyses

Injection fluids samples were collected on a quarterly basis and analyzed for the constituents listed per Item #9 of the *Bloomfield Refinery Class I (Non-Hazardous)* Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal dated March 23, 2004. First quarter samples were collected on January 28, 2009, second quarter samples were collected April 14, 2009, third quarter samples were obtained July 1, 2009, and fourth quarter samples were taken October 1, 2009. Laboratory Analytical Reports and Laboratory Quality Assurance Plan are presented in Appendices B and C, respectively.

Analytical results did not exhibit characteristics of hazardous waste.

#### 5.0 Maintenance Operations

During 2009, maintenance operations included well cleanout, well stimulation, acidization, and installation of an injection fluids filter.

#### 5.1 Well Stimulation/Acidization

In order to reduce sand and scale build up within the well bore and perforations, three separate well stimulation/acidization procedures were performed. On April 28, 2009 coil-tubing clean out and acidization procedures were completed. Eighty-three barrels of hydrochloric (HCl) acid were injected down hole and 65 barrels of flush water were used. After the procedure, the injection rate increased from 60 gpm to 100 gpm. Copies of Form C-103 are located in Appendix A.

The next well stimulation/acidization procedure occurred on July 7, 2009. The process consisted of pumping 3500 gallons down hole of 15% HCl acid in addition to 250 (1.3 specific gravity) "bio" ball sealers. Eight hundred gallons of flush water was used. The well was shut in 1 hour and 15 minutes, and then opened to flow back into frac tanks for three hours. The well was allowed to flow back to the evaporation ponds overnight (14 hours). The procedure improved the flow rate from 70 gpm to 101 gpm. Copies of Form C-103 are located in Appendix A.

The last stimulation/acidization procedure for 2009 was conducted on September 15 & 16, 2009. Coil tubing clean out was performed on September 15, 2009. The well bottom was tagged at 3520' and the hole was circulated clean. Two hundred gallons of 15% HCl was spotted across the perforations and the well shut in. On September 16, 2009, 350 (1.18 specific gravity) "bio" balls were dropped and 4,000 gallons of 15% HCl with corrosion inhibitor and Gas Perm 1000 were pumped in. Acid was displaced with 28 barrels of 2% (potassium chloride) KCl water. The well was shut in for 1 hour 45 minutes and then allowed to flow back 870 barrels to the frac tanks. The down hole flow rate improved to 98gpm. Copies of Form C-103 are located in Appendix A.

Down hole flow rates improved to approximately 100 gpm after each procedure and the average injection pressure decreased from 1,111 psia in January to 1,025 psia in November.

#### 5.2 Filter Installation

Historically sand and scale have likely caused plugging of the well bore and perforations, which in turn caused higher surface well pressures and lower injection flow rate. To further alleviate these potential problems, Bloomfield Refinery installed a filter to remove solids from the injection fluids. A skid mounted cartridge filter was leased from Filter Supply of Farmington, New Mexico. The filter was installed in the injection pump building and put into service on December 23, 2009.

#### **6.0 Mechanical Integrity Tests**

The 2009 well testing program included a radioactive tracer test, high-pressure shutdown test, Bradenhead test, mechanical integrity test, bottom hole pressure survey and pressure falloff test. The testing is discussed below.

#### **6.1** Radioactive Tracer Test

In accordance with the 5-year review of the permit and permit renewal a Radioactive Tracer Test was performed on September 23, 2009. Two millicuries of Scandium (Sc 46) was injected down hole and flushed with 5,000 gallons of water. A Gamma Ray correlation log was run from 3,506 feet to the surface. Two passes (up and down) were logged.

The logs indicate that most of the perforated intervals are taking fluid. There were spurious spikes above the packer which are usually associated with tubing collars. These spikes indicated that there was still some radioactive material hung up in the tubing. Results of the Radioactive Tracer Test prove that the operational integrity of the well is sound.

An electronic copy of the Gamma Ray correlation log and follow-up C-103 were e-mailed to New Mexico Oil Conservation Division – Santa Fe (NMOCD-Santa Fe) and New Mexico Oil Conservation Division - Aztec (NMOCD-Aztec) on September 28, 2009. A hard copy was also available in Appendix H of the 2009 Annual Bottomhole Pressure Surveys and Pressure Falloff Tests for Waste Disposal Well #1Report (Cobb & Associates, 2009b) that was sent to NMOCD – Santa Fe on November 18, 2009.

#### 6.2 Annual Mechanical Integrity Test

Bloomfield Refinery performed the annual High Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test (MIT) on September 24, 2009. All tests were

witnessed by Monica Kuehling of NMOCD-Aztec. The MIT held at 580 psi for 30 minutes, therefore indicating the absence of any leaks.

#### 6.3 Annual Pressure Fall-Off Test

Bloomfield Refinery retained William M. Cobb.& Associates, Inc. to perform the annual bottom hole pressure survey and pressure Falloff Test on WDW #1. The well tests were conducted in accordance with United States Environmental Protection Agency (USEPA) 40 CFR 146.13 and the State of New Mexico Falloff Test Guidelines, December 3, 2007. The 2009 pressure falloff test procedure was conducted in accordance with the USEPA's Region 6 "Pressure Falloff Testing Guidelines, Third Revision", dated August 8, 2002, and required by the State of New Mexico as of December 3, 2007. The pressure falloff test and bottom hole pressure survey performed on Waste Disposal Well No. 1 also met the NMOCD requirements for such testing.

The Falloff Test on WDW #1 at Bloomfield Refinery got underway with a pre-flow period beginning at 6PM on September 28, 2009 and ending at 9:56AM on October 2, 2009. The average flow rate for the 72-hour period prior to the beginning of the fall-off test was 69.3 gpm. On the morning of October 2, 2009, tandem bottom hole memory gauges were lowered into the well and allowed to stabilize. The well was shut-in for 238 hours, ending at 7:59 AM on October 12, 2009. The bottom hole pressure gauges were then pulled from the well making gradient stops every 1,000 feet.

Geologic assessment indicates the WDW #1 is in a confined low permeability sand interval and historically is not capable of producing a bottom hole 100 psi pressure drop between the test data. The Falloff Test data showed no unexpected pressure changes. The pressure dropped quickly during the first few minutes of the test due to wellbore storage effects and then continued to decline as the pressure in the reservoir adjusted to the noflow period. The Falloff Test data show linear flow for the duration of the test with no indication of end of linear flow or reservoir boundary effects. With pressures steady and rates increasing over most of the last four years, there does not appear to be any reservoir response to injection other than that which would be expected from normal growth of the injected volume.

All test data and conclusions are presented in the 2009 Annual Bottomhole Pressure Surveys and Pressure Falloff Tests for Waste Disposal Well #1Report (Cobb and Associates, 2009b) that was submitted to NMOCD – Santa Fe on November 18, 2009.

#### 7.0 Well Evaluations

#### 7.1 Well Evaluation

Bloomfield Refinery retained William M. Cobb & Associates, Inc. to evaluate available well information and present recommendations to improve the injectivity of the injection well. A report, *Evaluation of Disposal Well #1 Bloomfield Refinery* (Cobb and Associates, 2009a), was prepared by William M. Cobb & Associates, Inc. for Bloomfield

Refinery and submitted to NMOCD – Santa Fe on October 7, 2009. In the report, William M Cobb & Associates, Inc stated "with the current injection pressure limit of 1,150 psig at the wellhead and at rates of under 100 gpm, the well should serve for an additional ten years."

Bloomfield Refinery followed the recommendations to clean out/stimulate/acidize the well and to filter the injection fluids. Western believes that the well stimulation procedures were successful as indicated by the results of the Radioactive Tracer Test and the Falloff Test; therefore fracture treatment of the lower interval is not being considered at this time.

Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. Due to the reduced water usage caused by this suspension, injection flow rates have decreased to less than 60 gpm. With proper operation of the filtration system and with the decreased flow rates, WDW #1 should operate for more that ten years.

#### 7.2 Area of Review (AOR)

The Area of Review data from the 2008 Falloff test report was reviewed and updated in 2009 Annual Bottomhole Pressure Surveys and Pressure Falloff Tests for Waste Disposal Well #1Report (Cobb & Associates, 2009b) that was submitted to NMOCD – Santa Fe on November 18, 2009.

Fifty-eight wells were found within a one-mile radius of WDW #1, which injects water into the Mesaverde formation. The wells and status are spotted on an area map, Figure 3, with a well number listed with the well data in Table 2. Of these wells, 15 have been plugged and abandoned. Four wells are classified as dry holes and believed to be plugged and abandoned. Twenty-four wells produce petroleum from shallow zones. One well is an Entrada injection well. Fourteen wells produce petroleum from the Dakota and Gallup zones, which are deeper than the Mesaverde interval used for injection purposes.

Twenty-four of the 59 wells have penetrated the injection zone. Of these, three have been plugged. Five wells are currently producing from shallow zones and 14 wells produce from deep zones. There are two injection wells including WDW #1 and Ashcroft SWD #1 well.

No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of Disposal Well #1.

#### 8.0 Conclusions and Recommendations

The following is a summary of conclusions and recommendations developed from well activities in 2009.

#### 8.1 Conclusions

**Injection Volume** - The volume injected into the disposal well during 2009 was 34,042,355 gallons. Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation. Due to the reduced water usage caused by this suspension, injection flow rates have decreased to less than 50% or less than 60 gpm during December 2009.

**Sampling and Chemical Analyses** - Injection fluids samples were collected on a quarterly basis for chemical analysis. Analytical results did not exhibit characteristics of hazardous waste.

**Maintenance Operations** - During 2009, maintenance operations included well cleanout, well stimulation, well acidization, and installation of an injection fluids filter. Down hole flow rates improved to approximately 100 gpm after each procedure and the average injection pressure decreased from 1,111 psia in January to 1,025 psia in November.

**Mechanical Integrity Tests** - The 2009 well testing program included a Radioactive Tracer Test, high-pressure shutdown test, Bradenhead Test, Mechanical Integrity Test, bottom hole pressure survey and pressure Falloff Test. Results of these tests prove that the operational integrity of the well is sound.

**Well Evaluation** - Bloomfield Refinery retained William M Cobb & Associates, Inc to evaluate available well information and present recommendations to improve the injectivity of the injection well. Bloomfield Refinery followed the recommendations to clean out/stimulate/acidize the well and to filter the injection fluids. Western believes that the well stimulation procedures were successful as indicated by the results of the Radioactive Tracer Test and the Falloff Test; therefore fracture treatment of the lower interval is not being considered at this time.

**Area of Review (AOR)** - No wells are currently producing petroleum from the Mesaverde injection zone within the AOR, a one-mile radius of WDW #1.

#### 8.2 Recommendations

In 2010, Western will continue the routine operating, monitoring, maintenance and testing programs which include quarterly chemical analysis of injection fluids, annual MIT, Bradenhead testing, and the annual pressure Falloff Test. Western will continue to utilize the maximum operating injection pressure at the wellhead of 1150 psi as allowed

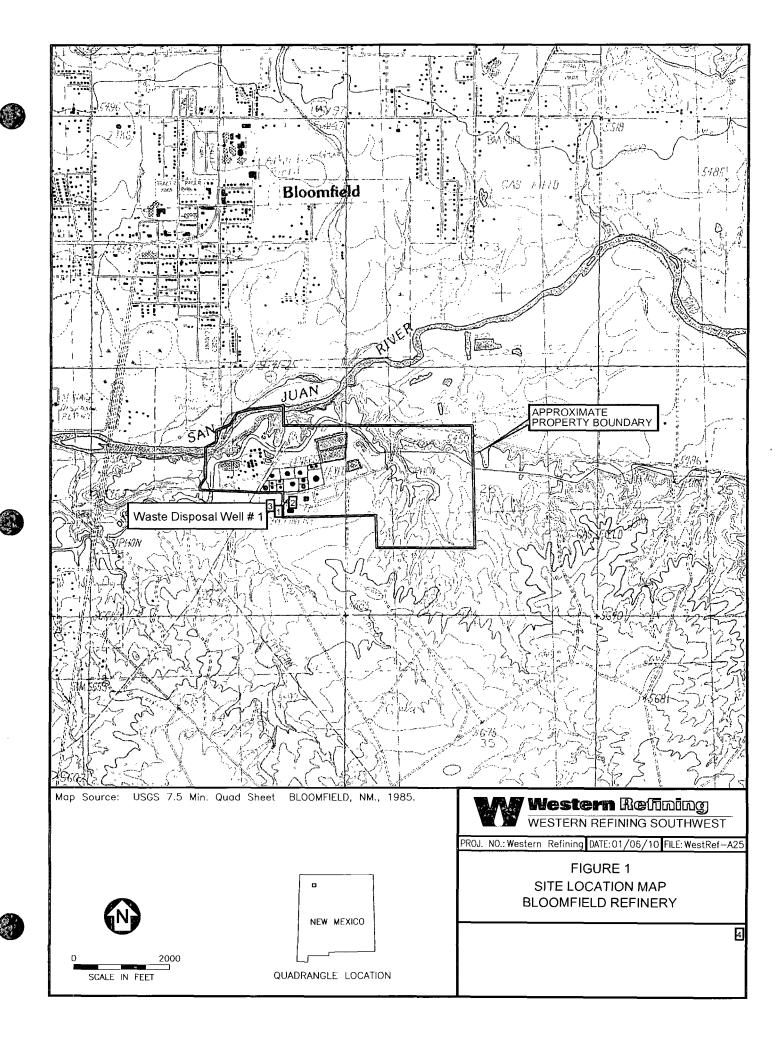
in the amended Administrative Order SWD-528 in order to optimize potential fluctuations in the dewatering activities associated with groundwater remediation and to accommodate any changes in operation of the facility.

# 9.0 References

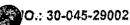
Cobb & Associates, 2009a, Evaluation of Disposal Well #1 Bloomfield Refinery, August 26, 2009.

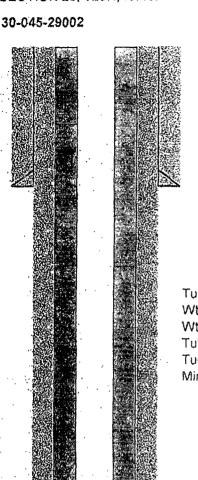
Cobb & Associates, 2009b, 2009 Annual Bottomhole Pressure Surveys and Pressure Falloff Tests for Waste Disposal Well #1Report November 2, 2009.

Bloomfield Refinery Class I (Non-Hazardous) Disposal Well UIC-CL1-009 (GW-130) Discharge Permit Renewal dated March 23, 2004.



# WESTERN REFINING DISPOSAL WELL #1 NW, SW SECTION 26, T29N, R11W







#### FIGURE 2

DISPOSAL WELL #1 WELL SCHEMATIC Western Refining Inc. Bioomfield, NM

1						
1	Date:	4/26/2006	Approved By:	ris	Job No.:	70F5830
Į	Drawn By: .	rts	Checked By:		Scale:	NIA

8-5/8", 48#/ft, Surface Casing @ 830'

TOC: Surface Hole Size: 11.0"

Tubing: 2-7/8", Acid Resistant Fluoroline Cement Lined

Wt of Tubing: 6.5 #/ft

Wt of Tubing Lined: 7.55 #/ft

Tubing ID: 2.128" Tubing Drift ID: 2.000"

Minimum JD @ Packer: ~1.87" estimated

Packer: Unknown Packer Type @ 3221'

Could be a Guiberson or similar model Uni-6

Perforations: 3276' - 3408' 4JSPF 0.5 EHD Top of the Cliff House Formation: 3276'

Fill was cleaned out of well on 4/20/06 Fill was orginally tagged at 3325'

Perforations: 3435' - 3460' 4JSPF 0.5 EHD Top of the Menefee Formation: 3400'

RBP: 3520'

5-1/2", 15.5#/ft, Production Casing @3600'

TOC: Surface Hole Size: 7-7/8"

Figure 3

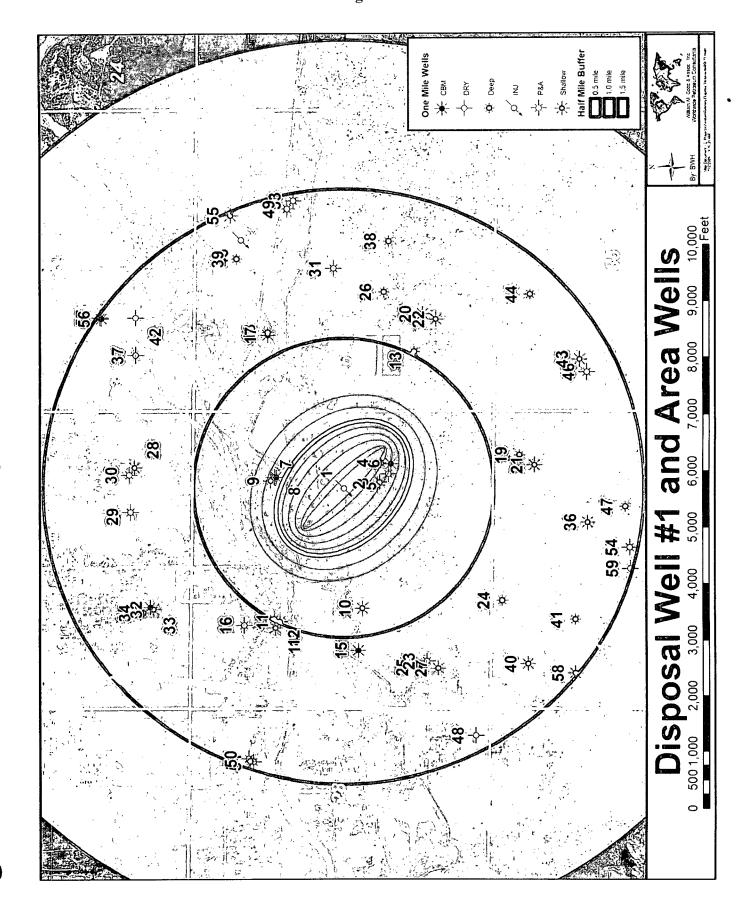




						Table 1	1 6					,	
			WESTERN REFINING	N REFIN		SOUTHWEST, INC	INC BI	BLOOMFIELD REFINERY	LD REFII	VERY			
			-			P.O. BOX 159	<b>K</b> 159						
				8	BLOOMFIE	OMFIELD, NEW MEXICO 87413	/ MEXICC	) 87413					
					VINTINOM	TACABA LIBIN MOITOBINI VIDEN	WEII DE	TOCO					
						DISCHARGE PI AN GW-130	1N GW-130						
					NE1/4 SE1/	14 SE1/4 SECTION 27, T29N, R11W	1 27, T29N,	R11W					
				Z	NMPM, SAN	M, SAN JUAN COUNTY, NEW MEXICO	NTY, NEW	MEXICO					
	AMOUNT	AMOUNT	TOTALIZER								ON-LINE	INE	
	OF WATER	TO SOLAR	AMOUNT	DOWN-	INJECTION PRESSURE	RESSURE		ANNULAR PRESSURE	RESSURE		FLOW RATES	RATES	
PERIOD	FROM RIVER	EVAP PONDS	INJECTED	TIME	MAX	NIM	AVG	MAX	NIW	AVG	MAX	NIM	AVG
2009	(GALLONS)	(GALLONS)	(GALLONS)	(HRS)	(PSIA)	(PSIA)	(PSIA)	(PSIA)	(PSIA)	(PSIA)	(GPM)	(GPM)	(GPM)
JAN	8,613,000	5,685,000	3,571,904	0	1138	1090	1111	300	113	216	91	39	81
FEB	8,257,000	8,838,500	3,221,260	0	1130	1104	1119	231	113	175	98	1.4	74
MAR	9,316,000	4,127,000	2,984,184	0	1122	1049.0	1108	191	170	178	*	*	29
APR	9,183,000	4,115,000	2,534,774	36	1142	1049	1117	228	143	184	104	14	62
MAY	9,421,000	4,177,000	3,669,236	0	1144	1050	1129	190	174	180	86	69	82
NOC	9,188,000	4,001,000	3,063,006	0	1138	266	1119	192	175	184	83	43	69
JUL	11,053,000	4,040,000	2,899,690	12	1143	1020	1120	190	93	176	106	68	86
AUG	10,282,000	3,878,000	3,255,566	0	1139	994	1097	181	100	154	93	47	78
SEP	8,630,000	3,992,000	3,225,841	12	1115	922	1058	188	136	164	98	24	75
OCT	4,960,000	1,430,000	2,047,955	264	1050	993	1075	249	106	159	36	61	80
NOV	7,231,000	4,048,000	2,405,228	108	1108	956	1025	177	61	126	96	34	99
DEC	2,345,000	1,918,000	1,163,711	180	995	916	957	197	127	141	53	18	36
*Flow meter	out of service - es	*Flow meter out of service - estimated average from Feb. and April readings	from Feb. and A	pril readings									
Total amount	t injected in 2009	Total amount injected in 2009 - 34,042,355 gallons	รทร										

Pen. Inj. Zone	Yes	Yes	8 N	Yes	S S	°	Š	8	Yes	Yes	Š	Yes	Yes	^o Z	Yes	°N	Yes	Yes	Yes	8 8	9 2	°Z	8 N	Yes
Status	S.Z.	P&A	Shallow	Deep	P&A	CBM	CBM	P&A	Shallow	Shallow	Shallow	Deep	Deep	Shallow	CBM	P&A	CBM	Deep	Deep	CBM	Shallow	Shallow	P&A	Deep
RESERVOIR	MESAVERDE	DAKOTA	CHACRA	GALLUP	PICTURED CLIFFS	FRUITLAND COAL	FRUITLAND COAL		CHACRA	PICTURED CLIFFS	FRUITLAND SAND	DAKOTA	DAKOTA	CHACRA	FRUITLAND COAL		FRUITLAND COAL	DAKOTA	GALLUP	FRUITLAND COAL	CHACRA	CHACRA	PICTURED CLIFFS	GALLUP
OPERATOR	WESTERN REFINING	BP AMERICA	XTO ENERGY, INC	XTO ENERGY, INC	Pre-Ongard	HOLCOMB 0&G	H-27-29N-11W HOLCOMB O&G	Pre-Ongard	H-27-29N-11W XTO ENERGY, INC	Burlington	F-27-29N-11W MANANA GAS INC	Burlington	. Burlington	F-27-29N-11W MANANA GAS INC	Burlington	Pre-Ongard	F-26-29N-11W HOLCOMB O&G	XTO ENERGY, INC	Burlington	Burlington	Burlington	ENERGEN	Pre-Ongard	ENERGEN
ULSTR	1-27-29N-11W	I-27-29N-11W	1-27-29N-11W	I-27-29N-11W	I-27-29N-11W	I-27-29N-11W	H-27-29N-11W	H-27-29N-11W Pre-Ongard	H-27-29N-11W	K-27-29N-11W Burlington	F-27-29N-11W	F-27-29N-11W	M-26-29N-11W Burlington	F-27-29N-11W	L-27-29N-11W Burlington	C-27-29N-11W Pre-Ongard	F-26-29N-11W	F-26-29N-11W	A-34-29N-11W	N-26-29N-11W	A-34-29N-11W	N-26-29N-11W ENERGEN	M-27-29N-11W Pre-Ongard	C-34-29N-11W ENERGEN
P&A Date		19-Jan-94			18-Oct-82			18-Aug-55								09-Nov-78							27-Jun-75	
Total Depth	3514	6298	2839	6177	1717	1714	1689	1800	6262	5808	1354	6160	6348	2710	6214	800	4030	6242	6148	1760	2857	2869	1747	5970
Perf. Bottom	3514	∞		"		4	6		_	_							•	w		<b>4</b>	2	.,		
tro!	35	6298	2839	5646		1714	1689		2810	1770	1354	6160	6348	2710	1661		1645	6242	6148	1760	2857 2	2869 2	1747	5970
Perf Top	3276 38	6157	2827 2839	5314 564		1543 171	1483 168		2701 2810	1680 1770	1326 1354	6024 6160	6176 6348	2578 2710	1388 1661									5326 5970
					30-045-07812			30-045-07883								30-045-07896	1645	6242	6148	1760	2857	2869	1747	
Perf Top	3276	6157	2827	5314	1 30-045-07812	1543	1483	2	2701	1680	1326	6024	6176	2578	1388	1 30-045-07896	1462 1645	1E 30-045-24083 6086 6242	6086 6148	1468 1760	2747 2857	2746 2869	1664 1747	5326
WELLNAME # APINO Perf	3276	6157	2827	30-045-30833 5314	Davis Pooled Unit 1 30-045-07812	1543	1483	Davis PU/FB Umbarger 2 30-045-07883	30-045-24084 2701	30-045-25673 1680	1326	6024	6176	2578	1388	Black Diamond 1 30-045-07896	1462 1645	6086 6242	30-045-25657 6086 6148	30-045-31118 1468 1760	30-045-24574 2747 2857	30-045-24572 2746 2869	1664 1747	30-045-25707 5326
# APINO Perf	1 30-045-29002 3276	1 30-045-07825 6157	1 30-045-23554 2827	1R 30-045-30833 5314	-	1 30-045-34463 1543	2 30-045-34409 1483	2	1E 30-045-24084 2701	18 30-045-25673 1680	1 30-045-27361 1326	1E 30-045-24673 6024	1 30-045-12003 6176	1 30-045-27365 2578	1 30-045-07835 1388	-	1 30-045-25329 1462 1645	1E 30-045-24083 6086 6242	16 30-045-25657 6086 6148	100 30-045-31118 1468 1760	9 30-045-24574 2747 2857	9 30-045-24572 2746 2869	1 30-045-07903 1664 1747	15 30-045-25707 5326

Pen. Int. Zone	°N	Yes	8 N	°Z	°Z	Yes	8 N	8 N	S N	Yes	S S	§	°Z	Yes	Yes	Š	Yes	8	Yes	Yes	Yes	o Z	Yes	o N
Status	Shallow	Deep	Shallow	Shallow	P&A	P&A	P&A	Shallow	CBM	Deep	Shallow	Shallow	DRY	Deep	Deep	Shallow	Deep	DRY	Shallow	Deep	$\vec{z}$	P&A	Deep	DRY
RESERVOIR	CHACRA	GALLUP	PICTURED CLIFFS	CHACRA	FRUITLAND SAND	DAKOTA	(N/A)	CHACRA	FRUITLAND COAL	DAKOTA	FRUITLAND SAND	PICTURED CLIFFS 8	FARMINGTON	DAKOTA	DAKOTA	FARMINGTON, NORTH Shallow	DAKOTA	FARMINGTON	CHACRA	GALLUP	MORRISON BLUFF EN	PICTURED CLIFFS	DAKOTA	
<u>OPERATOR</u>	ENERGEN	Burlington	Burlington	P-22-29N-11W MANANA GAS INC	O-22-29N-11W JOHN C PICKETT	P-22-29N-11W MANANA GAS INC	Pre-Ongard	N-22-29N-11W MANANA GAS INC	N-22-29N-11W MANANA GAS INC	N-22-29N-11W MANANA GAS INC	N-22-29N-11W MANANA GAS INC	G-34-29N-11W CHAPARRAL O&G	Pre-Ongard	Burlington	XTO ENERGY, INC	D-34-29N-11W MCELVAIN O&G	Burlington	Pre-Ongard	Burlington	Burlington	B-26-29N-11W XTO ENERGY, INC	CHAPARRAL O&G	Burlington	Pre-Ongard
ULSTR	M-27-29N-11W	K-26-29N-11W	M-27-29N-11W	P-22-29N-11W	O-22-29N-11W	P-22-29N-11W	M-26-29N-11W Pre-Ongard	N-22-29N-11W	N-22-29N-11W	N-22-29N-11W	N-22-29N-11W	G-34-29N-11W	M-23-29N-11W Pre-Ongard	J-26-29N-11W	B-26-29N-11W	D-34-29N-11W	F-34-29N-11W	O-23-29N-11W	E-35-29N-11W Burlington	C-35-29N-11W Burlington	B-26-29N-11W	E-35-29N-11W	G-34-29N-11W	P-28-29N-11W Pre-Ongard
P&A Date					02-Mar-00	14-Jun-99	11-Nov-58															18-Dec-99		
<u>Total</u> <u>Depth</u>	2790	5870	1678	2754	1466	6274	1917	2732	1608	6226	1410	1736	2335	6430	6160	1525	6347	2015	6328	5943	7382	1790	6340	870
Perf Bottom	2790	5870	1678	2754	1466	6274		2732	1608	6226	1410	1736		6430	6160	1064	6347		2906	5943	7070	1790	6340	
Perf Top	2668	5295	1648	2627	1380	6072		2622	1440	6052	1390	1726		6172	6047	1060	6202		2784	5369	6952	1776	6171	
APINO	30-045-24573	30-045-25612	30-045-21732	30-045-26721	30-045-07959	30-045-07961	30-045-07776	30-045-26731	30-045-34312	30-045-07940	30-045-13089	30-045-20755	30-545-02123	30-045-33093	30-045-07733	30-045-24834	30-045-24835	30-545-02124	30-045-24837	30-045-25675	30-045-30788	30-045-20752	30-045-07672	30-045-07751
#⊧	က	က	#	2	-	<del>-</del>	<del></del>	<b>~</b>		-	2	2	33	<u>†</u>	-	11	7E	4	4E	15	_	<b>←</b>	5	~
WELLNAME	GARLAND	CALVIN	GARLAND B	NANCY HARTMAN	GRACE PEARCE	HARTMAN	Davis	MARY JANE	ROYAL FLUSH	COOK	COOK	SHELLY	HARE	CALVIN	SULLIVAN GAS COM D	ELLEDGE FEDERAL 34	CONGRESS	HARE	CONGRESS	CONGRESS	ASHCROFT SWD	LEA ANN	CONGRESS	Viles EE
Miles to DW1	0.65	0.67	0.68	0.70	0.71	0.72	0.73	0.75	0.76	0.79	0.79	0.82	0.82	0.84	0.85	0.85	0.89	06.0	06.0	06.0	06.0	06.0	0.94	0.94
<u>Map</u> Seq.	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	<b>4</b>	42	43	44	45	46	47	48

WELLNAME         #         APINO         Perf Top         Perf Bottom Depth         Total         Ps.A Date         ULSTR         OPER/           Sullivan         1X 30-045-29107         900         23-Jun-55         G-26-29N-11W Pre-Ongard	APINO         Perf Total           Top         Bottom         Depth           30-045-29107         900	Perf Total Top Bottom Depth	Perf Total Bottom Depth	Total Depth 900		P&A Date ULSTR 23-Jun-55 G-26-29N-11W	<u>ULSTR</u> G-26-29N-11W		OPERATOR Pre-Ongard	RESERVOIR PICTURED CLIFFS	Status P&A	Pen. Inj. Zone No
selby Pooled Unit 2 30-045-07895 1600	30-045-07895 1600	1600				25-3411-35 G-20-25N- 05-May-78 A-28-29N-	A-28-29N-	¥ %1	Pre-Ongard	PICTURED CLIFFS	P &A	2 8
Masden-Selby 3 30-045-07762 600 05-Jun-78 A-28-29N-11W Pre-Ongard	009	009				05-Jun-78 A-28-29N	A-28-29N	-11W	Pre-Ongard		P&A	Š
MASDEN GAS COM 1 30-045-07894 6023 6125 6125 A-28-29	6023 6125 6125	6023 6125 6125	6125 6125	6125		A-28-29	A-28-29	N-11W	A-28-29N-11W XTO ENERGY, INC	ракота	Deep	Yes
Sullivan 1 30-045-07870 1420 31-Aug-53 G-26-2	1420 31-Aug-53	1420 31-Aug-53	31-Aug-53	31-Aug-53	31-Aug-53		G-26-2	9N-11W	G-26-29N-11W Pre-Ongard	PICTURED CLIFFS	P&A	9 2
CONGRESS 1 30-045-07674 PC 30-Oct-53 J-34-2	PC 30-Oct-53	PC 30-Oct-53	30-Oct-53	30-Oct-53	30-Oct-53	30-Oct-53 J-34-2	J-3 <b>4</b> -2	9N-11W	J-34-29N-11W Pre-Ongard	PICTURED CLIFFS	P&A	Š
EARL B SULLIVAN 1 30-045-23163 2750 2761 2761 B-26-2	2750 2761 2761	2750 2761 2761	2761 2761	2761		B-26-2	B-26-2	9N-11W	B-26-29N-11W XTO ENERGY, INC	CHACRA	Shallow	8
STATE GAS COM BS 1 30-045-23550 1470 1648 2761 K-23-2	1648 2761	1648 2761	1648 2761	2761		K-23-2	K-23-2	9N-11W	K-23-29N-11W HOLCOMB O&G	FRUITLAND COAL	CBM	°N
PEARCE GAS COM 1 30-045-07985 6154 6182 6182 10-Mar-97 K-23-29N-11W BP AMERICA	6154 6182 6182	6154 6182 6182	6182 6182	6182		10-Mar-97 K-23-2	K-23-2	9N-11W	BP AMERICA	DAKOTA	P&A	Yes
CHAPARRAL 1 30-045-20609 1712 1731 1731 E-34-2	1712 1731 1731	1712 1731 1731	1731 1731	1731		E-34-2	E-34-2	9N-11W	E-34-29N-11W CHAPARRAL O&G	PICTURED CLIFFS	Shallow	o N
CONGRESS 2 30-545-02151 Frlind -34-29	FrfInd	FrfInd				-34-29	-34-29	-34-29N-11W	Pre-Ongard	FRUITLAND SAND	DRY	Š

r	- Zone	<u>N</u>	12	4	0	5	4	0	35
	Pen Inj. 20ne	Yes	က	0	2	2	က	4	24
	Total	Wells	15	4	2	7	17	14	59
		Status	P&A	Dry	Ţ	CBM	Shallow	Deep	Total

# Section 6.0 Form C-103 Notifications

	Submit 3 Copies To Appropriate District Office	State of New M	exico		Form C-103
}	District 1	Energy, Minerals and Nat	ural Resources		June 19. 2008
•	1625 N. French Dr., Hobbs, NM 88240			WELL API NO.	220.0
	District II 1301 W. Grand Ave., Artesia, NM 88210	OIL CONSERVATION	NOIVISION	30-045-290002-00	
	District III	1220 South St. Fra		5. Indicate Type of L	
	1000 Rio Brazos Rd , Aziec, NM 87410	Santa Fe, NM 8		STATE	FEE
	District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505	Santa I C, INIVI o	17303	6. State Oil & Gas Le	ease No.
		CES AND REPORTS ON WELL	S	7. Lease Name or Un	it Agreement Name
	(DO NOT USE THIS FORM FOR PROPOS DIFFERENT RESERVOIR USE "APPLIC	SALS TO DRILL OR TO DEEPEN OR PI	LUG BACK TO A	Disposal	
		Gas Well 🗌 OtherX SWR		8. Well Number #00	
	2. Name of Operator Western Refining Souhwest, Inc. –	Bloomfield Refinery		9. OGRID Number 037218	
	3. Address of Operator			10. Pool name or Wi	
	#50 Road 4990 Bloomfield, NM	87413		SHD; Mesall	and a
Ī	4. Well Location			( ) / ( )	
Ĭ	Unit Letter I: 244	2 feet from the South	line and 1250	feet from theEast	line
	Section 24 27	Township 29	Range 11		unty San Juan
		11. Elevation (Show whether DI			
		Tr. Biovación (Brion mientes Br	i, 1112, 111, 011, 011		
	12. Check A	appropriate Box to Indicate N	Nature of Notice	e, Report or Other Da	ta
	NOTICE OF IN	TENTION TO:	9111	BSEQUENT REPO	DT OE:
	PERFORM REMEDIAL WORK	PLUG AND ABANDON	REMEDIAL WO		TERING CASING
	TEMPORARILY ABANDON	CHANGE PLANS			AND A
	August 1		1		IND A
	PULL OR ALTER CASING	MULTIPLE COMPL	CASING/CEME	NI JOB	
	DOWNHOLE COMMINGLE				
	OTHER:	Ø	OTHER:		
	of starting any proposed wo or recompletion.	leted operations. (Clearly state all rk). SEE RULE 1103, For Multip	ple Completions: A	Attach wellbore diagram (	of proposed completior
	This Class I Injection Well operated Discharge Permit Disposal Well UIC		nc. – Bloomfield R	tefinery is permitted by N	ew Mexico OCD
	Well Maintenance (Down-Hole Clea	n Out) will be conducted starting	approximately on 4	1-22-09 or no later than 4-	30-09.
		ومسر		921	N ADD 2010
		<i>*</i>		KUV	D APR 20 '09
				on	CONS. DIV.
					DIST. 3
	Spud Date:	Rig Release D	Date:		
-	I hereby certify that the information a	above is true and complete to the l	hest of my knowled	loe and belief	
	$\alpha$	to the and complete to the	oost of my knowice	150 and benef.	
;	SIGNATURE CINDY HWYAC	Lo TITLE Envir	renmental Gordi	nator DATE	4-16-09
		urtaalo E-mail addres	Cincle hunter	nator DATE	- exc. (-31-(11)k)
	Type or print name Chiby 11 t				E: 303-032-4(4)
	APPROVED BY: Tolk G	Depu	ity Oil & Gas District #	Inspector, 3 DATE	APR 2 4 2009
	Conditions of Approval (if any):				110 11 12 - 6000



BLOOMFIELD REFINERY

Jim Griswold New Mexico Oil Conservation Division 1220 South St. Francis Drive Santa Fe, New Mexico 87505 RCVD APR 20 '09 OIL CONS. DIV.

Certified Mail: 7007 0220 0004 0187 0756

DIST. 3

April 16, 2009

RE: Bloomfield Refinery UIC Class I Well API# 30-0-45-29002 Disposal Well #1 Unit I, Section 27, Township 20, Range 11

Dear Mr. Griswold,

Please find enclosed the C-103 notification for well maintenance work (down-hole cleanout) that will be conducted on Bloomfield Refinery's Class I Injection Well. This work is tentatively scheduled for 4-22-09 but will occur no later than 4-30-09.

If you need additional information, please contact Randy Schmaltz (505-632-4171), Bob Krakow (505-632-4135), or myself (505-632-4161).

Sincerely.

Cindy Hurtado

Environmental Coordinator

Bloomfield Refinery - Western Refining

Cc: Randy Schmaltz – Environmental Manager – Bloomfield Refinery Brandon Powell – NMOCD Aztec District Office

Submit 3 Copies To Appropriate District Office	State of New Mo Energy, Minerals and Natu			Form C-103 May 27, 2004
<u>District I</u> 1625 N. French Dr., Hobbs, NM 88240	thergy, Millerals and Nati	nar Resources	WELL API NO.	171117 27, 2007
District II 1301 W. Grand Ave., Artesia, NM 88210	OIL CONSERVATION	DIVISION	30-045-290002-0	
District III	1220 South St. Fran	i	5. Indicate Type STATE	
1000 Rio Brazos Rd., Aztec, NM 87410 District IV	Santa Fe, NM 8		6. State Oil & Ga	
1220 S. St. Francis Dr., Santa Fe, NM	,		0. 0 0 0	.5 501.00
SUNDRY NOTICES	AND REPORTS ON WELLS	`	7 Lease Name of	r Unit Agreement Name
(DO NOT USE THIS FORM FOR PROPOSALS DIFFERENT RESERVOIR. USE "APPLICATION"	TO DRILL OR TO DEEPEN OR PL	UG BACK TO A	7. Bouse Rume of	ome, ig. coment in the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of th
PROPOSALS.)   1. Type of Well: Oil Well   Gas	Well DtherX		8. Well Number	
2. Name of Operator	Wen Coment		9. OGRID Numb	er
Western Refining Southwest, Inc Blo	omfeld Refinery		037218	
3. Address of Operator	2		10. Pool name or	Wildcat
#50 Road 4990 Bloomfield, NM 8741	<i>3</i>			
4. Well Location				
Unit Letter 1: 2442 feet fi				
	ownship 29 Range Elevation (Show whether DR	NMPM NMPM		/ San Juan
Pit or Below-grade Tank Application or Clos	·	, KKB, K1, OK, etc./		
	Distance from nearest fresh v	vater well Dista	mee from nearest surf	ace water
	Below-Grade Tank: Volume			
	opriate Box to Indicate N			
12. Check Appl	opitale box to indicate is	fattife of Notice, i	report of Other	Data
NOTICE OF INTER	NTION TO:	SUBS	SEQUENT RE	PORT OF:
PERFORM REMEDIAL WORK 🔲 PL		REMEDIAL WORK		ALTERING CASING
	IANGE PLANS ☐		LING OPNS.	P AND A
PULL OR ALTER CASING   MI	JLTIPLE COMPL	CASING/CEMENT	JOB 🗌	
OTHER:		OTHER:		
<ol> <li>Describe proposed or completed of starting any proposed work). or recompletion.</li> </ol>	operations. (Clearly state all SEE RULE 1103. For Multip	pertinent dotails, and de Completions: Att	give pertinent date ach wellbore diagr	es, including estimated date am of proposed completion
The Class I Injection Well operated by W Discharge Permit Disposal Well UICL-9.	estern Refining Southwest, In EPA ID# NMD089416416.	c. – Bloomfield Refi	nery is permitted b	y New Mexico OCD
·				
April 28, 2009 coil tubing clean out and a downhole, 65 barrels of flush water was a increasesd from 60 gpm to 100 gpm.	cidization processes were con used. After the process was con	npleted on the injection mpleted the Injection	on Well. 83 barrels Well was put back	s of HCL acid was injected con line. The injection rate
9Pm 10 9Pm				
			· · · · · · · · · · · · · · · · · · ·	
I hereby certify that the information above grade tank has been yill be constructed or closed	l according to NMOCD guidelines [	], a general permit [] c	er an (attached) altern	ative OCD-approved plan .
SIGNATURE ( my Huntado				DATE 4-29-2009
Type or print name For State Use Only	tado E-mail ac	idress: Cindy, hur	tado e wnr.197	Rephone No. 505-632 - 4/6/
APPROVED BY: but the Conditions of Approval (if any):	TITLE_	Environmental	Engereen	DATE \$/14/09

Submit 3 Copies To Appropriate District Office  State of New Mexico	Form C-103
District 1 1625 N. French Dr., Hobbs, NM 88240  Energy, Minerals and Natural Resources	WELL API NO.
District II 1301 W. Grand Ave., Artesia, NM 88210 OIL CONSERVATION DIVISION	30-045-29002-00 5. Indicate Type of Lease
District III 1220 South St. Francis Dr. 1000 Rio Brazos Rd., Aztec, NM 87410	STATE FEE X
District IV Santa Fe, NM 87505	6. State Oil & Gas Lease No.
1220 S. St. Francis Dr., Santa Fc, NM	N/A
SUNDRY NOTICES AND REPORTS ON WELLS	7. Lease Name or Unit Agreement Name
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH	Disposal
PROPOSALS.)  1. Type of Well: Oil Well Gas Well OtherX (Disposal)	8. Well Number #001
2. Name of Operator	9. OGRID Number
San Juan Refining Co/Western Refining Southwest, Inc Bloomfeld Refinery	037218
3. Address of Operator	10. Pool name or Wildcat
#50 Road 4990 Bloomfield, NM 87413	Blanco/Mesa Verde
4. Well Location	
Unit Letter 1: 2442 feet from the South line and 1250 feet	et from theEastline
Section 27 Township 29 Range 11 NMP	
11. Elevation (Show whether DR, RKB, RT, GR, etc.	
Pit or Below-grade Tank Application   or Closure	
Pit type Depth to Groundwater Distance from nearest fresh water well Di	
Pit Liner Thickness; mil Below-Grade Tank: Volume bbls; C	onstruction Material
<ol><li>Check Appropriate Box to Indicate Nature of Notice</li></ol>	, Report or Other Data
NOTICE OF INTENTION TO: SUB	SSEQUENT REPORT OF:
PERFORM REMEDIAL WORK PLUG AND ABANDON REMEDIAL WOR	_
	RILLING OPNS. PANDA
PULL OR ALTER CASING   MULTIPLE COMPL   CASING/CEMEN	
OTHER: Well Stimulation/Acidize Well  X  OTHER:	
13. Describe proposed or completed operations. (Clearly state all pertinent details, a	ad give pertinent dates, including estimated date
of starting any proposed work). SEE RULE 1103. For Multiple Completions: A	
or recompletion.	
Western Refining Soutwest, Inc. – Bloomfield Refinery requests permission to perform well referenced above. Procedures for this project are attached.	ell stimulation/acidization procedures on the
The procedure will be scheduled pending approval from OCD.	
The protestant with our sentential politicing approval from OCD.	
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I hereby certify that the information above is true and complete to the best of my knowled grade tank has been will be constructed or closed according to NMOCD guidelines, a general permit	
SIGNATURE undy / unfado TITLE Environmental Coc	ordinator_DATE6/29/09
Type or print name Cindy Hurtado E-mail address: cindy.hurtado@wnr.com For State Use Only	Telephone No. (505)632-4161
ADEDOUGD GV. A. A.I.	
APPROVED BY: Conditions of Approval (if any):	1 Engineer DATE 6/29/09

#### Western Refining

#### **Procedure**

May 12, 2009

Well: Location:

By:

Disposal Well #1

Sec 26, T29N, R11W

San Juan Co, New Mexico

John Thompson

Field:

Mesaverde

Elevation:

API No: Lease No: 30-045-29002

#### Project:

Lower injection pressure by pumping 15% HCl acid.

#### Prior to Job:

Spot 2 ea. 400 bbl frac tanks (only 1 will be needed if displacement water is available from refinery). Hard line well to 1 tank (for flowback).

#### Acid Job:

- 1. Hold safety meeting w/ Halliburton and Western Refinery personnel and review
- Rig up Halliburton to well head and pressure test pumps and lines to 4000 psi.
- Pump 3,500 gal of 15% HCl acid w/ inihibtors and mutual solvent with 250 ea. biodegradable ball sealers
- 4. Displace acid to bottom perforation with ~ 24 bbls of 2% KCl water (or disposal water
- Shut well in for ~ 1 hr and let acid treatment "soak". Rig down and release Halliburton.
- Open well through 2" line and let well flow back to frac tank. Flow back approximately 400 bbls of fluid.
- 7. After flowback, return well to injection status and monitor rates and pressures.

#### Materials & Vendors

Acid: Halliburton Energy Services

Frac Tank: M&R Trucking Roustabouts: Englehart

Engineering/Supervision: Walsh Engineering

#### Hurtado, Cindy

From:

Hurtado, Cindy

Sent:

Monday, July 13, 2009 9:44 AM

To:

'Chavez, Carl J, EMNRD'; 'monica.kuehling@state.nm.us'; Schmaltz, Randy

Cc:

Krakow, Bob

Subject:

UICI-9 WRSW-Bloomfield Refinery Acid Job 7-07-09

Attachments: C-103 Follow up 7-07-09.pdf

#### Good Morning,

Please find attached the C-103 follow-up report for the well strmulation/acidization procedure that was conducted at Bloomfield Refinery's Class I Injection Well. Monica Kueling from the Aztec District OCD office was onsite and observed the well strmulation/acidization process. Please let me know if a hard copy of this report needs to be mailed out.

Thanks, Cindy

Cindy Hurtado
Environmental Coordinator
Western Refining Southwest, Inc. - Bloomfield Refinery
cindy.hurtado@wnr.com
505-632-4161

Submit 3 Copies To Appropriate District Office  District 1	State of New Me Energy, Minerals and Natu			Form C-103 May 27, 2004
1625 N. French Dr., Hobbs, NM 88240 <u>District II</u> 1301 W. Grand Ave., Artesia, NM 88210	OIL CONSERVATION	DIVISION	WELL API NO. 30-045-29002-00	
District III 1000 Rig Brazos Rd., Aztec, NM 87410	1220 South St. Fran	icis Dr.	5. Indicate Type of Lease STATE FI	SE X
District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505	Santa Fe, NM 87	'505	6. State Oil & Gas Lease N N/A	0.
SUNDRY NOTIC (DO NOT USE THIS FORM FOR PROPOSA DIFFERENT RESERVOIR. USE "APPLICA		JG BACK TO A	7. Lease Name or Unit Agr Disposal	eement Name
	as Well OtherX (Disposal)		8. Well Number #001	
2. Name of Operator San Juan Refining Co/Western Refin	ing Southwest Inc - Bloomfeld I	Refinery	9. OGRID Number 037218	
3. Address of Operator	*		10. Pool name or Wildcat	
#50 Road 4990 Bloomfield, NM 87	7413		Blanco/Mesa Verde	
	et from the South 1	ine and 1250 fee	et from the East line	
Section 27	Township 29 Range	II NMPN	1 County San Juan	1
	11. Elevation (Show whether DR,	RKB, RT, GR, etc.,		
Pit or Below-grade Tank Application Tor C	losure 🗌			
Pit typeDepth to Groundwate		ater well Dist	ance from nearest surface water	
Pit Liner Thickness: mil	Below-Grade Tank: Volume	bbls; Co	nstruction Material	
12. Check Ap	propriate Box to Indicate N	ature of Notice,	Report or Other Data	
TEMPORARILY ABANDON	ENTION TO: PLUG AND ABANDON  CHANGE PLANS  MULTIPLE COMPL	SUB REMEDIAL WOR COMMENCE DRI CASING/CEMEN	LLING OPNS. P AND A	IG CASING 🗌
OTHER:		OTHER: Well Stin	nulation/Acidize Well	Χ□
<ol> <li>Describe proposed or complet of starting any proposed work or recompletion.</li> </ol>	ted operations. (Clearly state all p i). SEE RULE 1103. For Multipl			
On July 7, 2009, Western Refining Soil Injection well referenced above. The gravity "bio" ball sealers downhole. 80 flow back into frac tanks for three how injection Well was put back on line, flow	procedure consisted of pumping 3 00 gallons of flush water was used rs. The well was allowed to flowb	500 gallons of 15%. The well was shuack to the evaporat	6 HCL acid in addition to 250 in 1 hour and 15 minutes and	- 1.3 specific then opened to
	·			
I hereby certify that the information ab	ove is true and complete to the be used according to NMOCD guidelines	st of my knowledge l, a general permit []	e and belief. I further certify the or an (attached) alternative OCD-s	nt any pit or below- approved plan .
SIGNATURE ( indy ) Into	ado title e	nvironmental Coor	dinatorDATE7/13/09	
Type or print name Cirldy Hurtado For State Use Only	E-mail address: cindy.hurt	ado@wnr.com	Telephone No. (505)632-4	161
APPROVED BY:	TITLE		DATE	
Conditions of Approval (if any):		-		

.

Submit 3 Copies To Appropriate District St	ate of New Mex	xico		Form C-103
	inerals and Natur	al Resources		May 27, 2004
1625 N French Dr., Hobbs, NM 88240 District II			WELL API NO. 30-045-29002-00	
1301 W. Grand Avc., Artesia, NM 88210 OIL CON	ISERVATION		5. Indicate Type of Leas	e
1000 Pio Prozos Pd. Aztan NIA 07410	South St. France		STATE	FEE X
District IV 1220 S. St. Francis Dr., Santa Fc, NM	anta Fe, NM 87	303	6. State Oil & Gas Lease N/A	: No.
87505				
SUNDRY NOTICES AND REPO (DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMI PROPOSALS.)	TO DEEPEN OR PLU	G BACK TO A R SUCH	7. Lease Name or Unit A Disposal	Agreement Name
1	therX (Disposal)		8. Well Number #001	
2. Name of Operator			9. OGRID Number	
San Juan Refining Co/Western Refining Southwest,	Inc. – Bloomfeld R	Lefinery	037218 10. Pool name or Wildca	
3. Address of Operator #50 Road 4990 Bloomfield, NM 87413			Blanco/Mesa Verde	
4. Well Location		1 1250 6	of de Park 1	
Unit Letter 1: 2442 feet from the Se			t from theEastline	1
		11 NMPN RKB, RT, GR, etc.)		uan
Pit or Below-grade Tank Application or Closure				
Pit typeDepth to GroundwaterDistance			ance from nearest surface wate	r
Pit Liner Thickness: mil Below-Grade T			nstruction Material	
12. Check Appropriate Bo	x to Indicate Na	nture of Notice,	Report or Other Data	
NOTICE OF INTENTION TO	): l	SUB	SEQUENT REPORT	OF:
PERFORM REMEDIAL WORK   PLUG AND ABA	ANDON 🗆	REMEDIAL WORL		RING CASING 🗆
TEMPORARILY ABANDON		COMMENCE DRI		) A 📋
PULL OR ALTER CASING  MULTIPLE COI	WIPL []	CASING/CEMENT	1 106	
OTHER: Well Stimulation/Acidize Well		OTHER:		
13. Describe proposed or completed operations.	(Clearly state all pe	ertinent details, and	d give pertinent dates, inclu	iding estimated date
of starting any proposed work). SEE RULE or recompletion.  Western Refining Soutwest, Inc. – Bloomfield Refiner Class I Injection well referenced above. Procedures fo The procedure will be scheduled pending approval fro				
Western Refining Soutwest, Inc Bloomfield Refiner	ry requests permiss	sion to perform wel	ll stimulation/acidization p	ocedares on the
Class I Injection well referenced above. Procedures for	r this project are at	tached.	<u></u>	213
The procedure will be scheduled pending approval to	ill OCD.		20.	
			8	Ch 20 3
			99	
			14. X	<b>` %</b> `
			(2)	1,00
I hereby certify that the information above is true and grade tank has been/will be constructed or closed according to I	complete to the bes	st of my knowleag	e and dellet. I further cectify	that any pit or below-
SIGNATURE (indy funtado	TITLE_ E	nvironmental Coor	dinator_DATE9/11/0	9
	address: cindy.hurt	ado@wnr.com	Telephone No. (505)632	2-4161
For State Use Only	Depu	ity Oil & Gas	Inspector,	
APPROVED BY: Jaly G. B.D.	TITLE	ity Oil & Gas District #	dati	E SEP 1 4 2009
APPROVED BY: Zelly G. Rode Conditions of Approval (if any): Notify NACOED	ATTEC 24 H	lours Prior	TO BEGINNING OPE	ERATIONS

-

#### Western Refining

#### Procedure

August 18, 2009

Well:

Disposal Well #1

Field:

Mesaverde

Location:

Sec 26, T29N, R11W

Elevation:

30-045-29002

By:

San Juan Co, New Mexico John Thompson

API No:

Lease No:

### Project:

Lower injection pressure by pumping 15% HCI acid.

#### Prior to Job:

Spot 2 ea. 400 bbl frac tanks for flowback after acid job. Spot flowback tank for clean out. Use water truck for displacement. Hydrant on location has too much pressure for standard suction lines to acid truck. Hard line well to tank (s) for flowback.

#### Clean out and Acid Spot:

- 1. Hold safety meeting w/ Halliburton, Saniel and Western Refinery personnel and review procedure.
- 2. Rig up Sanjel coil tubing unit & Halliburton to well head and pressure test pumps and lines to'4000 psi.
- 3. RIH w/ 1-1/4" coil tubing to PBTD at 3520' KB. Clean out if necessary.
- 4. Pull coiled tubing up to bottom perforation at 3,460' KB (bottom perforation).
- 5. Spot 200 gal of 15% HCL w/ inhibitors.
- 6. Pull out coiled tubing and shut well in overnight.

#### Acid / Ball Off:

- 7. Establish an injection rate with water. Pump 4,000 gal of 15% HCl acid w/ inihibtors and mutual solvent with 300 ea. bio-degradable ball sealers. Pump 1st 500 gal without
- 8. Displace acid to bottom perforation with ~ 24 bbls of 2% KCl water (or disposal water if available).
- 9. Shut well in for ~ 1 hr and let acid treatment "soak". Rig down and release Halliburton.
- 10. Open well through 2" line and let well flow back to frac tank. Flow back approximately 400 bbls of fluid.
- 11. After flowback, return well to injection status and monitor rates and pressures.

#### Materials & Vendors

Acid: Halliburton Energy Services

Coil Tubing: Sanjel

Frac Tank: M&R Trucking Roustabouts: Englehart

Engineering/Supervision: Walsh Engineering

#### Hurtado, Cindy

From:

Hurtado, Cindy

Sent:

Thursday, September 17, 2009 1:30 PM

To:

 $\hbox{'Chavez, Carl J, EMNRD'; 'charlie.perrin@state.nm.us'; Schmaltz, Randy}\\$ 

Cc:

'kellyg.roberts@state.nm.us'; 'Kuehling, Monica, EMNRD'; Krakow, Bob

Subject:

Follow Up C103 - UICI-9 Acid Job 9-2009

Attachments: C103 Follow Up Report - Acid Job 9-2009.jpg

#### Good Afternoon,

Please find attached the follow up C-103 report for the well stimulation/acidization procedure that was conducted at Bloomfield Refinery's Class I Injection Well on September 15 and 16, 2009. Please contact me if you have questions concerning this report.

Thanks, Cindy

Cindy Hurtado
Environmental Coordinator
Western Refining Southwest, Inc. - Bloomfield Refinery
cindy.hurtado@wnr.com
505-632-4161

Submit 3 Copies To Appropriate District Office <u>District I</u>	State of New Mexico Energy, Minerals and Natural Resou	Form C-103 May 27, 2004
1625 N. French Dr., Hobbs, NM 88240 <u>District II</u> 1301 W. Grand Ave., Artesia, NM 88210 <u>District III</u> 1000 Rio Brazos Rd., Aztec, NM 87410 <u>strict IV</u>	OIL CONSERVATION DIVISI 1220 South St. Francis Dr. Santa Fe, NM 87505	5. Indicate Type of Lease  STATE FEE X  6. State Oil & Gas Lease No.
(DO NOT USE THIS FORM FOR PROPO	ICES AND REPORTS ON WELLS SALS TO DRILL OR TO DEEPEN OR PLUG BACK T CATION FOR PERMIT" (FORM C-101) FOR SUCH	7. Lease Name or Unit Agreement Name Disposal
PROPOSALS.)	Gas Well  OtherX (Disposal)	8. Well Number #001 9. OGRID Number
	fining Southwest, Inc. – Bloomfeld Refinery 87413	037218 10. Pool name or Wildcat Blanco/Mesa Verde
4. Well Location  Unit Letter I: 2442  Section 27  Pit or Below-grade Tank Application	feet from the South line and Township 29 Range 11  11. Elevation (Show whether DR, RKB, RT, por Closure	NMPM County San Juan
	raterDistance from nearest fresh water well	Distance from nearest surface water
Pit Liner Thickness: mil	Below-Grade Tank: Volume Appropriate Box to Indicate Nature of	bbls: Construction Material
NOTICE OF IN PERFORM REMEDIAL WORK TEMPORARILY ABANDON TO THE POLICY OR ALTER CASING	ITENTION TO: PLUG AND ABANDON  REMED CHANGE PLANS  COMME	SUBSEQUENT REPORT OF: IAL WORK
THER	□ OTHER:	: Well Stimulation/Acidize Well
		etails, and give pertinent dates, including estimated date tions: Attach wellbore diagram of proposed completion
on the Class I Injection well referen September 15, 2009 – Coil tubing of HCL across the perforations – shut September 16, 2009 – Dropped 350	ced above.  lean out was performed. Tagged bottom at 352 in the well.  1.18 specific gravity "bio" balls – pumped in 28 bbls. of 2% KCL water. Shut in the well f	nery performed well stimulation/acidization procedures 20° – circulated hole clean – spotted 200 gallons of 15% 4000 gallons of 15% HCL with corrosion inhibitor and for 1 hour 45 minutes. Flowed back 870 bbls to frac
I hereby certify that the information	above is true and complete to the best of my leading to NMOCD guidelines \( \sqrt{1} \), a general	Knowledge and belief. I further certify that any pit or below- permit □ or an (attached) alternative OCD-approved plan □.
		ntal CoordinatorDATE9/17/09
pe or print name Cindy Hurtado		
APPROVED BY:  Conditions of Approval (if any):	TITLE	DATE

Submit 3 Copies To Appropriate District	State of New Me	exico		Form C-103
Office <u>District I</u>	Energy, Minerals and Natu	iral Resources	Living Living	May 27, 2004
1625 N. French Dr., Hobbs, NM 88240. District II		•	WELL API NO. 30-045-29002-00	
1301 W. Grand Ave., Artesia, NM 88210	OIL CONSERVATION		5. Indicate Type of Lea	356
<u>District III</u> 1000 Rio Brazos Rd., Aztec, NM 87410	1220 Söuth St. Frai		STATE	FEE X
<u>District IV</u>	Santa Fe, NM 81	7505	6. State Oil & Gas Lea	
(220 S. St. Francis Dr., Santa Fe, AM (7505			N/A	
		UG BACK TO A	7. Lease Name or Unit Disposal	Agreement Name
PROPOSALS.)			8. Well Number #001	
I. Type of Well; Oil Well G	is Well [ OtherX (Disposal)			
<ol> <li>Name of Operator</li> <li>San Juan Refining Co/Western Refini</li> </ol>	nu Sputhwast Inc. Disamfuld	Patinary	9. OGRID Number 037218	
3. Address of Operator	ng Southwest, me Bloomfeld	Kermery	10. Pool name or Wild	cat
#50 Road 4990 Bloomfield, NM 87-	413		Blanco/Mesa Verde	
4. Well Location			,	
	t from the South	line and 1250 G	et from the East 1	ine
Section 27		TI NMP		
	11. Elevation (Show whether DR			
	11. The vactor (Short whenler Est	, KKB, KT, OK, EK		
it or Below-grade Tank Application 🗌 or C	losure 🗌		Desire services and a service service service service services services and a service service service service service services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services services se	Personal State of the Parish Control of Parish State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of State of S
rit type Depth to Groundwate:	r Distance from nearest fresh v	vater well Di	stance from nearest surface wa	ter
it Liner Thickness; mil	Below-Grade Tank: Volume	bbls; (	onstruction Material	
12 Chack Ap	propriate Box to Indicate N	lature of Notice	Report or Other Data	1
	ENTION TO: PLUG AND ABANDON   CHANGE PLANS	REMEDIAL WOR	BSEQUENT REPOR RK □ ALT RILLING OPNS.□ PAR	ERING CASING 🔲
	MULTIPLE COMPL	CASING/CEMEN		
OTHER: Radioactive Tracer Test/M		OTHER:		
<ol> <li>Describe proposed or complet of starting any proposed work or recompletion.</li> </ol>	ed operations. (Clearly state all.). SEE RULE 1103. For Multip	pertinent details, a ble Completions: A	nd give pertinent dates, in attach wellbore diagram of	Juding estimated da proposed completion
For the 5-year review of the permit and perform a Radioactive Tracer test to as efferenced above. Two millicuries of As tentatively scheduled for September	sess the mechanical integrity of landimony B124 isotope will be a	the coment behind	the casing on the Class I in	njection well
Bloomfield Refinery also requests pert ntegrity Test on September 24, 2009.	mission to perform the annual Hi	gh Pressure Shutdo	own Test, Bradenhead Tes	t, and Mechanical
hereby certify that the information ab				
SIGNATURE Condy Has				
Type or print name   Cindy Hurtado For State Use Only			Telephone No. (505)0	
APPROVED BY: Lee J. C. Conditions of Approval (if any):	house TITLE	Env. Engr.	DA	TE 9/18/69

#### Hurtado, Cindy

From:

Hurtado, Cindy

Sent:

Monday, September 28, 2009 3:43 PM

To:

Chavez, Carl J, EMNRD; 'Roberts, Kelly G, EMNRD'; Schmaltz, Randy

Cc:

Kuehling, Monica, EMNRD; Krakow, Bob

Subject:

UICI-9 - Follow Up C-103 - Radioactive Tracer Test-MIT

Attachments: C103 Radioactive Test-MIT Follow Up.pdf; Western Refining Western Refining SWD #1.tif

#### Good Afternoon.

Please find attached the follow up C103 for the Radioactive Tracer Test and MIT performed on Bloomfield Refinery's Class I Injection Well (UICI-9). Also, please find attached an electronic copy of the GR/CCL log that was produced during the Radioactive Tracer Test. Please contact me if you have questions.

Thanks, Cindy

Cindy Hurtado
Environmental Coordinator
Western Refining Southwest, Inc. - Bloomfield Refinery
cindy.hurtado@wnr.com
505-632-4161

Submit 3 Copies To Appropriate District Office	State of New Mexico	Form C-103
District [	Energy, Minerals and Natural Resources	May 27, 2004
1625 N. French Dr., Hobbs, NM 88240 District H		WELL API NO.
1301 W. Grand Ave., Artesia, NM 88210	OIL CONSERVATION DIVISION	30-045-29002-00  5. Indicate Type of Lease
District III	1220 South St. Francis Dr.	STATE THE XT
1000 Rio Brazos Rd., Aztec, NM 87410 Digmet IV	Santa Fe, NM 87505	6. State Oil & Gas Lease No.
1220 S. St. Francis Dr., Santa Fe, NM		N/A
87505	ICES AND REPORTS ON WELLS	7. Lease Name or Unit Agreement Name
(DO NOT USE THIS FORM FOR PROPO	ISALS TO DRIEL OR TO DEEPEN OR PLUG BACK TO A CATION FOR PERMIT" (FORM C-101) FOR SUCH	Disposal
1	Gas Well [ OtherX (Disposal)	8. Well Number #001
2. Name of Operator		9. OGRID Number
	fining Southwest, Inc Bloomfeld Refinery	037218
3. Address of Operator	00.10	10. Pool name or Wildcat
#50 Road 4990 Bloomfield, NM	87413	Bianco/Mesa Verde
4. Well Location		
Unit Letter I: 2442	feet from the South line and 1250 fee	et from theEastline
Section 27	Township 29 Range 11 NMPN	
	11. Elevation (Show whether DR, RKB, RT, GR, etc.)	
Pit or Below-grade Tank Application [] o		
Pit type Depth to Groundw	aterDistance from nearest fresh water wellDist	
Pit Liner Thickness: mil	Below-Grade Tank: Volume bbis: Co	onstruction Material
12. Check A	Appropriate Box to Indicate Nature of Notice,	Report or Other Data
NOTICE OF IN	ITENTION TO: SUB	SEQUENT REPORT OF:
PERFORM REMEDIAL WORK		
TEMPORARILY ABANDON		LLING OPNS. P AND A
PULL OR ALTER CASING	MULTIPLE COMPL CASING/CEMEN	T JOB
OTHER []		oactive Tracer Test/MIT/BadenheadTest
13 Describe proposed or comp		d give portinent dates, including estimated date
	ork). SEE RULE 1103. For Multiple Completions: Att	
or recompletion.	,	
,		
Western Refining Southwest, Inc	Bloomfield Refinery performed a Radioactive Tracer to nica Kuchling of NMOCD-Aztec witnessed all proceed	est on September 23, 2009 on the Class I
Scandium (Sc. 46) was injected down	phole and flushed with 5000 gallons of water. A Gamm	a Ray correlation log was run from 3506' to
the surface. Two passes (up and dow	n) were logged. The logs indicate that most of the perfo	orated intervals are taking fluid. There were
spurious spikes above the packer wh	ich are usually associated with tubing collars. These sp	ikes indicated that there was still some
radioactive material hung up in the ti		
	annual High Pressure Shutdown Test, Bradenhead Test,	
24, 2009. All tests were witnessed by	y Monica Kuehling of NMOCD-Aztec. The MIT held a	it 580 psi for 30 minutes.
I hereby certify that the information a grade track has been/will be constructed or	above is true and complete to the best of my knowledge closed according to NMOCD guidelines [], a general permit [] o	e and belief. I further certify that any pit or below- or an (attached) alternative OCD-approved plan
SIGNATURE Condy Hunt	ado TITLE Environmental Coord	dinatorDATE9/28/09
Type or print name Cindy Hurtado For State Use Only	E-mail address: cindy.hurtado@wnr.com	Telephone No. (505)632-4161
of State Cae Only		
APPROVED BY:	TITLE	DATE
Conditions of Approval (if any):	TITLE	

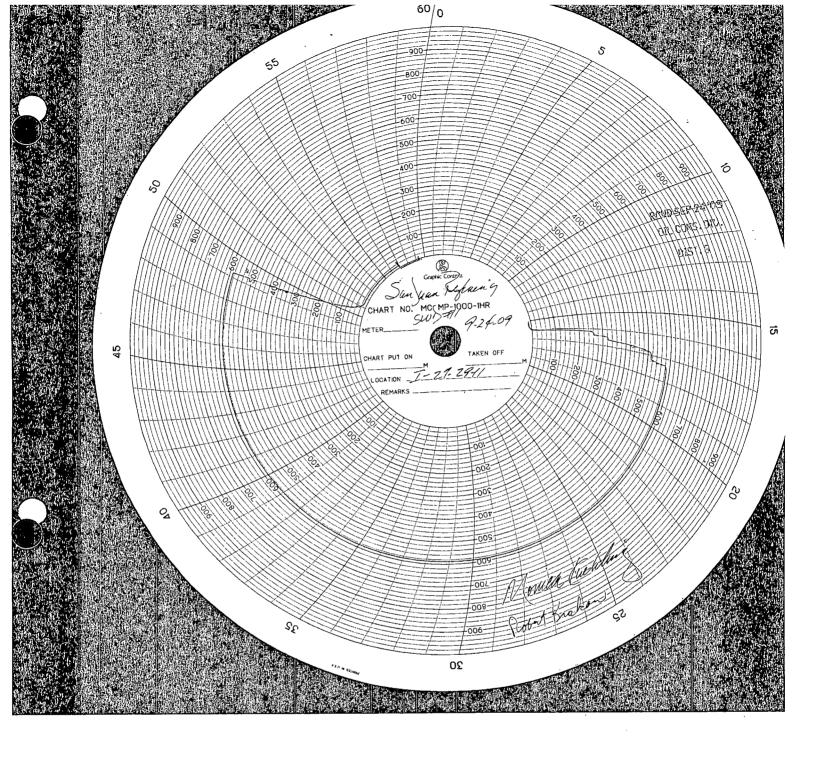


# NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

# MECHANICAL INTEGRITY TEST REPORT

	(TA OR UIC)	
Date of Test 9-24-09	Operator Sun Juun	Location: Unit Sec 7Twn 29 Rge 1/
Property Name Swi	Well #/	Location: Unit Sec 7Twn 29Rge //
Land Type:  State Federal Private Indian	Well? BND-528	Type:  Water Injection  Salt Water Disposal  Gas Injection  Producing Oil/Gas  Pressure obervation
Temporarily Abandoned Well (Y/N	) TA E	xpires:
Casing Pres.  Bradenhead Pres.  Tubing Pres.  Int. Casing Pres.  Pressured annulus up to	Tbg. SI Pres Tbg. Inj. Pres	RCVD SEP 24 'OS OIL CONS. DIV. DIST. 3
REMARKS:		
	01	
By Cofet Known (Operator Representative)	Witness // / //	(NMOCD)
(Position)		Revised 02-11-02

Oil Conservation Division * 1000 Rio Brazos Road * Aztec, New Mexico 87410 Phone: (505) 334-6178 * Fax (505) 334-6170 * <a href="http://www.emnrd.statc.nm.us">http://www.emnrd.statc.nm.us</a>





# NEW MEXICO ENERGY, MINIERALS & NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
AZTEC DISTRICT OFFICE
1000 RIO BRAZOS ROAD
AZTEC NM 87410
(505) 334-6178 FAX: (505) 334-6170
http://emord.state.nm.us/ocd/District.lil/3distric.htm

# BRADENHEAD TEST REPORT

(submit 1 copy to above address)

Date of Test 9 2	4,09 Operato	or San yan Cal.	API #30-0 <u>45.39002</u>
Property Name <u>Swf</u>	Well No	Location: Unit	Section <u>37</u> Township <u>39</u> Range //
Well Status(Shut-In or Pro	oducing) Initial PSI: T	ubing Intermediate	VA Casing 16 Bradenhead 0
OPEN BRADENHEAD A	AND INTERMEDIATE	TO ATMOSPHERE INDI	VIDUALLY FOR 15 MINUTES EACH
PRES Testing Bradenhead BH Int Csg	SURE INTERM Int Csg		OW CHARACTERISTICS NHEAD INTERMEDIATE
TIME 5 min		Steady Flow	
10 min		Surges	
15 min		Down to Nothing	
20 min		Nothing	
25 min		Gas	RCUD SEP 24 '09
30 min		Gas & Water	OIL CONS. DIV.
-		Water	DIST. 3
If bradenhead flowed water, c	heck all of the description	ns that apply below:	
CLEAR FRES	SH SALTY	SULFURBLACK	,
5 MINUTE SHUT-IN PRESSUREMARKS:	u <b>re</b> bradenhe. um JM J	AD () INTER	,
1. ND 00.			
		1 A	
By Vobert Krak	Eon "	Vitness / Ouila (	Luliling
(Position)			
E-mail address			
	•	•	



#### **COVER LETTER**

Thursday, February 12, 2009

Cindy Hurtado Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4161 FAX (505) 632-3911

RE: Injection Well 1st QTR 1/28/09

Dear Cindy Hurtado:

Order No.: 0901396

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 1/29/2009 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Business Manager Nancy McDuffie, Laboratory Manager

NM Lab # NM9425 AZ license # AZ0682 ORELAP Lab # NM100001 Texas Lab# T104704424-08-TX



Date: 12-Feb-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0901396

Project:

Injection Well 1st QTR 1/28/09

Lab ID:

0901396-01

Client Sample ID: Injection Well

Collection Date: 1/28/2009 10:30:00 AM

Date Received: 1/29/2009

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Unit	s <b>D</b> F	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: RAG
Chloride	1700	10	mg/L	100	2/10/2009 12:29:01 AM
Sulfate	490	5.0	mg/L	10	2/6/2009 1:04:51 PM
EPA METHOD 7470: MERCURY	,			•	Analyst: SNV
Mercury	0.00021	0.00020	mg/L	1	2/3/2009 2:37:47 PM
EPA 6010B: TOTAL RECOVERABLE	METALS				Analyst: TES
Arsenic	ND	0.020	mg/L	1	2/3/2009 7:14:21 PM
Barium	0.15	0.020	mg/L	1	2/3/2009 7:14:21 PM
Cadmium	ND	0.0020	mg/L	1	2/3/2009 7:14:21 PM
Calcium	92	1.0	mg/L	· 1	2/3/2009 7:14:21 PM
Chromium	ND	0.0060	mg/L	. 1	2/3/2009 7:14:21 PM
Lead	ND	0.0050	mg/L	1	2/3/2009 7:14:21 PM
Magnesium	. 25	1.0	mg/L	1 "	2/3/2009 7:14:21 PM
Potassium	15	1.0	mg/L	1	2/3/2009 7:14:21 PM
Selenium	ND	0.050	mg/L	1	2/3/2009 7:14:21 PM
Silver	ND	0.0050	mg/L	1	2/3/2009 7:14:21 PM
Sodium	740	10	mg/L	. 10	2/3/2009 10:34:51 PM
EPA METHOD 8270C: SEMIVOLATILE	ES			· ·	Analyst: JDC
Acenaphthene	ND	50	μg/L	1	2/2/2009
Acenaphthylene	ND	50	μg/L	.1	2/2/2009
Anlline	60	50	μg/L	1	2/2/2009
Anthracene	ND	50	μg/L	1	2/2/2009
Azobenzene	ND	50	µg/L	1	2/2/2009
Benz(a)anthracene	ND	50	μg/L	1	2/2/2009
Benzo(a)pyrene	ND	50	μg/L	. 1	2/2/2009
Benzo(b)fluoranthene	ND	50	μg/L	. 1 .	2/2/2009
Benzo(g,h,i)perylene	, ND	50	μg/L	1	2/2/2009
Benzo(k)fluoranthene	. ND	50	μg/L	1.	2/2/2009
Benzoic acid	ND	100	µg/L	1	2/2/2009
Benzyl alcohol	ND	50	μg/L	1	2/2/2009
Bis(2-chloroethoxy)methane	ND	50	µg/L	1	2/2/2009
Bis(2-chloroethyl)ether	· ND	50	μg/L	1 -	2/2/2009
Bis(2-chloroisopropyl)ether	ND	50	μg/L	, 1	2/2/2009
Bis(2-ethylhexyl)phthalate	ND	50	μg/L	1	2/2/2009
4-Bromophenyl phenyl ether	ND	50	μg/L	1	2/2/2009
Butyl benzyl phthalate	ND	50	μg/L	. 1	2/2/2009
Carbazole	ND ·	50	μg/L	1	2/2/2009
4-Chloro-3-methylphenol	ND	50	μg/L	. 1	2/2/2009
4-Chloroaniline	ND	50	μg/L	1	2/2/2009
2-Chloronaphthalene	ND	50	μg/L	1	2/2/2009

Qualifiers:

- Value exceeds Maximum Contaminant Leve!
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 1 of 7

Date: 12-Feb-09



CLIENT:

Western Refining Southwest, Inc.

Client Sample ID: Injection Well

Lab Order:

0901396

Collection Date: 1/28/2009 10:30:00 AM

Project:

Injection Well 1st QTR 1/28/09

Date Received: 1/29/2009

Lab ID:

0901396-01

Matrix: AQUEOUS

Analyses	Result	PQL Qı	ial Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLAT	ILES			· · · · · · · · · · · · · · · · · ·	Analyst: JD0
2-Chlorophenol	· ND	50	μg/L	1	2/2/2009
4-Chlorophenyl phenyl ether	ND	50	μg/L	1	2/2/2009
Chrysene	ND	50	μg/L	1	2/2/2009
Di-n-butyl phthalate	ND	50	μg/L	1	2/2/2009
Di-n-octyl phthalate	ND	50	μ <b>g/L</b>	1	2/2/2009
Dibenz(a,h)anthracene	ND	50	μg/L	1	2/2/2009
Dibenzofuran	·· ND	50	μg/L	1	2/2/2009
1,2-Dichlorobenzene	ND	50	µg/L	-1	2/2/2009
1,3-Dichlorobenzene	ND	50	μg/L	1	2/2/2009
1,4-Dichlorobenzene	ND	50	μg/L	1	2/2/2009
3,3'-Dichlorobenzidine	ND	50	μg/L	1	2/2/2009
Diethyl phthalate .	ND	50	µg/L	1	2/2/2009
Dimethyl phthalate	ND	50	µg/L	1	2/2/2009
2,4-Dichlorophenol	ND	100	μg/L	1	2/2/2009
2,4-Dimethylphenol	ND	50	µg/L	1	2/2/2009
4,6-Dinitro-2-methylphenol	~ ND	100	µg/L	1	2/2/2009
2;4-Dinitrophenol	ND	100	µg/L	1	2/2/2009
2,4-Dinitrotoluene	ND	50	µg/L	1	2/2/2009
2,6-Dinitrotoluene	ND	50	μg/L	1	2/2/2009
Fluoranthene	ND	50	μg/L	1	2/2/2009
Fluorene	ND	50	µg/L	1	2/2/2009
Hexachlorobenzene	<b>N</b> D	50	ug/L	1	2/2/2009
Hexachlorobutadiene	ND	50	μg/L	1	2/2/2009
Hexachlorocyclopentadiene	ND	50	μg/L	1	2/2/2009
Hexachloroethane	ND	50	μg/L	1	2/2/2009
Indeno(1,2,3-cd)pyrene	ND.	50	μg/L	1	2/2/2009
Isophorone	ND	50	µg/L	1	2/2/2009
2-Methylnaphthalene	ND	50	μg/L	1	2/2/2009
2-Methylphenol	120	50	μg/L	1	2/2/2009
3+4-Methylphenol	120	50	ug/L	1	2/2/2009
N-Nitrosodi-n-propylamine	ND	50	μg/L	1	2/2/2009
N-Nitrosodimethylamine	NÐ	50	μg/L	1	2/2/2009
N-Nitrosodiphenylamine	ND	50	μg/L	, 1	2/2/2009
Naphthalene	ND	50	µg/L	1	2/2/2009
2-Nitroaniline	ND	50	µg/L	1	2/2/2009
3-Nitroaniline	ND	50	μg/L	1	2/2/2009
4-Nitroaniline	ND	50	μg/L	1	2/2/2009
Nitrobanzena	ND	50	µg/L	1	2/2/2009
2-Nitrophanol	ND	50	µg/L	1	2/2/2009
I-Nitrophenol	ND	50	μg/L	1	2/2/2009
Pentachlorophenol	ND	100	μg/L	1	2/2/2009
Phenanthrene	ND	50	μg/L	1	2/2/2009



- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 2 of 7



Date: 12-Feb-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0901396

Injection Well 1st QTR 1/28/09

Project:
Lab ID:

0901396-01

Client Sample ID: Injection Well

Collection Date: 1/28/2009 10:30:00 AM

Date Received: 1/29/2009

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATIL	ES			****	Analyst: JDC
Phenol	ND	50	μg/L	1	2/2/2009
Pyrene	, ND	50	μg/L	1	2/2/2009
Pyridine	ND	50	µg/L	1 1	2/2/2009
1,2,4-Trichlorobenzene	ND	50	<b>ր</b> g/L	1	2/2/2009
2,4,5-Trichlorophenol	ND	50	μġ/L	1	2/2/2009
2,4,6-Trichlorophenol	ND	50	µg/L	1	2/2/2009
Surr: 2,4,6-Tribromophenol	69.8	16.6-150	%REC	1	2/2/2009
Surr: 2-Fluorobiphenyl	45.2	19.6-134	%REC	1	2/2/2009
Surr: 2-Fluorophenol	33.0	9.54-113	%REC	1	2/2/2009
Surr: 4-Terphenyl-d14	54.0	22.7-145	%REC	1 .	2/2/2009
Surr: Nitrobenzene-d5	45.2	14.6-134	%REC	1	2/2/2009
Surr: Phenol-d5	25.5	10.7-80.3	%REC	1	2/2/2009
EPA METHOD 8260B: VOLATILES					Analyst: HL
Benzene	11	1.0	μg/L	1	1/29/2009 8:43:18 PM
Toluene	16	1.0	μg/L	1	1/29/2009 8:43:18 PM
Ethylbenzene	1.8	1.0	μg/L	1	1/29/2009 8:43:18 PM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,2,4-Trimethylbenzene	6.6	1.0	µg/L	1	1/29/2009 8:43:18 PM
1,3,5-Trimethylbenzene	, 2.6	1.0	µg/L	1	1/29/2009 8:43:18 PM
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,2-Dibromoethane (EDB)	ND.	1.0	μg/L	1	1/29/2009 8:43:18 PM
Naphthalene	6.8	2.0	μg/L	1	1/29/2009 8:43:18 PM
1-Methylnaphthalene	9.2	4.0	μg/L	1	1/29/2009 8:43:18 PM
2-Methylnaphthalene	12	4.0	μg/L	. 1	1/29/2009 8:43:18 PM
Acetone	2700	200	μg/L	. 20	1/31/2009 3:01:14 PM
Bromobenzene	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
Bromodichloromethane	ND	1.0	μg/L	1.	1/29/2009 8:43:18 PM
Bromoform	ND	1.0	µg/L	4 -	1/29/2009 8:43:18 PM
Bromomethane	ND	1.0	μg/L	. 1	1/29/2009 8:43:18 PM
2-Butanone	190	50	μg/L	5	1/31/2009 3:31:10 PM
Carbon disulfide	42	. 10	· μg/L	. 1	1/29/2009 8:43:18 PM
Carbon Tetrachloride	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
Chlorobenzene	ND	1.0	µg/L	1	1/29/2009 8:43:18 PM
Chloroethane	. ND	2.0	μg/L	1	1/29/2009 8:43:18 PM
Chloroform	,ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
Chloromethane	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
2-Chlorotoluene	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
4-Chlorotoluene	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
cis-1,2-DCE	ND	1.0	µg/L	1	1/29/2009 8:43:18 PM
cis-1,3-Dichtoropropene	ND	1.0	μg/L	· 1	1/29/2009 8:43:18 PM
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	1/29/2009 8:43:18 PM

#### Qualifiers:

- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 3 of 7



Date: 12-Feb-09



Western Refining Southwest, Inc.

Lab Order:

0901396

Injection Well 1st QTR 1/28/09

Project: Lab ID:

0901396-01

Client Sample ID: Injection Well

Collection Date: 1/28/2009 10:30:00 AM

Date Received: 1/29/2009

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	······································			<del></del>	Analyst: HL
Dibromochloromethane	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
Dibromomethane	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,2-Dichlorobenzene	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,3-Dichlorobenzene	. ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,4-Dichlorobenzene	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
Dichlorodifluoromethane	· ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,1-Dichloroethane	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,1-Dichloroethene	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,2-Dichloropropane	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,3-Dichloropropane	ND	1.0	µg/L	1	1/29/2009 8:43:18 PM
2,2-Dichloropropane	ND	2.0	μg/L	1	1/29/2009 8:43:18 PM
1,1-Dichloropropene	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
Hexachlorobutadiene	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
2-Hexanone	ND	10	µg/L	1	1/29/2009 8:43:18 PM
Isopropylbenzene	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
4-Isopropyltoluene	ND	1.0	µg/L	1	1/29/2009 8:43:18 PM
4-Methyl-2-pentanone	ND	10	μg/L	1	1/29/2009 8:43:18 PM
Methylene Chloride	ND	3.0	μg/L	1	1/29/2009 8:43:18 PM
n-Butylbenzene	1.1	1.0	μg/L	1	1/29/2009 8:43:18 PM
n-Propylbenzene	· ND	1.0	µg/L	1	1/29/2009 8:43:18 PM
sec-Butylbenzene	ND	1.0	µg/L	1	1/29/2009 8:43:18 PM
Styrene	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
tert-Butylbenzene	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,1,1,2-Tetrachlorosthane	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	1/29/2009 8:43:18 PM
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
trans-1,2-DCE	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
trans-1,3-Dichloropropene	ND	. 1.0	μg/L	- 1	1/29/2009 8:43:18 PM
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,2,4-Trichlorobenzene	ND	1.0	μg/L	. 1	1/29/2009 8:43:18 PM
1,1,1-Trichloroethane	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,1,2-Trichloroethane	ND	1.0	µg/L	1	1/29/2009 8:43:18 PM
Trichloroethene (TCE)	ND	1.0	µg/L	1	1/29/2009 8:43:18 PM
Trichtorofluoromethane	ND	1.0	μg/L	1	1/29/2009 8:43:18 PM
1,2,3-Trichloropropane	ND	2.0	μg/L	1	1/29/2009 8:43:18 PM
Vinyl chloride	ND	1.0	µg/L	1	1/29/2009 8:43:18 PM
Xylenes, Total	18	1.5	μg/L	1	1/29/2009 8:43:18 PM
Surr: 1,2-Dichloroethane-d4	111	68.1-123	%REC	1	1/29/2009 8:43:18 PM
Surr: 4-Bromofluorobenzene	93.0	53.2-145	%REC	1	1/29/2009 8:43:18 PM
Surr: Dibromofluoromethane	104	68.5-119	%REC	1	1/29/2009 8:43:18 PM
Surr: Toluene-d8	109	64-131	%REC	1	1/29/2009 8:43:18 PM



- Value exceeds Maximum Contaminant Level
- E Estimated value
- Analyte detected below quantitation limits
- Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
  - RL Reporting Limit

Page 4 of 7

Date: 12-Feb-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order: Project: 0901396

r: 0901.

Injection Well 1st QTR 1/28/09

Lab ID:

0901396-01

Client Sample ID: Injection Well

Collection Date: 1/28/2009 10:30:00 AM

Date Received: 1/29/2009

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	$\mathbf{DF}$	Date Analyzed
SM 2320B: ALKALINITY					Analyst: KMS
Alkalinity, Total (As CaCO3)	540	40	mg/L CaCO3	2	2/4/2009
Carbonate	·ND	4.0	mg/L CaCO3	2	2/4/2009
Bicarbonate	540	. 40	mg/L CaCO3	2	2/4/2009
EPA 120.1: SPECIFIC CONDUCTANCE					Analyst: KMS
Specific Conductance	6700	0.010	μmhos/cm	1	2/5/2009
SM4500-H+B: PH					Analyst: KMS
pH'	7.56	0.1	pH units	1	1/29/2009
SM 2540 C: TOTAL DISSOLVED SOLIDS					Analyst: <b>KMS</b>
Total Dissolved Solids	3800	100	mg/L	1	1/29/2009

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 5 of 7

Date: 12-Feb-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order: Project:

Lab ID:

0901396

Injection Well 1st QTR 1/28/09

0901396-02

Client Sample ID: TRIP BLANK

Collection Date:

onection Date.

Date Received: 1/29/2009

Matrix: TRIP BLANK

Analyses	Result	PQL Q	ual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	····				Analyst: HL
Benzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
Toluene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
Ethylbenzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1 ·	1/29/2009 9:12:26 PM
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PN
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,2-Dichloroethane (EDC)	ND	1.0	µg/L	1	1/29/2009 9:12:28 PM
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	· 1	1/29/2009 9:12:26 PN
Naphthalene	ND	2.0	µg/L	1	1/29/2009 9:12:26 PM
1-Methylnaphthalene	ND	4.0	μg/L	1	1/29/2009 9:12:26 PM
2-Methylnaphthalene	ND	4.0	μg/L	1	1/29/2009 9:12:26 PM
Acetone	ND	10	μg/L	1	1/29/2009 9:12:26 PM
Bromobenzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
Bromodichloromethane	ND	1.0	µg/L	1	1/29/2009 9:12:26 PM
Bromoform	ND	1.0	µg/L	1	1/29/2009 9:12:26 PM
Bromomethane	. ND	1.0	µg/L	1	1/29/2009 9:12:26 PM
2-Butanone	ND	10	µg/L	1	1/29/2009 9:12:26 PM
Carbon disulfide	ND	10	μg/L	1	1/29/2009 9:12:26 PM
Carbon Tetrachloride	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
Chlorobenzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
Chloroethane	ND	2.0	µg/L	1	1/29/2009 9:12:26 PM
Chloroform	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
Chloromethane	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
2-Chlorotoluene	ND	1.0	µg/L	1	1/29/2009 9:12:26 PM
4-Chlorotoluene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
cis-1,2-DCE	ND	1.0	µg/L	1	1/29/2009 9:12:26 PM
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,2-Dibromo-3-chloropropane	<b>N</b> D	2.0	μg/L	1	1/29/2009 9:12:26 PM
Dibromochloromethane	ND	1.0	µg/L	1	1/29/2009 9:12:26 PM
Dibromomethane	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,2-Dichlorobenzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,3-Dichlorobenzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,4-Dichlorobenzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
Dichlorodifluoromethane	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,1-Dichloroethane	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,1-Dichloraethene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,2-Dichloropropane	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,3-Dichloropropane	ND	1.0	µg/L	1	1/29/2009 9:12:26 PM
2,2-Dichloropropane	ND	2.0	µg/L	1	1/29/2009 9:12:26 PM
1,1-Dichloropropene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
Hexachlorobutadiene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
2-Hexanone	ND	10	µg/L	1	1/29/2009 9:12:26 PM

Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 6 of 7

Date: 12-Feb-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0901396

der: 090139

Injection Well 1st QTR 1/28/09

Project: Lab ID:

0901396-02

Client Sample ID: TRIP BLANK

Collection Date:

Date Received: 1/29/2009

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	· · · · · · · · · · · · · · · · · · ·			·····	Analyst: HL
Isopropylbenzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
4-Isopropyitoluene	ND	1.0	μg/L	. 1	1/29/2009 9:12:26 PM
4-Methyl-2-pentanone	ND	. 10	μg/L	1	1/29/2009 9:12:26 PM
Methylene Chloride	ND	3.0	μg/L	1	1/29/2009 9:12:26 PM
n-Butylbenzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
n-Propylbenzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
sec-Butylbanzene	ND	1.0	µg/L	1	1/29/2009 9:12:26 PM
Styrene	ND	1.0	µg/L	1	1/29/2009 9:12:26 PM
tert-Butylbenzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1 .	1/29/2009 9:12:26 PM
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	1/29/2009 9:12:26 PM
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
trans-1,2-DCE	ND	1.0	μg/L	. 1	1/29/2009 9:12:26 PM
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,2,3-Trichlorobenzene	, ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,1,1-Trichloroethane	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
1,1,2-Trichloroethane	ND	1.0	μg/L	1	1/29/2009 9:12:26 PM
Trichloroethene (TCE)	ND	1.0	μ <b>g/L</b>	1	1/29/2009 9:12:26 PM
Trichlorofluoromethane	ND ·	1.0	μg/L	.1	1/29/2009 9:12:26 PM
1,2,3-Trichloropropane	ND	2.0	μg/L	1	1/29/2009 9:12:26 PM
Vinyl chloride	ND	1.0	µg/L	.1	1/29/2009 9:12:26 PM
Xylenes, Total	ND	1.5	μg/L	1	1/29/2009 9:12:26 PM
Surr: 1,2-Dichloroethane-d4	99.6	68.1-123	%REC	1	1/29/2009 9:12:26 PM
Surr: 4-Bromofluorobenzene	98.2	53.2-145	%REC	. 1	1/29/2009 9:12:26 PM
Surr: Dibromofluoromethane	96.5	68.5-119	%REC	1	1/29/2009 9:12:26 PM
Surr: Toluene-d8	104	64-131	%REC	1	1/29/2009 9:12:26 PM

One	otif	ìers:
Vu		1010.

Value exceeds Maximum Contaminant Level

Page 7 of 7



E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

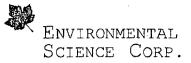
S Spike recovery outside accepted recovery limits

B Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

MCL Maximum Contaminant Level

RL Reporting Limit



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

February 05, 2009

Anne Thorne Hall Environmental Analysis Laborat 4901 Hawkins NE

Albuquerque, NM 87109

Date Received

January 0901396

30, 2009

ESC Sample # : L385818-01

Description

Site ID :

Sample ID

INJECTION WELL

Project # :

0901396

Collected By

Collection Date :

01/28/09 10:30

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Corrosivity	Non-Corrosive			9040C	02/04/09	1
Flashpoint	See Footnote		deg F	D93/1010A	02/02/09	1
Reactive CN (SW846 7.3.3.2)	BDL	0.125	mg/l	9012B	02/04/09	1
Reactive Sulf. (SW846 7.3.4.1)	BDL	25.	mg/l	9034/9030B	02/02/09	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC.

. Reported: 02/05/09 09:47 Printed: 02/05/09 09:48 L38\$818-01 (FLASHPOINT) - Did Not Flash @170f

Date: 12-Feb-09

## QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st QTR 1/28/09

Work Order:

0901396

Analyte 	Result	Units	PQL	%Rec	LowLimit HighLimit	%RPD RP	DLimit Qual
Method: EPA Method 300.0: A	nions						
Sample ID: MB		MBLK			Batch ID: R323	35 Analysis Date:	2/6/2009 9:01:08 AM
Chloride	ND	mg/L	0.10				
Sulfate	ND	mg/L	0.50				
Sample ID: MB-2		MBLK			Batch ID; R323	35 Analysis Date:	2/7/2009 3:35:14 AM
Chloride	ND	mg/L	0.10				
Sulfate	ND	mg/L	0.50				
Sample ID: MB		MBLK			Batch ID: R323	55 Analysis Date:	2/9/2009 10:16:02 AM
Chloride	ND	mg/L	0.10			•	
Sulfate	ND	mg/L	0.50		4		
Sample ID: LCS		LCS			Batch ID: R323	55 Analysis Date:	2/6/2009 9:18:33 AM
Chloride	4.976	mg/L	0.10	99.5	90 110		
Sulfate	10.16	mg/L	0.50	102	90 110	• .	
Sample ID: LCS-2		LCS			Batch ID: R323	15 Analysis Date:	2/7/2009 3:52:39 AM
Chloride	4.881	mg/L	0.10	97.6	90 110		•
Sulfate	9.984	mg/L	0.50	99.8	90 110		
Sample ID: LCS		LCS			Batch ID: R323	55 Analysis Date:	2/9/2009 10:33:26 AM
Chloride	4.873	mg/L	0.10	97.5	90 110	•	
Sulfate	10.06	mg/L	0.50	101	90 110	·	
Wethod: SM 2320B: Alkalinity						•	
Sample ID: MB		MBLK			Batch ID: R322	6 Analysis Date:	2/4/2009
Alkalinity, Total (As CaCO3)	ND	mg/L CaC	20		·	•	
Carbonate	ND	mg/L CaC	2.0				
Bicarbonate	ND	mg/L CaC	20				
Sample ID: LCS		LCS			Batch ID: R322	6 Analysis Date:	2/4/2009
Alkalinity, Total (As CaCO3)	85.00	mg/L CaC	20	104	80 120		A Section 1

Qua	lifiers:

E Estimated value

j Analyte detected below quantitation limits

· R RPD outside accepted recovery limits Н

Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits



**Date:** 12-Feb-09

### QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

ject:

Injection Well 1st QTR 1/28/09

Work Order:

0901396

Analyte	Result	Units	PQL	%Rec	LowLimit	Hig	hLimit	%RPD	RPDLimit	Qual	
Method: EPA Method 8270C	: Semivolatiles					10	45.55	A = 5 1 = 70			0/0/000
Sample ID: mb-18194		MBLK			Batch	ID:	18194	Analysis D	rate:		2/2/200
Acenaphthene	ND	µg/L	10								
Acenaphthylene	ND	µg/L	10								
Aniline	ND	µg/L	10								
Anthracene	ND	µg/L	10				*				
Azobenzene	ND	µg/L	10								
Benz(a)anthracene	ND	μg/L	10								
Benzo(a)pyrene	ND	µg/L	10								
Benzo(b)fluoranthene	ND	μg/L	10								
Benzo(g,h,i)perylene	ND	μg/L	10								
Benzo(k)fluoranthene	ND	μg/L	10								
Benzoic acid	ND	μg/L	20								
Benzyl alcohol	ND	μg/L	10								
Bis(2-chloroethoxy)methane	ND	µg/L	10								
Bis(2-chloroethyl)ether	ND	µg/L	10								
Bis(2-chloroisopropyl)ether	ND	μg/L	10								
Bis(2-ethylhexyl)phthalate	ND	μg/L	10								
4-Bromophenyl phenyl ether	ND	μg/L	10								
Butyl benzyl phthalate	ND	μg/L	10								
Carbazole	ND	μg/L	10								
4-Chloro-3-methylphenol	ND	μg/L	10	•							
hloroaniline	ND	μg/L	10								
nloronaphthalene	ND	μg/L	10								
2-Chlorophenol	ND	μg/L	10								
4-Chlorophenyl phenyl ether	ND	μg/L	10								
Chrysene	ND	μg/L	10								
Di-n-butyl phthalate	ND .	μg/L	10								
			10								
Di-n-octyl phthalate	ND	µg/L									
Dibenz(a,h)anthracene	ND	µg/L	10								
Dibenzofuran	ND	μg/L	10								
1,2-Dichlorobenzene	ND	μg/L "	10								
1,3-Dichlorobenzene	ND	μg/L	10								
1,4-Dichlorobenzene	ND	µg/L	10								
3,3'-Dichlorobenzidine	ND	µg/L	10								
Diethyl phthalate	ND	μg/L	10								
Dimethyl phthalate	ND	μg/L "	10								
2,4-Dichlorophenol	ND	µg/L	20								
2,4-Dimethylphenol	ND	µg/L	10								
4,6-Dinitro-2-methylphenol	ND	μg/L	20								
2,4-Dinitrophenol	ND	μg/L	20								
2,4-Dinitrotoluene	ND	μg/L 	10								
2,6-Dinitrotoluene	ND	μg/L	10								
Fluoranthene	ND	ug/L	10								
Fluorene	ND	µg/L	10								
Hexachlorobenzene	ND	μg/L	10								





Estimated value

Analyte detected below quantitation limits

RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

Project: Injection Well 1st QTR 1/28/09

Analyte detected below quantitation limits

RPD outside accepted recovery limits

Work Order:

0901396

Analyte	Result	Units	PQL	%Rec	LowLimit	HighL	.imit	%RPD	RPDLimit	Qual	
Method: EPA Method 82700	: Semivolatiles										
Sample ID: mb-18194		MBLK			Batch I	ID:	18194	Analysis D	ate:		2/2/2009
Hexachlorobutadiene	ND	µg/L	10								
Hexachlorocyclopentadiene	ND	µg/L	10								
Hexachloroethane	ND	μg/L	10								
Indeno(1,2,3-cd)pyrene	ND	μg/L	10	,							•
Isophorone	ND	μg/L	10								
2-Methylnaphthalene	ND	μg/L	10								
2-Methylphenol	ND	µg/L	10								
3+4-Methylphenol	ND	μg/L	10								
N-Nitrosodi-n-propylamine	ND	µg/L	10				•				
N-Nitrosodimethylamine	ND	μg/L	10							•	
N-Nitrosodiphenylamine	ND	μg/L	10				*				
Naphthalene	ND	μg/L	10								
2-Nitroaniline	ND	μg/L	10				~				
3-Nitroaniline	ND	µg/L	10								
4-Nitroaniline	ND	µg/L	10								
Nitrobenzene	ND	μg/L	.10								
2-Nitrophenol	ND	µg/L	10								
4-Nitrophenol	ND	μg/L	10								
Pentachlorophenol	ND	μg/L	20				•		•		
Phenanthrene	ND	μg/L	10								
Phenol	ND	µg/L	10								
Pyrene	ND	μg/L	10								
Pyridine	ND	µg/L	- 10								
1,2,4-Trichlorobenzene	ND	µg/L	10								
2,4,5-Trichlorophenol	ND	µg/L	10								
2,4,6-Trichlorophenol	ND	μg/L	10								
Sample ID: lcs-18194	,	LCS			Batch I	D:	18194	Analysis D	ate:		2/2/2009
•	64.00		40	66.0		123		•			
Acenaphthene 4-Chloro-3-methylpheno)	64.96 125,2	μg/L	10 10	65.0 62.6	11 15.4	119					
4-Chlorophenol	114.8	µg/L µg/L	10	57.4	12.2	122					
•	50.48		10	50.5	16.9	100					
1,4-Dichlorobenzene	70.42	µg/L µg/L	10	70.4	13	138					
2,4-Dinitrotoluene	70.42 59.14		10	59.1	9.93	122			•		
N-Nitrosodi-n-propylamine	92.52	µg/L µg/L	10	46.3	12.5	87.4					
4-Nitrophenol	92.92 144.4		20	72.2	3.55	114					
Pentachlorophenol		hg/L hg/L	10	37.4	7.53	73.1				*	
Phenol	74.86 60.86	hg/L	10	60.9	12.6	140					
Pyrene	50.20	μg/L	10	50.2	17.4	98.7					
1,2,4-Trichlorobenzene	50.20	LCSD	10	30.2	Batch I		18194	Analysis D	ete:		2/2/2009
Sample ID: 1csd-18194							10104	-			21212000
Acenaphthene	62.40	μg/L	10	62.4	11	123		4.02	30.5		
1-Chloro-3-methylphenol	127.2	µg/L	10	63.6	15.4	119		1.55	28.6		
2-Chlorophenol	113.1	μg/L	10	56.5	12.2	122		1.56	107		
1,4-Dichlorobenzene	49.72	μg/L	10	49.7	16.9	100		1.52	62.1		
2,4-Dinitrotoluene	71.28	μg/L	10	71.3	13	138		1.21	14.7		



Page 3

ND

Not Detected at the Reporting Limit

Spike recovery outside accepted recovery limits

Date: 12-Feb-09

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

icct: Injection Well 1st QTR 1/28/09

Work Order:

0901396

Analyte	Result	Units	PQL	%Rec	LowLimit	High	ıLimit	%RPD	RPDL	imit Qual
Wethod: EPA Method 8270C	: Semivolatiles							-		
Sample ID: Icsd-18194		LCSD			Batch I	ID;	18194	Analysis	Date:	2/2/200
N-Nitrosodi-n-propylamine	58.68	µg/L	10	58.7	9.93	12	2	0.781	30.3	
-Nitrophenol	96.82	μg/Ľ	10	48.4	12.5	87	.4	4.54	36.3	
entachiorophenol	153.2	μg/L	20	76.6	3.55	11	4	5.95	49	
Phenol	75.12	μg/L	10	37.6	7.53	73	.1	0.347	52.4	
yrene	65.42	μg/L	10	65.4	12.6	14	0	7.22	16.3	
,2,4-Trichlorobenzene	48.16	µg/L	10	48.2	17.4	98	.7	4.15	36.4	
lethod: EPA Method 7470: I	Mercury		•							
ample ID: MB-18218		MBLK			Batch I	D:	18218	Analysis	Date:	2/3/2009 2:10:52 F
lercury	ND	mg/L	0.00020							
iample ID: LCS-18218		LCS			Batch I	D:	18218	Analysis I	Date:	2/3/2009 2:12:36 P
fercury	0.004727	mg/L	0.00020	94.5	80	12	0 .			
lethod: EPA 6010B: Total R	ecoverable Met									
ample ID: MB-18221		MBLK			Batch I	D:	18221	Analysis I	Date:	2/3/2009 6:24:44 P
rsenic	ND	mg/L	0.020							
arium	ND	mg/L	0.010							
admium	ND	mg/L	0.0020							
alcium	ND	mg/L	0.50							
hromium	ND	mg/L	0.0060							
ad	ND	mg/L	0.0050							
pnesium	ND	mg/L	0.50							
otassium	ND	mg/L	1.0							
elenium	ND	mg/L	0.050							
lver	ND	mg/L	0.0050							
odium	ND	mg/L	0.50							
ample ID: LCS-18221		LCS			Batch I	D:	18221	Analysis I	Date:	2/3/2009 6:28:32 P
senic	0.5244	mg/L	0.020	105	80	12	0			
arium	0.4913	mg/L	0.010	98.3	80	12	0			
admium	0.5001	mg/L	0.0020	100	80	12	0			
alcium	50.82	mg/L	0.50	102	80	12				•
nromium	0.5023	mg/L	0.0060	100	80	120				
ad	0.4975	mg/L	0.0050	98.7	80	120				
agnesium	50.55	mg/L	0.50	101	80	120				
otassium	53.97	mg/L	1.0	108	80	120				
elenium	0.4843	mg/L	0.050	96.9	80	. 120				
lver	0.5147	mg/L	0.0050	102	80	120				
odium	55.05	mg/L	0.50	110	80	120				
ethod: SM 2540 C: Total Dis	ssoived Solids		· · · · · · · · · · · · · · · · · · ·							
ample ID: MB-18191		MBLK			Batch II	D:	18191	Analysis [	Date:	1/29/200
otal Dissolved Solids	20.00	mg/L	20							
ample ID: LCS-18191		LCS			Batch II	D:	18191	Analysis E	Pate:	1/29/200
otal Dissolved Solids	1036	mg/L	20	102	80	120	)			
)										
Qualifiers:  E Estimated value			Н	Holding ti	mes for prepar	ation (	or analveic	exceeded		
Analyte detected below quan	titation limits		ND		ed at the Repo					
RPD outside accepted recove			S		very outside ac	_				Page 4

Date: 12-Feb-09

### QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st QTR 1/28/09

Work Order:

0901396

Analyte	Result	Units	PQL	%Rec	LowLimit HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B:	VOLATILES			- 17.				`
Sample ID: b2		MBLK			Batch ID: R32209	Analysis Da	ate: 1/29/2	009 10:23:08 Af
Benzene	ND	μg/L	1.0				•	
Toluene	ND	µg/L	1.0					
Ethylbenzene	ND	µg/L	1.0					•
Methyl tert-butyl ether (MTBE)	ND.	μg/L	1.0		•			
1,2,4-Trimethylbenzene	ND	μg/L	1.0			•		
1,3,5-Trimethylbenzene	ND	µg/L	1.0					
1,2-Dichloroethane (EDC)	ND	µg/L .	1.0					
1,2-Dibromoethane (EDB)	ND	µg/L	1.0		•	-		
Naphthalene	ND	μg/L	2.0	,				
1-Methylnaphthalene	ND	μg/ <b>L</b>	4.0					
2-Methylnaphthalene	ND	µg/L	4.0					
Acetone	ND	μg/L	10					
Bromobenzene	ŅD	µg/L	1.0					
Bromodichloromethane	ND	μg/L	1.0					
Bromoform	ND	hg/F	1.0					
Bromomethane	ND	µg/L	1.0		•			
2-Butanone	ND	µg/L	10					
Carbon disulfide	ND	µg/L	10					
Carbon Tetrachloride	ND '	µg/L	1.0					
Chlorobenzene	ND	µg/L	1.0					
Chloroethane	ND	µg/L	2.0				•	
Chloroform	ND	μg/L	1.0					
Chloromethane	ND .	µg/L	1.0					
-Chlorotoluene	ND .	μg/L	1.0					
I-Chlorotoluene	ND	µg/L	1.0					
sis-1,2-DCE	ND	μg/L μg/L	1.0				•	
	ND	µg/L	1.0					
is-1,3-Dichloropropene	ND	μg/L	2.0					
,2-Dibromo-3-chloropropane	ND	μg/L μg/L	1.0					
	ND	μg/L	1.0					
Dibromomethane i,2-Dichlorobenzene	ND	µg/L	1.0					
1,3-Dichlorobenzene	ND	μg/L	1.0					
,4-Dichlorobenzene	ND	μg/L	1.0				•	
Dichlorodifluoromethane	ND .	µg/L	1.0					
1,1-Dichloroethane	445	µg/L	1.0					
,1-Dichloroethene	ND ,	µg/L	1.0					
,2-Dichloropropane	ND	h8/F	1.0					
,3-Dichloropropane	ND	µg/L	1.0		,			
,3-Dichloropropane	ND	µg/L µg/L	2.0			•	•	
,1-Dichloropropene	ND	μg/L	1.0				•	
l, 1-Dichioropropene lexachlorobutadiene	ND ND	μg/L	1.0					
	ND	μg/L .μg/L	1.0					
?-Hexanone				•				
sopropylbenzene	ND .	µg/L	1.0		•			
l-Isopropyltoluene	ND	µg/L	1.0					

E Estimated value

J Analyte detected below quantitation limits

RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

oject:

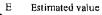
Injection Well 1st QTR 1/28/09

Work Order:

0901396

Analyte	Result	Units	PQL	%Rec	LowLimit Hi	ghLimit	%RPD R	PDLimit Qual
Method: EPA Method 8260B:	VOLATILES						,	
Sample ID: b2		MBLK			Batch ID:	R32209	Analysis Date:	1/29/2009 10:23:08 Al
4-Methyl-2-pentanone	ND	μg/L	10					
Methylene Chloride	ND	μg/L	3.0					
n-Butylbenzene	ND	μg/L	1.0					
n-Propylbenzene	ND	μg/L	1.0					
sec-Butylbenzene	ND	μg/L	1.0					
Styrene	ND	μg/L	1.0					
tert-Butylbenzene	ND	µg/L	1.0					
1,1,1,2-Tetrachloroethane	ND	μg/L	1.0					
1,1,2,2-Tetrachloroethane	ND	μg/L	2.0					
Tetrachloroethene (PCE)	ND	µg/L	1.0					
trans-1,2-DCE	ND	μg/L	1.0					•
trans-1,3-Dichloropropene	ND	μg/L	1.0					
1,2,3-Trichlorobenzene	ND	μg/L	1.0					
1,2,4-Trichlorobenzene	ND	μg/L	1.0					
1,1,1-Trichloroethane	ND	μg/L	1.0					
1,1,2-Trichloroethane	ND	μg/L	1.0					
Trichloroethene (TCE)	ND	μg/L	1.0					**
Trichlorofluoromethane	ND	μg/L	1.0					
1,2,3-Trichtoropropane	ND	μg/L	2.0					
Vinyl chloride	ND	μg/L	1.0					
Nenes, Total	ND	μg/L	1.5					
mple ID: 5ml rb		MBLK			Batch ID:	R32237	Analysis Date:	1/30/2009 8:28:07 Aft
Banzena	ND	μg/L	1.0					
Toluene	ND	μg/L	1.0				•	
Ethylbenzene	ND.	μg/L	1.0					
Methyl tert-butyl ether (MTBE)	ND	μg/L	1.0					
1,2,4-Trimethylbenzene	ND	μg/L	1.0					
1,3,5-Trimethylbenzene	ND	μg/L	1.0					
1,2-Dichloroethane (EDC)	ND	μg/L	1.0					
1,2-Dibromoethane (EDB)	ND	μg/L	1.0					
Naphthalene	ND	μg/L	2.0					
1-Methylnaphthalene	ND	μg/L	4.0					
2-Methylnaphthalene	ND	μg/L	4.0					
Acetone	ND	μg/L	10					• •
Bromobenzene	ND	μg/L	1.0					
Bromodichloromethane	ND	μg/L	1.0					
Bromoform	ND	μg/L	1.0					
Bromomethane	ND	µg/L	1.0					
2-Butanone	ND	μg/L	10					
Carbon disulfide	ND	μg/L	10		•			
Carbon Tetrachloride	ND	μg/L	1.0					
Chlorobenzene	ND	μg/L	1.0					
Chloroethane	ND	μg/L	2.0					
Chloroform	ND	μg/L	1.0					





Analyte detected below quantitation limits

RPD outside accepted recovery limits

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

H Holding times for preparation or analysis exceeded

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st QTR 1/28/09

Work Order:

0901396

Analyte	Result	Units	PQL	%Rec	LowLimit Hi	ghLimit	%RPD RP	DLimit Qual
Method: EPA Method 8260B	: VOLATILES							
Sample ID: 6ml rb		MBLK			Batch ID:	R32237	Analysis Date:	1/30/2009 8:28:07 AN
Chloromethane	ND	µg/∟	1.0					
2-Chlorotoluene	ND	μg/L	1.0					
4-Chiorotoluene	ND	µg/L	1.0					•
cis-1,2-DCE	ND	µg/L	1.0					
cis-1,3-Dichloropropene	ND	µg/L	1.0					
1,2-Dibromo-3-chloropropane	ND	.µg/L	2.0					
Dibromochloromethane	ND	µg/L	1.0					
Dibromomethane	ND	µg/L	1.0					
1,2-Dichlorobenzene	ND	hg/L	1.0		•			
1,3-Dichlorobenzene	ND	µg/L	1.0					
1,4-Dichlorobenzene	ND	µg/∟	1.0				•	
Dichlorodifluoromethane	ND	µg/L	1.0					
1,1-Dichloroethane	ND	µg/L	1.0					
1,1-Dichloroethene	ND	μg/L	1.0					*
1,2-Dichloropropane	ND	μg/L	1.0					
1,3-Dichioropropane	ND	μg/L	1.0					
2,2-Dichloropropane	ND	μg/L	2.0					
1,1-Dichloropropene	ND	µg/L	1.0					
Hexachlorobutadiene	ND	µg/L	1.0					
2-Hexanone	ND	µg/L	10				•	
Isopropylbenzene	ND	µg/L	1.0					•
4-Isopropyltoluene	ND	μg/L	1.0					
4-Methyl-2-pentanone	ND	μg/L	. 10					•
Methylene Chlorida	ND	μg/L	3.0		*			
n-Butylbenzene	ND	hâ/r	1.0					
n-Propylbenzene	ND	hâ∖⊏ bâ∖⊏	1.0					
sec-Butylbenzene	ND	μg/L	1.0					
Styrene	ND	μg/L	1.0		•			
tert-Butylbenzene	ND	µg/L	1.0					
1,1,1,2-Tetrachloroethane	ND	µg/L	1.0					
1,1,2,2-Tetrachloroethane	ND	μg/L	2.0			•		
Tetrachioroethene (PCE)	ND	µg/L	1.0					
trans-1,2-DCE	ND	μg/L	1.0					
trans-1,3-Dichloropropene	ND ND	µg/L	1.0					
1,2,3-Trichlorobenzene	ND	μg/L	1.0					
1,2,4-Trichlorobenzene	ND .	μg/L	1.0					•
1,1,1-Trichloroethane	ND	μg/L	1.0					
1,1,2-Trichloroethane	ND	μg/L	1.0					
Trìchloroethene (TCE)	ND	μg/L	1.0					
Trichlorofluoromethane	ND	μg/L	1.0					
1,2,3-Trichloropropane	ND	μg/L	2.0					
Vinyl chloride	ND	μg/L	1.0					
Xylenes, Total	ND	µg/L	1.5					
	110	MBLK			Batch ID:	R32237	Analysis Date:	1/30/2009 11:32:07 PM
Sample ID: b6		WIDLE			Daton 10.	1104401		., 90, 200 / 1,02.01 / 1



E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits



Date: 12-Feb-09

## QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

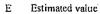
ject: Injection Well 1st QTR 1/28/09

Work Order:

0901396

Analyte	Result	Units	PQL	%Rec	LowLimit Hig	ghLimit	%RPD RP	DLimit Qual
Method: EPA Method 8260B	: VOLATILES							
Sample ID: b6		MBLK			Batch ID:	R32237	Analysis Date:	1/30/2009 11:32:07 PI
Benzene	ND	µg/L	1.0					
Toluane	ND	μg/L	1.0					
Ethylbenzene	ND	µg/L	1.0					
Methyl tert-butyl ether (MTBE)	ND	μg/L	1.0					
1,2,4-Trimethylbenzene	ND	μg/L	1.0	•				
1,3,5-Trimethylbenzene	ND	μg/L	1.0					
1,2-Dichloroethane (EDC)	ND	μg/L	1.0					
1,2-Dibromoethane (EDB)	ND	μg/L	1.0					
Naphthalene	ND	μg/L	2.0					
1-Methylnaphthalene	ND	µg/L	4.0					
2-Methylnaphthalene	ND	µg/L	4.0					
Acetone	ND	μg/L	10					
Bromobenzene	ND	μg/L	1.0					
Bromodichloromethane	ND	μg/L	1.0					
Bromoform	ND	μg/L	1.0					
Bromomethane	ND	μg/L	1.0					
2-Butanone	ND	μg/L	10					
Carbon disulfide	ND	μg/L	10					
Carbon Tetrachloride	ND	ug/L	1.0					
Chlorobenzene	ND	μg/L	1.0					
`oroethane	ND	μg/L	2.0					
oroform	ND	μg/L	1.0					
Chloromethane	ND	μg/L	1.0					
2-Chlorotoluene	ND	µg/L	1.0					
4-Chlorotoluene	ND	μg/L	1.0					
cis-1,2-DCE	ND	µg/L	1.0					
cis-1,3-Dichloropropene	ND	μg/L	1.0					
1,2-Dibromo-3-chioropropane	ND	μg/L	2.0					
Dibromochloromethane	ND	μg/L	1.0					
Dibromomethane	ND	μg/L	1.0					
1,2-Dichlorobenzene	ND	μg/L	1.0					
1,3-Dichlorobenzene	ND	µg/L	1.0					
1,4-Dichlorobenzene	ND	μg/L	1.0					
Dichlorodifluoromethane	ND	μg/L	1.0					
1,1-Dichloroethane	ND	μg/L	1.0					
1,1-Dichloroethene	ND	μg/L	1.0					
1,2-Dichloropropane	ND	μg/L	1.0					
1,3-Dichloropropane	ND	µg/L	1.0				•	
2,2-Dichloropropane	ND	µg/L	2.0					
1,1-Dichloropropene	ND	µg/L	1.0					
Hexachlorobutadiene	ND	μg/L	1.0					
2-Hexanone	ND	μg/L	10					
Isopropylbenzene	ND	μg/L	1.0					
4-Isopropyltoluene	ND	µg/L	1.0					

#### Qualifiers:



Analyte detected below quantitation limits RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Date: 12-Feb-09

## QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st QTR 1/28/09

Work Order:

0901396

Analyte	Result	Units	PQL	%Rec	LowLimit Hig	ghLimit	%RPD RP	DLimit Qual
Method: EPA Method 8260B	: VOLATILES							
Sample ID: b6		MBLK			Batch ID:	R32237	Analysis Date:	1/30/2009 11:32:07 PN
4-Methyl-2-pentanone	ND	hg/r	10					
Methylene Chloride	ND	μg/L	3.0					
n-Butylbenzene	ND	μg/L	1.0					
n-Propylbenzene	ND	µg/L	1.0	•				
sec-Butylbenzene	ND	µg/L	1.0					
Styrene	ND	μg/L	1.0					•
tert-Butylbenzene	ND -	μg/L	1.0				•	
1,1,1,2-Tetrachloroethane	ND .	µg/L	1.0			,		
1,1,2,2-Tetrachloroethane	ND	µg/L	2.0					•
Tetrachloroethene (PCE)	ND	μg/L	1.0					
trans-1,2-DCE	ND	μg/L	1.0					
trans-1,3-Dichloropropene	ND	μg/L	1.0					
1,2,3-Trichlorobenzene	ND	- μg/L	1.0					
1,2,4-Trichtorobenzene	ND	µg/L	1.0					
1,1,1-Trichtoroethane	ND	μg/L	1.0					
1,1,2-Trichloroethane	ND	μg/L	- 1.0					
Trichloroethene (TCE)	ND	µg/L	1.0					•
Trichlorofluoromethane	ND	μg/L	1.0					
1,2,3-Trichloropropane	ND	μg/L	2.0					
Vinyl chloride	ND	μg/L	1.0					
Xylenes, Total	ND	µg/L	1.5		•			
Sample ID: b7		MBLK			Batch ID:	R32237	Analysis Date:	1/31/2009 10:11:51 AM
Benzene	ND	µg/L	1.0				,	
Toluene	ND	µg/L	1.0					
Ethylbenzene	ND	µg/L	1.0					
Methyl tert-butyl ether (MTBE)	ND	µg/L	1.0					•
1,2,4-Trimethylbenzene	ND	μg/L	1.0					
1,3,5-Trimethylbenzene	ND .	µg/L	1.0					
1,2-Dichloroethane (EDC)	ND	µg/L	1.0					
1,2-Dibromoethane (EDB)	ND	µg/L	1.0					
Naphthalene	ND	µg/L	2.0					
1-Methylnaphthalene	ND	µg/L	4.0					
2-Methylnaphthalene	ND	µg/L	4.0					
Acetone	ND	µg/L	10					
Bromobenzene	ND	µg/L	1.0					
Bromodichtoromethane	ND	µg/L	1.0					
Bromoform	ND	µg/L	1.0					
Bromomethane	ND	µg/L	1.0					
2-Butanone	ND	µg/L	10					
Carbon disulfide	ND	µg/L	10					
Carbon Tetrachloride	ND	μg/L	1.0					
Chlorobanzene	ND	µg/Ł	1.0					
Chloroethane	ND	μg/L	2.0					•
Chloroform	ND	μg/L	1.0					



E Estimated value



J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

Injection Well 1st QTR 1/28/09

Work Order:

0901396

Analyte	Result	Units	PQL	%Rec	LowLimit Hi	ighLimit	%RPD RF	PDLimit Qual
Method: EPA Method 8260B:	VOLATILES							
Sample ID: b7		MBLK			Batch ID:	R32237	Analysis Date:	1/31/2009 10:11:51 A
Chloromethane	ND	µg/L	1.0					
2-Chlorotoluene	ND	µg/L	1.0					
4-Chlorotoluene	ND	μg/L	1.0					
cis-1,2-DCE	ND	μg/L	1.0					•
cis-1,3-Dichloropropene	ND	μg/L	1.0					
1,2-Dibromo-3-chloropropane	ND	µg/L	2.0					
Dibromochloromethane	ND	μg/L	1.0					
Dibromomethane	ND	μg/L	1.0				•	
1,2-Dichlorobenzene	ND	μg/L	1.0					
1,3-Dichlorobenzene	ND	μg/L	1.0					
1,4-Dichlorobenzene	ND	µg/L	1.0					
Dichlorodifluoromethane	ND	µg/L	1.0					
1,1-Dichloroethane	ND	µg/L	1.0					
1,1-Dichloroethene	ND	µg/L	1.0					
1,2-Dichloropropane	ND	µg/L	1.0					
1,3-Dichloropropane	ND	µg/L	1.0					•
2,2-Dichloropropane	ND	μg/L	2.0					
1,1-Dichloropropene	ND	μg/L	1.0					
Hexachlorobutadiene	ND	μg/L	1.0			*		
*Hexanone	ND	hâ\ŗ	10					
propylbenzene	ND	µg/L	1.0					
Sopropyltoluene	ND	μg/L	1.0					
4-Methyl-2-pentanone	ND	µg/L	10					
• •	ND	μg/L	3.0					
Methylene Chloride	ND		1.0					
n-Butylbenzene		μg/L	1.0					
n-Propylbenzene	ND ND	µg/L						
sec-Butylbenzene	ND	μg/L	1.0					
Styrene	ND	µg/L	1.0					
tert-Butylbenzene	ND	µg/L	1.0					
1,1,1,2-Tetrachloroethane	ND	μg/L	1.0			-		
1,1,2,2-Tetrachloroethane	ND	μg/L	2.0					
Tetrachloroethene (PCE)	ND	μg/L	1.0					
trans-1,2-DCE	ND ND	µg/L	1.0 1.0					
trans-1,3-Dichloropropene	ND ND	µg/L	1.0					
1,2,3-Trichlorobenzene		µg/L µg/L	1.0		•			
1,2,4-Trichlorobenzene	ND	µg/L µg/L	1.0				•	
1,1,1-Trichloroethane	ND ND							
1,1,2-Trichloroethane	ND ND	μg/L	1.0					
Trichloroethene (TCE) Trichlorofluoromethane	ND ND	μg/L	1.0 1.0	•				
1,2,3-Trichloropropane		µg/L	2.0					
	ND	μg/L	1.0					
Vinyl chloride	ND ND	μg/L						
Xylenes, Total	ND	µg/L	1.5		Datab ID:	пассос	Analysis Date:	4/20/2000 40-00-07 1044
Sample ID: 100ng ics		LCS			Batch ID:	R32209	Analysis Date:	1/29/2009 12:00:27 PM





Estimated value

Analyte detected below quantitation limits RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Date: 12-Feb-09

### QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 1st QTR 1/28/09

Work Order:

0901396

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD RP	DLimit Qual
Method: EPA Method 82601	3: VOLATILES							
Sample ID: 100ng lcs		LCS -			Batch	ID: R32209	Analysis Date:	1/29/2009 12:00:27 PM
Benzene	19.05	µg/L	1.0	95.3	88	116		
Toluene	17.46	µg/L	1.0	87.3	82.9	112		
Chlorobenzene	17.06	μg/L	1.0	85.3	71.4	133		
1,1-Dichloroethene	22.17	μg/L	1.0	111	97.9	140		
Trichloroethene (TCE)	17.96	µg/∟	1.0	89.8	90.5	112	•	S
Sample ID: 100ng lcs		LCS			Batch	ID: R32237	Analysis Date:	1/30/2009 9:24:52 AM
Benzene	19.75	μg/L	1.0	98.8	88	116 ∈	•	
Toluene	18.36	μg/L	1.0	91.8	82.9	112		
Chlorobenzene	20.10	μg/L	1.0	100	71.4	133		
1,1-Dichloroethene	21.35	μg/L	1.0	107	97.9	140		
Trichloroethene (TCE)	20.09	μg/L	1.0	100	90.5	112		
Sample ID: 100ng lcs_b		LCS			Batch	ID: <b>R32237</b>	Analysis Date:	1/30/2009 10:06:56 PM
Benzene	19.67	μg/L	1.0	98.3	88	116		
Toluene	18.47	µg/L	1.0	92.3	82.9	112	•	
Chlorobenzene	20.43	µg/L	1.0	102	71.4	133		
1,1-Dichloroethene	21.09	μg/L	1.0	105	97.9	140		
Trichloroethene (TCE)	19.93	μg/L	1.0	99.7	90.5	112		
Sample ID: 100ng lcs_c	•	LCS			Batch	ID: R32237	Analysis Date:	1/31/2009 11:09:01 AM
Benzene	20.00	μg/L	1.0	100	88	116	·	
Toluene	18.11	μg/L	1.0	90.5	82.9	112	,	
Chlorobenzene	19.86	µg/L	1.0	99.3	71.4	1 <b>3</b> 3		
1,1-Dichtoroethene	20.06	μg/L	1.0	100	97.9	140		
Trichloroethene (TCE)	19.56	μg/L	1.0	97.8	90.5	112		

Qu	ali	fie	rs

E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits



#### Sample Receipt Checklist

Ant Name WESTERN REFINING SOUT    Matrix:   Carrier name   LPS	<b>A</b>	Sample I		sipt O				4 (00/0000	
Matrix:  Carrier name  PS  Shipping container/cooler in good condition?  Custody seals infact on shipping container/cooler?  Ves No No Not Present Not Shipped  Custody seals infact on shipping container/cooler?  Ves No No Not Present Not Shipped  Custody seals infact on sample boths?  Custody seals infact on sample boths?  Ves No No Not Present Not Shipped  Custody present?  Ves No No Not Present Not Shipped  Custody present?  Ves No No Not Present Not Shipped  Chain of custody agned when relinquished and received?  Ves No No Sample container infact?  Ves No No No Not Not Present Not Shipped  Chain of custody agned when relinquished and received?  Ves No No No Not Not Present Not Shipped  Sample on proper container/bettle?  Ves No No No Not Not Not Shipped  Not Shipped Not Not Shipped Not Shipped Not Not Shipped Not Not Shipped Not Not Shipped Not Not Shipped Not Not Not Shipped Not Not Not Shipped Not Not Not Shipped Not Not Not Shipped Not Not Not Shipped Not Not Not Shipped Not Not Not Shipped Not Not Not Not Shipped Not Not Not Shipped Not Not Not Shipped Not Not Not Not Not Shipped Not Not Not Not Not Not Not Not Not Not	nt Name WESTERN REFINING SOUT							1/29/2009	
Cherckitist completed by:	Work Order Number 0901396			1	,			11	
Matrix: Carrier name UPS  Shipping container/cooler in good condition? Yes  No  Not Present	Checklist completed by:			1/5	Sample ID	abels checked	by:	Initials	
Shipping container/coder in good condition?  Ves  No  Not Present  Not Present  Not Shipped  Not Shipped  Not Shipped  Not Shipped  Not Shipped  Not Custody seals infact on shipping container/cooler?  Ves  No  No  Not Present  Not Shipped  Not Custody seals infact on sample bottles?  Chain of custody gined when relinquished and received?  Ves  No  No  Samples in proper container/bottle?  Sample sontainers what?  Sample containers what?  Ves  No  No  No  Not Present  No  No  No  No  No  No  No  No  No  N			$\top$	Date	10				
Custody seals intact on shipping container/cooler?  Ves No No NtA V  Custody seals intact on sample bottles?  Yes No No NtA V  Chain of custody present?  Chain of custody signed when relinquished and received?  Chain of custody signed when relinquished and received?  Chain of custody signed when relinquished and received?  Chain of custody signed when relinquished and received?  Yes No No No No No No No No No No No No No	Matrix:	Carrier name	JPS						
Custody seals intact on sample bottles?  Yes No No No No No No No No No No No No No	Shipping container/cooler in good condition?	•	res.	V	No 🗌	Not Present			
Chain of custody present?  Chain of custody signed when relinquished and received?  Chain of custody agrees with sample labels?  Chain of custody agrees with sample labels?  Yes  No  No  No  Samples in proper container/bottle?  Samples in proper container/bottle?  Yes  No  No  No  No  No  No  No  No  No  N	Custody seals intact on shipping container/cooler?	,	/es	V	No 🗀	Not Present		Not Shipped	
Chain of custody signed when relinquished and received? Yes	Custody seals intact on sample bottles?	,	/es		No 🗆	N/A	V		
Chain of custody agrees with sample labels?  Samples in proper container/bottle?  Sample containers intact?  Sufficient sample volume for indicated test?  Yes	Chain of custody present?	,	/es	V	No 🗆				
Samples in proper container/bottle?  Sample containers intact?  Sufficient sample volume for indicated test?  All samples received within holding time?  Water - VOA vials have zero headspace?  No VOA vials submitted  Yes  No   No   Water - VOA vials have zero headspace?  No VOA vials submitted  Yes  No  NA   Vater - Preservation labels on bottle and cap match?  Yes  No  NA   Vater - pH acceptable upon receipt?  Yes  No  NA   Container/Temp Blank temperature?  1º   **6° C Acceptable*  If given sufficient time to cool.  Client contacted  Date contacted:  Person contacted  Contacted by:  Regarding:  Comments:	Chain of custody signed when relinquished and rec	ceived?	/es	$\checkmark$	No 🔲				
Sample containers intact?  Sufficient sample volume for indicated test?  Sufficient samples volume for indicated test?  All samples received within holding time?  Water - VOA vials have zero headspace?  No VOA vials submitted  Yes No No NA  Vater - Preservation labels on bottle and cap match?  Yes No No NA  Vater - PH acceptable upon receipt?  Yes No NA  Container/Temp Blank temperature?  1º <6° C Acceptable  If given sufficient time to cool.  Cilient contacted  Date contacted:  Person contacted  Contacted by:  Regarding:  Comments:	Chain of custody agrees with sample labels?	)	es/	$\overline{\mathbf{V}}$	No 🗆			•	
Sufficient samples volume for indicated test?  All samples received within holding time?  Water - VOA vials have zero headspace?  No VOA vials submitted  Yes No No No No No No No No No No No No No	Samples in proper container/bottle?	`	es/	$\checkmark$	No 🗌			•	
All samples received within holding time?  Water - VOA vials have zero headspace? No VOA vials submitted  Yes  No  No  No  No  No  No  No  No  No  N	Sample containers intact?	١	'es		No 🗆				
Water - VOA vials have zero headspace? No VOA vials submitted	Sufficient sample volume for indicated test?	· Y	es.	$\checkmark$	No 🗆				
teter - Preservation labels on bottle and cap match?  Yes ✓ No No N/A Container/Temp Blank temperature?  Yes ✓ No N/A Container/Temp Blank temperature?  Yes ✓ No N/A Container/Temp Blank temperature?  1º <6° C Acceptable  If given sufficient time to cool.  Comments:	All samples received within holding time?	Y	'es	V	No 🗌	•			
Vater - pH acceptable upon receipt?  Container/Temp Blank temperature?  1° <6° C Acceptable If given sufficient time to cool.  COMMENTS:  Client contacted	Water - VOA vials have zero headspace?	No VOA vials submit	ed		Yes 🗹	No 🗆			
Comments:  1° <6° C Acceptable If given sufficient time to cool.  Client contacted	ater - Preservation labels on bottle and cap matc	ch? Y	es .	$\mathbf{V}$	No 🗆	N/A			
COMMENTS:  If given sufficient time to cool.  Client contacted Date contacted: Person contacted  Contacted by: Regarding:  Comments:	Vater - pH acceptable upon receipt?	Y	'es	V	No 🗆	N/A			
Client contacted	Container/Temp Blank temperature?		•	1°					,
Contacted by:  Regarding:  Comments:	COMMENTS:				If given sufficien	t time to cool.			
Contacted by:  Regarding:  Comments:									
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Comments:	Dien contacted	ato contacted.				on contacted			
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Chain-of-Custody Record	Turn-Around Time:			
Client, West of Polivins	Er Standard		HALL ENVIRONMENTAL	_, ≥
	Project Name:	I THE TANK THE THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK THE TANK TH	Mark Hallenvironmental com	.d
Mailing Address: # 50 CR 4990	Nection well 1st all 1-28-09	4901 Hawkins NE	4901 Hawkins NE - Albuquerque, NM 87109	
13100mf, eld, NM 874,3	111	Tel. 505-345-3975	Fax 505-345-4107	. , ,
0115-			GO THE WAY	
email or Fax#: 505-632-3911	Project Manager:	(Vlr	9	
QA/QC Package:		Si Dies		}
☑ Standard ☐ Level 4 (Full Validation)		(Ca (Ca	nys.	0 ⁺
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□ EDD (Type)	On the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of th	1 + 181	(V)	A jo
	Sample temperature	98 d 4 bo	Sebi	), () ()
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Date Time Matrix Sample Request ID	41	8TEX - BTEX - M HQT M) HQT	ARDA Anions 8081 P 8260B 8270 (9 12017 12017	G 53 Air Bub
1-28-09 10:30 HzD injection well	3-10A HC1 1		×	
	1-Liter Amber 1		X	
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Trip Blank	2-104		<b>&gt;</b>	
		۵,		
Date: Time: Relinquished by:	Received by: Date Time	Remarks: Per BK- no	7310	
Time: Relinquished by:	Received by Time			
If necessary, samples submitted to Hall Environmental may be subco	If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.	oossibility. Any sub-contracted data w	be clearly notated on the analytical report.	



#### **COVER LETTER**

Monday, May 04, 2009

Cindy Hurtado Western Refining Southwest, Inc. #50 CR 4990

Bloomfield, NM 87413

TEL: (505) 632-4161, FAX (505) 632-3911

RE: Injection Well 2nd QTR 4/14/09

Dear Cindy Hurtado:

Order No.: 0904211

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 4/15/2009 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

NM Lab # NM9425 AZ license # AZ0682 ORELAP Lab # NM100001 Texas Lab# T104704424-08-TX



Date: 04-May-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order: Project:

0904211

Injection Well 2nd QTR 4/14/09

Lab ID:

0904211-01

Client Sample ID: Injection Well

Collection Date: 4/14/2009 8:45:00 AM

Date Received: 4/15/2009

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS	<del></del>				Analyst: T <b>A</b> F
Chloride	1400	5.0	mg/L	50	5/2/2009 5:22:26 PM
Sulfate	, 550	25	mg/L	. 50	5/2/2009 5:22:26 PM
EPA METHOD 7470: MERCURY					Analyst: <b>MMS</b>
Mercury	0.0012	0.00020	mg/L	1	4/24/2009 2:48:03 PM
EPA 6010B: TOTAL RECOVERABLE	METALS	•			Analyst: <b>NM</b> O
Arsenic	ND	0.020	mg/L	1	4/20/2009 9:16:14 AM
Barium	0.23	0.020	mg/L	1	4/20/2009 9:16:14 AM
Cadmium	ND	0.0020	mg/L	1	4/20/2009 9:16:14 AM
Calcium	120	10	mg/L	10	4/20/2009 10:16:47 AM
Chromium	ND	0.0060	mg/L	1	4/20/2009 9:16:14 AM
Lead	ND	0.0050	mg/L	1	4/20/2009 9:16:14 AM
Magnesium	24	1.0	mg/L	1	4/20/2009 9:16:14 AM
Potassium	18	1.0	mg/L	. 1	4/20/2009 9:16:14 AM
Selenium	ND	0.050	mg/L	1	4/20/2009 9:16:14 AM
Silver	ND	0.0050	mg/L	1	4/20/2009 9:16:14 AM
Sodium	770	10	mg/L	10	4/20/2009 10:16:47 AM
EPA METHOD 8270C: SEMIVOLATILI	ES				Analyst: JDC
Acenaphthene	ND	50	μg/L	1	4/20/2009
Acenaphthylene	ND	50	μg/L	1	4/20/2009
Aniline	ND	50	µg/L	1	4/20/2009
Anthracene	ND	50	µg/L	1	4/20/2009
Azobenzene	ND	50	μg/L	1	4/20/2009
Benz(a)anthracene	ND	50	μg/L	1	4/20/2009
Benzo(a)pyrene	. ND	50	μg/L	1	4/20/2009
Benzo(b)fluoranthene	ND	50	µg/L	. 1	4/20/2009
Benzo(g,h,i)perylens	ND	50	µg/L	1	4/20/2009
Benzo(k)fluoranthene	ND	50	μg/L	1	4/20/2009
Benzoic acid	ND	100	μg/L	1	4/20/2009
Benzyl alcohol	ND	50	μg/L	1	4/20/2009
Bis(2-chloroethoxy)methane	ND	50	µg/L	1	4/20/2009
Bis(2-chloroethyi)ether	. ND	50	μg/L	1	4/20/2009
Bis(2-chloroisopropyl)ether	ND	50	μg/L	1 .	4/20/2009
Bis(2-ethylhexyl)phthalate	ND	50	μg/L	1	4/20/2009
4-Bromophenyl phenyl ether	ND	5 <b>0</b>	µg/L	1	4/20/2009
Butyl benzyl phthalate	ND	50	μg/L	1	4/20/2009
Carbazole	ND	50	μg/L	1	4/20/2009
4-Chioro-3-methylphenol	ND	50	μg/L	1	4/20/2009
4-Chioroaniline	ND	50	hg/F	1	4/20/2009
2-Chloronaphthalene	ND	50	μg/L	1	4/20/2009

Qualifiers:

- Value exceeds Maximum Contaminant Level
- Estimated value
- Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank В
- Holding times for preparation or analysis exceeded Н
- MCL Maximum Contaminant Level
- Reporting Limit

Page 1 of 7

Date: 04-May-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0904211

Project:

Injection Well 2nd QTR 4/14/09

Lab ID:

0904211-01

Client Sample ID: Injection Well

Collection Date: 4/14/2009 8:45:00 AM

Date Received: 4/15/2009

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLA	TILES				Analyst: JD
2-Chlorophenol	ND	50	µg/L	1	4/20/2009
4-Chlorophenyl phenyl ether	ND	50	µg/L	1	4/20/2009
Chrysene	ND	50	μg/L	. 1	4/20/2009
Di-n-butyl phthalate	ND	50	μg/L	1	4/20/2009
Di-n-octyl phthalate	ND	50	μg/L	1	4/20/2009
Dibenz(a,h)anthracene	ND	50	µg/L	. 1	4/20/2009
Dibenzofuran	ND	50	μg/L	1	4/20/2009
1,2-Dichlorobenzene	ND	50	µg/L	1	4/20/2009
1,3-Dichlorobenzene	- ND	50	μg/L	1	4/20/2009
1,4-Dichlorobenzene	ND	50	µg/L	1	4/20/2009
3,3'-Dichlorobenzidine	ND	50	μg/L	1	4/20/2009
Diethyl phthalate	ND	50	μg/L	1	4/20/2009
Dimethyl phthalate	ND	50	µg/L	1	4/20/2009
2,4-Dichlorophenol	ND	100	μg/L	1	4/20/2009
2,4-Dimethylphenol	ND	50	μg/L	1	4/20/2009
4,6-Dinitro-2-methylphenol	ND	100	µg/L	1	4/20/2009
2,4-Dinitrophenol	ND	100	μg/L	1	4/20/2009
2,4-Dinitrotoluene	ND	50	μg/L	1	4/20/2009
2,6-Dinitrotoluene	ND	50	μg/L	1	4/20/2009
Fluoranthene	ND	50	μg/L	1	4/20/2009
Fluorene	ND	50	μg/L	1	4/20/2009
Hexachiorobenzene	ND	50	µg/L	1	4/20/2009
Hexachlorobutadiene	ND	50	μg/L	` 1	4/20/2009
Hexachlorocyclopentadiene	ND	50	μg/L	1	4/20/2009
Hexachloroethane	ND	50	μg/L	1	4/20/2009
Indeno(1,2,3-cd)pyrene	ND	50	μg/L	1	4/20/2009
Isophorone	ND	50	µg/L	1	4/20/2009
2-Methylnaphthalene	ND	50	μg/L	1	4/20/2009
2-Methylphenol	ND	50	μg/L	1	4/20/2009
3+4-Methylphenol	ND	50	µg/L	1	4/20/2009
N-Nitrosodi-n-propylamine	ND	50	µg/L	1	4/20/2009
N-Nitrosodimethylamine	ND	50	μg/L	1	4/20/2009
N-Nitrosodiphenylamine	ND	50	μg/L	1	4/20/2009
Naphthalene	ND	50	µg/L	1	4/20/2009
2-Nitroaniline	ND	50	µg/L	1	4/20/2009
3-Nitroaniline	ND	50	μg/L	1	4/20/2009
4-Nitroaniline	ND	50	μg/L	1	4/20/2009
Nitrobenzene	ND	50	μg/L	1	4/20/2009
2-Nitrophenol	ND	50	µg/L	1	4/20/2009
4-Nitrophenol	ND	50	µg/L	1	4/20/2009
Pentachlorophenol	ND	100	μg/L	1	4/20/2009
Phenanthrene	ND	50	μg/L	1	4/20/2009



- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
  - RL Reporting Limit

Page 2 of 7



Date: 04-May-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0904211

Injection Well 2nd QTR 4/14/09

Project: Lab ID:

0904211-01

Client Sample ID: Injection Well

Collection Date: 4/14/2009 8:45:00 AM

Date Received: 4/15/2009

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
<b>EPA METHOD 8270C: SEMIVOLATILES</b>	;			······································	Analyst: JDC
Phenol	ND	50	μg/L	1	4/20/2009
Pyrene	ND	50	μg/L	1	4/20/2009
Pyridine	ND	50	μg/L	1	4/20/2009
1,2,4-Trichlorobenzene	ND.	50	μg/L	. 1	4/20/2009
2,4,5-Trichlorophenol	ND	<b>5</b> 0	μg/L	1	4/20/2009
2,4,6-Trichlorophenol	ND	50	μg/L	1	4/20/2009
Surr: 2,4,6-Tribromophenol	101	16.6-150	%REC	. 1	4/20/2009
Surr: 2-Fluorobiphenyl	83.3	19.6-134	%REC	. 1	4/20/2009
Surr: 2-Fluorophenol	66.7	9.54-113	%REC	1	4/20/2009
Surr: 4-Terphenyl-d14	71.6	22.7-145	%REC	1	4/20/2009
Surr: Nitrobenzene-d5	83.0	14.6-134	%REC	1	4/20/2009
Surr: Phenol-d5	61.9	10.7-80.3	%REC	1	4/20/2009
EPA METHOD 8260B: VOLATILES					Analyst: HL
Benzene	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
Toluene	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
Ethylbenzene	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
1,2,4-Trimethylbenzene	ND	1.0	µg/L	1	4/21/2009 6:01:15 PM
1,3,5-Trimethylbenzene	ND .	1.0	μg/L	1	4/21/2009 6:01:15 PM
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
Naphthalene	ND	2.0	μg/L	1	4/21/2009 6:01:15 PM
1-Methylnaphthalene	ND	4.0	µg/L	1 "	4/21/2009 6:01:15 PM
2-Methylnaphthalene	ND	4.0	µg/L	1.	4/21/2009 6:01:15 PM
Acetone	520	50	ug/L	5	4/21/2009 5:32:27 PM
Bromobenzene	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
Bromodichloromethane	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
Bromoform	ND	1.0	µg/L	1	4/21/2009 6:01:15 PM
Bromomethane	ND	1.0	µg/L	1	4/21/2009 6:01:15 PM
2-Butanone	36	10	μg/L	1	4/21/2009 6:01:15 PM
Carbon disulfide	21	10	μg/L	1 '	4/21/2009 6:01:15 PM
Carbon Tetrachloride	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
Chlorobenzene	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
Chloroethane	ND [*]	2.0	µg/L	• 1	4/21/2009 6:01:15 PM
Chloroform	ND	1.0	μg/L	. 1	4/21/2009 6:01:15 PM
Chloromethane	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
2-Chlorotoluene	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
4-Chlorotoluene	· ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
cis-1,2-DCE	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	4/21/2009 6:01:15 PM
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	. 1	4/21/2009 6:01:15 PM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
  - RL Reporting Limit

Page 3 of 7

Date: 04-May-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0904211

Injection Well 2nd QTR 4/14/09

Project: Lab ID:

0904211-01

Client Sample ID: Injection Well

Collection Date: 4/14/2009 8:45:00 AM

Date Received: 4/15/2009

Matrix: AQUEOUS

Analyses	Result	PQL	Qual L	Jnits	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES			<u>,</u>	<del></del>		Analyst: HL
Dibromochloromethane	ND	1.0	μ	g/L	1	4/21/2009 6:01:15 PM
Dibromomethane	ND	1.0	μ	g/L	1	4/21/2009 6:01:15 PM
1,2-Dichlorobenzene	ND	1.0	μ	g/L	1	4/21/2009 6:01:15 PM
1,3-Dichlorobenzene	ND	1.0	μ	g/L	. 1	4/21/2009 6:01:15 PM
1,4-Dichlorobenzene	ND	1,0	μ	g/L	1	4/21/2009 6:01:15 PM
Dichlorodifluoromethane	ND	1.0	$\mu$	g/L	1	4/21/2009 6:01:15 PM
1,1-Dichloroethane	ND	1.0	μ	g/L	1	4/21/2009 6:01:15 PM
1,1-Dichloroethene	ND	1.0	μ	g/L	1	4/21/2009 6:01:15 PM
1,2-Dichloropropane	ND	1.0	μ̈́	g/L	1	4/21/2009 6:01:15 PM
1,3-Dichloropropane	ND	1.0	μ	g/L	1,	4/21/2009 6:01:15 PM
2,2-Dichloropropane	ND .	2.0	μ	g/L	1	4/21/2009 6:01:15 PM
1,1-Dichloropropene	ND	1.0	μ	g/L	1	4/21/2009 6:01:15 PM
Hexachlorobutadiene	ND	1.0	þí	g/L	1	4/21/2009 6:01:15 PM
2-Hexanone	ND	10	μ	g/L	1	4/21/2009 6:01:15 PM
Isopropylbenzene	ND	1.0	μ	g/L	1	4/21/2009 6:01:15 PM
4-Isopropyltoluene	ND	1.0	μ	g/L	1	4/21/2009 6:01:15 PM
4-Methyl-2-pentanone	ND	10	μ	g/L	1	4/21/2009 6:01:15 PM
Methylene Chloride	ND	3.0	μ	g/L	1	4/21/2009 6:01:15 PM
n-Butylbenzene	ND	1.0	μί	g/L	1	4/21/2009 6:01:15 PM
n-Propyibenzene	ND	1.0	μί	g/L	1	4/21/2009 6:01:15 PM
sec-Butylbenzene	ND	1.0	· hí	g/L	1	4/21/2009 6:01:15 PM
Styrene	ND	1.0	μ	g/L	1	4/21/2009 6:01:15 PM
tert-Butylbenzene	ND	1.0	μ	g/L	1	4/21/2009 6:01:15 PM
1,1,1,2-Tetrachloroethane	ND	1.0	μg	g/L	1	4/21/2009 6:01:15 PM
1,1,2,2-Tetrachloroethane	ND	2.0	μ	g/L	1	4/21/2009 6:01:15 PM
Tetrachioroethene (PCE)	<b>N</b> D	1.0	μ	g/L	1	4/21/2009 6:01:15 PM
trans-1,2-DCE	ND	1.0	μ	g/L	1	4/21/2009 6:01:15 PM
trans-1,3-Dichloropropene	ND	1.0	μί	g/L	1	4/21/2009 6:01:15 PM
1,2,3-Trichlorobenzene	ND	1.0	μg	g/L	1	4/21/2009 6:01:15 PM
1,2,4-Trichlorobenzene	ND	1.0	μį	g/L	1	4/21/2009 6:01:15 PM
1,1,1-Trichloroethane	ND	1.0	μο	g/L	1	4/21/2009 6:01:15 PM
1,1,2-Trichloroethane	ND	1.0	μο	g/L	1	4/21/2009 6:01:15 PM
Trichloroethene (TCE)	ND	1.0	μς	g/L	1	4/21/2009 6:01:15 PM
Trichtorofluoromethane	ND	1.0	μg	g/L	1	4/21/2009 6:01:15 PM
1,2,3-Trichloropropane	ND	2.0	μg	g/L	1	4/21/2009 6:01:15 PM
Vinyl chloride	ND	1.0	μg	j/L	1	4/21/2009 6:01:15 PM
Xylenes, Total	ND	1.5	μg	J/L	1	4/21/2009 6:01:15 PM
Surr: 1,2-Dichloroethane-d4	87.9	68.1-123	%	REC	1	4/21/2009 6:01:15 PM
Surr: 4-Bromofluorobenzene	104	53.2-145	%	REC	1	4/21/2009 6:01:15 PM
Surr: Dibromofluoromethane	94.2	68.5-119		REC	1	4/21/2009 6:01:15 PM
Surr: Toluene-d8	99.0	64-131	%	REC	1	4/21/2009 6:01:15 PM



- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit





Date: 04-May-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0904211

Project:

Injection Well 2nd QTR 4/14/09

Lab ID:

0904211-01

Client Sample ID: Injection Well

Collection Date: 4/14/2009 8:45:00 AM

Date Received: 4/15/2009

Matrix: AQUEOUS

Analyses	Result	PQL Q	ual Units	DF	Date Analyzed
SM 2320B: ALKALINITY			***************************************		Analyst: NSB
Alkalinity, Total (As CaCO3)	330	20	mg/L CaCO3	1	4/15/2009
Carbonate	ND	2.0	mg/L CaCO3	1	4/15/2009
Bicarbonate	330	20	mg/L CaCO3	1	4/15/2009
EPA 120.1: SPECIFIC CONDUCTANCE					Analyst: <b>NS</b> B
Specific Conductance	5000	0.010	µmhos/cm	1	4/15/2009
SM4500-H+B: PH					Analyst: NSB
На	7.44	0.1	pH units	1	4/15/2009
SM2540C MOD; TOTAL DISSOLVED S	OLIDS				Analyst: <b>JMP</b>
Total Dissolved Solids	2800	100	mg/L	1	4/15/2009

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- Value exceeds Maximum Contaminant Level
- Estimated value Ε
- Analyte detected below quantitation limits
- Not Detected at the Reporting Limit
- Spike recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- Reporting Limit



Date: 04-May-09



Western Refining Southwest, Inc.

Lab Order:

0904211

Project: Inj

Injection Well 2nd QTR 4/14/09

Lab ID:

0904211-02

Client Sample ID: TRIP BLANK

**Collection Date:** 

Date Received: 4/15/2009

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	····	·····				Analyst: HL
Benzene	ND	1.0		μg/L	1	4/21/2009 6:30:01 PM
Toluene	ND -	1.0		μg/L	1	4/21/2009 6:30:01 PM
Ethylbenzene	ND	1.0	•	µg/L	1	4/21/2009 6:30:01 PM
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
1,2,4-Trimethylbenzene	ND	1.0		μg/L	1	4/21/2009 6:30:01 PM
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
1,2-Dichloroethane (EDC)	ND	1.0		μg/L	1	4/21/2009 6:30:01 PM
1,2-Dibromoethane (EDB)	ND	. 1.0		µg/L	1	4/21/2009 6:30:01 PM
Naphthalene	ND	2.0		µg/L	1	4/21/2009 6:30:01 PM
1-Methylnaphthalene	ND	4.0		µg/L	1	4/21/2009 6:30:01 PM
2-Methylnaphthalene	ND	4.0		μg/L	1	4/21/2009 6:30:01 PM
Acetone	ND	10		µg/L	1	4/21/2009 6:30:01 PM
Bromobenzene	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
Bromodichloromethane	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
Bromoform	ND	1.0		μg/L	1	4/21/2009 6:30:01 PM
Bromomethane	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
2-Butanone	ND	10		μg/L	1	4/21/2009 6:30:01 PM
Carbon disulfide	ND	10		μg/L	1	4/21/2009 6:30:01 PM
Carbon Tetrachloride	ND	1.0		μg/L	1	4/21/2009 6:30:01 PM
Chlorobenzene	ND	1.0		μg/L	1	4/21/2009 6:30:01 PM
Chloroethane	ND	2.0		µg/L	1	4/21/2009 6:30:01 PM
Chloroform	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
Chloromethane	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
2-Chlorotoluene	ND	1.0		µg/L	1	4/21/2009 8:30:01 PM
4-Chlorotoluene	ND	1.0		μg/L	1	4/21/2009 6:30:01 PM
cis-1,2-DCE	ND	1.0		μg/L	1	4/21/2009 6:30:01 PM
cis-1,3-Dichloropropene	ND	1.0		μg/L	1	4/21/2009 6:30:01 PM
1,2-Dibromo-3-chloropropane	ND	2.0		μg/L	1	4/21/2009 6:30:01 PM
Dibromochloromethane	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
Dibromomethane	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
1,2-Dichlorobenzene	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
1,3-Dichlorobenzene	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
1,4-Dichlorobenzene	ND	1.0		μg/L	1	4/21/2009 6:30:01 PM
Dichlorodifluoromethane	ND	1.0		μg/L	1	4/21/2009 6:30:01 PM
1,1-Dichloroethane	ND	1.0		μg/L	1	4/21/2009 6:30:01 PM
1,1-Dichloroethene	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
1,2-Dichloropropane	ND	1.0		μg/L	. 1	4/21/2009 6:30:01 PM
1,3-Dichloropropane	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
2,2-Dichloropropane	ND	2.0		µg/L	1	4/21/2009 6:30:01 PM
1,1-Dichloropropene	ND	1.0		μg/L	1	4/21/2009 6:30:01 PM
Hexachlorobutadiene	ND	1.0		ha\r	1	4/21/2009 6:30:01 PM
2-Hexanone	ND	10		µg/L	1	4/21/2009 6:30:01 PM



- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
  - RL Reporting Limit

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Date: 04-May-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0904211

0704211

Project: Lab ID: Injection Well 2nd QTR 4/14/09

0904211-02

Client Sample ID: TRIP BLANK

Collection Date:

Date Received: 4/15/2009

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES				· · · · · · · · · · · · · · · · · · ·	Analyst: HL
isopropylbenzene	ND	1.0	hg/L	1 .	4/21/2009 8:30:01 PM
4-Isopropyitoluene	ND	· 1.0	μg/L	1	4/21/2009 6:30:01 PM
4-Methyl-2-pentanone	ND	10	μg/L	1	4/21/2009 6:30:01 PM
Methylene Chloride	ND	3.0	μg/L	1	4/21/2009 6:30:01 PM
n-Butylbenzene	ND	1.0	μg/L	1	4/21/2009 6:30:01 PM
n-Propylbenzene	ND	1.0	μg/L	1	4/21/2009 6:30:01 PM
sec-Butylbenzene	ND	1.0	μg/L	. 1	4/21/2009 6:30:01 PM
Styrene	, ND	1.0	μ <b>g</b> /L	. 1	4/21/2009 6:30:01 PM
tert-Butylbenzene	ND	1.0	µg/L	1	4/21/2009 6:30:01 PM
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	4/21/2009 6:30:01 PM
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	4/21/2009 6:30:01 PM
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	4/21/2009 6:30:01 PM
trans-1,2-DCE	ND	1.0	μg/L	1	4/21/2009 6:30:01 PM
trans-1,3-Dichloropropene	ND	1.0	· μg/L	1	4/21/2009 6:30:01 PM
1,2,3-Trichlorobenzene	ND	1.0	µg/L	1	4/21/2009 6:30:01 PM
1,2,4-Trichlorobenzene	<b>N</b> D	1.0	μg/L	1	4/21/2009 6:30:01 PM
1,1,1-Trichloroethane	ND	1.0	µg/L	1	4/21/2009 6:30:01 PM
1,1,2-Trichloroethane	ND	1.0	µg/L	1 .	4/21/2009 6:30:01 PM
Trichloroethene (TCE)	ND	1.0	μg/L:	1	4/21/2009 6:30:01 PM
Trichlorofluoromethane	ND	1.0	μg/L	1	4/21/2009 6:30:01 PM
1,2,3-Trichloropropane	· , ND	2.0	μg/L	. 1	4/21/2009 6:30:01 PM
Vinyl chloride	<b>N</b> D	1.0	µg/L	1	4/21/2009 6:30:01 PM
Xylenes, Total	ND	1.5	μg/L	1	4/21/2009 6:30:01 PM
Surr: 1,2-Dichloroethane-d4	86.8	68.1-123	%REC	1	4/21/2009 6:30:01 PM
Surr: 4-Bromofluorobenzene	102	53.2-145	%REC	1	4/21/2009 6:30:01 PM
Surr: Dibromofluoromethane	92.2	68.5-119	%REC	1	4/21/2009 6:30:01 PM
Surr: Toluene-d8	97.4	64-131	%REC	1	4/21/2009 6:30:01 PM

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- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

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#### LABORATORY ANALYTICAL REPORT

Client:

Hall Environmental

Project: Lab ID:

0904211

B09041551-001

Client Sample ID: 0904211-01E, Injection Well

Report Date: 04/27/09

Collection Date: 04/14/09 08:45

DateReceived: 04/16/09 -

Matrix: Aqueous

Analyses	Result	Unite	Qualifiers	RL.	GCF MCF/	Method	Analysis Date / By
IGNITABILITY							
Flash Point (Ignitability)	>200	٠F		30		SW1010A	02/17/09 15:00 / cir
CORROSIVITY							
pH of Liquid Waste	7.35	s.u.		0.10		SW9040C	04/17/09 11:30 / clr
REACTIVITY	. •						
Cyanide, Readive	, ND	mg/kg		0.05	250	8W846 Ch 7	04/21/09 09:57 / kjp
Sulfide, Reactive	ND	mg/kg		20	500	SW846 Ch 7	04/17/09 08:00 / pwo

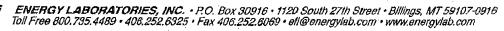


RL - Analyte reporting limit.

QCL - Quality control limit.

MCL - Maximum contaminant level. ND - Not detected at the reporting limit.







### **QA/QC Summary Report**

Client: Hall Environmental

Report Date: 04/22/09

Project: 0904211

Work Order: B09041551

Analyte	Result Units	RL	%REC Low Limit High Limit RP	D RPDLimit Quai
Method: SW846 Ch 7		<del></del>		Batch: 38348
Sample ID: MB-38348 Cyanide, Reactive	Method Blank ND mg/kg	0.05	Run: AUTOAN201-8_090421A	04/21/09 10:01
Method: SW846 Ch 7			· ·	Batch: R127981
Sample ID: MB-R127981	Method Blank		Run: MISC-HZW_090417A	04/17/09 08:00
Sulfide, Reactive	ND mg/kg	10		
Sample ID: LCS-R127981	Laboratory Control Sample		Run: MISC-HZW_090417A	04/17/09 08:00
Sulfide, Reactive	<b>32</b> mg/kg	20	110 50 150	
Method: SW9040C				Batch: R127984
Sample ID: B09041650-001ADUP	Sample Duplicate		Run: MISC-HZW_090417B	04/17/09 11:30
pH of Liquid Waste	7.22 s.u.	0.10		



RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



Date: 04-May-09

## QA/QC SUMMARY REPORT

ent: Oject: Western Refining Southwest, Inc. Injection Well 2nd QTR 4/14/09

Work Order:

0904211

Analyte	Result	Units	PQL	%Rec	LowLimit Hi	ghLimit	%RPD RP	DLimit Qual
Method: EPA Method 300.0:	Anions							
Sample ID: MB		MBLK			Batch ID:	R33495	Analysis Date:	4/30/2009 12:42:50 PM
Chloride	ND	mg/L	0.10					
Sulfate	ND	mg/L	0.50					
Sample ID: MB		MBLK			Batch ID:	R33509	Analysis Date:	5/2/2009 1:01:19 PM
Chloride	ND	mg/L	0.10					
Sulfate	ND	mg/L	0.50					
Sample ID: LCS		LCS			Batch ID:	R33495	Analysis Date:	4/30/2009 1:00:14 PM
Chloride	4.968	mg/L	0.10	99.4	90	110		
Sulfate	9.991	mg/L	0.50	99.9	90	110		
Sample ID: LCS		LCS			Batch ID:	R33509	Analysis Date:	5/2/2009 1:18:43 PM
Chloride	5.064	mg/L	0.10	101	90	110		•
Sulfate	10.20	mg/L	0.50	102	90	110		
Method: SM 2320B: Alkalinity	y							
Sample ID: MB		MBLK			Batch ID:	R33262	Analysis Date:	4/15/2009
Alkalinity, Total (As CaCO3)	ND	mg/L CaC	20			*		
Carbonate	ND	mg/L CaC	2.0					
Bicarbonate	ND	mg/L CaC	20					
Sample ID: 80PPM LCS		LCS			Batch ID:	R33262	Analysis Date:	4/15/2009
kalinity, Total (As CaCO3)	82.16	mg/L CaC	20	103	80 1	120		





Estimated value

Analyte detected below quantitation limits

RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

Project: Injection Well 2nd QTR 4/14/09

Work Order:

0904211

			%Rec		hLimit	%RPD RPI	OLimit Qual
VOLATILES							
	MBLK			Batch ID:	R33331	Analysis Date:	4/20/2009 8:54:55 AM
ND	µg/L	1.0					
4						•	
						•	
					,		
							•
						-	
						•	
						•	
						•	
						•	
					,	•	
				•			4
					*		
				*			
		ND	ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 ND μg/L 1.0 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E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits



ent: ject: Western Refining Southwest, Inc.

Injection Well 2nd QTR 4/14/09

Work Order:

0904211

Analyte	Result	Units	PQL	%Rec	LowLimit Hi	ghLimit	%RPD RP	DLimit Qual
Method: EPA Method 8260B	: VOLATILES							
Sample ID: 5ml rb		MBLK			Batch ID:	R33331	Analysis Date:	4/20/2009 8:54:55 AN
4-Methyl-2-pentanone	ND	µg/L	10					
Methylene Chloride	ND	µg/L	3.0					
n-Butylbenzene	ND	µg/L	1.0					
n-Propylbenzene	ND	μg/L	1.0					
sec-Butylbenzene	ND	μg/L	1.0					
Styrene	ND	μg/L	1.0					
tert-Butylbenzene	ND	μg/L	1.0					
1,1,1,2-Tetrachtoroethane	ND	μg/L	1.0					
1,1,2,2-Tetrachioroethane	ND	µg/L	2.0					I
Tetrachloroethene (PCE)	ND	µg/L	1.0					
trans-1,2-DCE	ND	µg/L	1.0					
trans-1,3-Dichloropropene	ND	µg/L	1.0					
1,2,3-Trichlorobenzene	ND	µg/L	1.0			•		
1,2,4-Trichlorobenzene	ND	µg/L	1.0					
1,1,1-Trichloroethane	ND	µg/L	1.0				•	
1,1,2-Trichloroethane	ND	µg/L	1.0					
Trichloroethene (TCE)	ND	μg/L	1.0					
Trichlorofluoromethane	ND	μg/L	1.0					
1,2,3-Trichloropropane	ND	μg/L	2.0					
vi chloride	ND	μg/L	1.0					
nes, Total	ND	μg/L	1.5	*				
Sample ID: b4		MBLK			Batch ID:	R33331	Analysis Date:	4/20/2009 9:25:32 PM
Benzene	ND	μg/L	1.0				*	
Toluene	ND	μg/L	1.0					
Ethylbenzene	ND	µg/L	1.0					
Methyl tert-butyl ether (MTBE)	ND	µg/L	1.0					
1,2,4-Trimethylbenzene	ND	μg/L	1.0		•			
1,3,5-Trimethylbenzene	ND	μg/L	1.0					
1,2-Dichloroethane (EDC)	ND	μg/L	1.0					
1,2-Dibromoethane (EDB)	ND	μg/L	1.0					•
Naphthalene	ND	μg/L	2.0					
1-Methylnaphthalene	ND	µg/L	4.0					
2-Methylnaphthalene	ND "	µg/L	4.0					
Acetone	ND	µg/L	10					
Bromobenzene	ND	µg/L	1.0					
Bromodichloromethane	ND	µg/L	1.0					
Bromoform	ND	μg/L	1.0					
Bromomethane	ND	μg/L	1.0					
2-Butanone	ND	µg/L	10					
Carbon disulfide	ND	µg/L	10					
Carbon Tetrachloride	ND	μg/L	1.0					
Chlorobenzene	ND	μg/L	1.0					
Chloroethane	ND	µg/L	2.0					
Chloroform	ND	µg/L	1.0					





Estimated value

Analyte detected below quantitation limits RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

Project: Injection Well 2nd QTR 4/14/09

Work Order:

0904211

Analyte	Result	Units	PQL	%Rec	LowLimit HighLimit	%RPD RPI	DLimit Qual
Method: EPA Method 8260B:	VOLATILES	4.00			Date In	0 1	1/00/0000 0 55 00 55
Sample ID: b4		MBLK			Batch ID: R33331	Analysis Date:	4/20/2009 9:25:32 PM
Chloromethane	ND	µg/L	. 1.0				
2-Chlorotoluene	ND	μg/L	1.0		•		
4-Chlorotoluene	ND	µg/L	1.0		•		1 / 1 / 2
cis-1,2-DCE	ND	µg/L	1.0			,	
cis-1,3-Dichloropropene	ND	μg/L	1.0				
1,2-Dibromo-3-chloropropane	ND	µg/L	2.0				
Dibromochloromethane	ND	µg/L	1.0		·	•	
Dibromomethane	ND	µg/L	1.0				
1,2-Dichlorobenzene	ND	μg/L	1.0			4	
1,3-Dichlorobenzene	ND	µg/L	1.0				
1,4-Dichlorobenzene	ND	μg/L	1.0				•
Dichlorodifluoromethane	ND	μg/L	1.0				
1,1-Dichloroethane	ND	μg/L	1.0		•		
1,1-Dichloroethene	ND	µg/L	1.0				
1,2-Dichloropropane	ND	µg/L	1.0				
1,3-Dichloropropane	ND	μg/L	1.0				
2,2-Dichloropropane	ND	µg/L	2.0				
1,1-Dichloropropene	ND	µg/L	1.0		•		
Hexachlorobutadiene	ND	µg/L	1.0				
2-Hexanone	ND	µg/L	10				
tsopropylbenzene	ND	µg/L	1.0			•	
4-Isopropyitoluene	ND	µg/L	1.0				
4-Methyl-2-pentanone	ND	µg/L	10				
Methylene Chloride	ND -	µg/L	3.0				i .
n-Butylbenzene	ND .	μg/L	1.0				
n-Propylbenzene	, ND	µg/L	1.0		•		
sec-Butylbenzene	ND	µg/L	1.0				
Styrene	ND	µg/L	1.0				
tert-Butylbenzene	ND	µg/L	1,0				
1,1,1,2-Tetrachloroethane	ND	µg/L	1.0				
1,1,2,2-Tetrachloroethane	ND	µg/L	2.0				
Tetrachloroethene (PCE)	ND	µg/L	1.0				
trans-1,2-DCE	ND	µg/L	1.0				٠.
trans-1,3-Dichtoropropene	ND	µg/L	1.0				
1,2,3-Trichlorobenzene	ND	µg/L	1.0				
1,2,4-Trichlorobenzene	ND	µg/L	1.0				
1,1,1-Trichloroethane	ND	µg/L	1.0				
1,1,2-Trichloroethane	ND	µg/L	1.0				
Trichloroethene (TCE)	ND	µg/L	1.0				
Trichlorofluoromethane	ND	μg/L	1.0				
1,2,3-Trichloropropane	ND	µg/L	2.0				
Vinyl chloride	ND	µg/L	1.0				•
Xylenes, Total	ND	μg/L	1.5				
Sample ID: 5ml rb		MBLK			Batch ID: R33347	Analysis Date:	4/21/2009 B:37:30 AM



E Estimated value

J Analyte detected below quantitation limits

R. RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Spike recovery outside accepted recovery limits



ent: ject: Western Refining Southwest, Inc. Injection Well 2nd QTR 4/14/09

Work Order:

0904211

Analyte	Result	Units	PQL	%Rec	LowLimit Hi	ghLimit	%RPD RP	DLimit Qual
Method: EPA Method 8260B:	VOLATILES							
Sample ID: 5ml rb		MBLK			Batch ID:	R33347	Analysis Date:	4/21/2009 8:37:30 AM
Benzene	ND	μg/L	1.0					•
Toluene	ND	μg/L	1.0					
Ethylbenzene	ND	μg/L	1.0					
Methyl tert-butyl ether (MTBE)	ND	μg/L	1.0					
1,2,4-Trimethylbenzene	ND	μg/L	1.0					
1,3,5-Trimethylbenzene	ND	μg/L	1.0					
1,2-Dichloroethane (EDC)	ND	μg/L	1.0					
1,2-Dibromoethane (EDB)	ND ·	μg/L	1.0					
Naphthalene	ND	µg/L	2.0					
1-Methylnaphthalene	ND	μg/L	4.0					
2-Methylnaphthalene	ND	μg/L	4.0					
Acetone	ND	μg/L	10					
Bromobenzene	ND	μg/L	1.0					
Bromodichloromethane	ND	μg/L	1.0					
Bromoform	ND	µg/L	1.0					
Bromomethane	ND	µg/L	1.0					•
2-Butanone	ND	μg/L	10					
Carbon disulfide	ND	μg/L	10					
Carbon Tetrachloride	ND	μg/L μg/L	1.0					
oanon retracmonde  Norobenzene	ND	μg/L μg/L	1.0					
proethane	ND	μg/L	2.0					
Chloroform	ND	μg/L μg/L	1.0					
Chloromethane	ND	μg/L μg/L	1.0					
2-Chlorotoluene	ND		1.0					
4-Chlorotoluene		μg/L	1.0					
cis-1,2-DCE	ND ND	μg/L	1.0					
	ND	. μg/L						
cis-1,3-Dichloropropene	ND	μg/L	1.0					
1,2-Dibromo-3-chloropropane	ND	µg/L	2.0					
Dibromochloromethane	ND	µg/L	1.0					
Dibromomethane	ND	µg/L	1.0					
1,2-Dichlorobenzene	ND	μg/L	1.0					
1,3-Dichlorobenzene	ND	µg/L	1.0					
1,4-Dichlorobenzene	ND	µg/L	1.0					
Dichlorodifluoromethane	ND	μg/L	1.0					
1,1-Dichloroethane	ND	µg/L	1.0					
1,1-Dichloroethene	ND	µg/L	1.0					
1,2-Dichloropropane	ND	µg/L	1.0					
1,3-Dichloropropane	ND ND	µg/L	1.0					
2,2-Dichloropropane	ND	µg/L	2.0					
1,1-Dichloropropene	ND	µg/L	1.0					
Hexachlorobutadiene	ND	μg/L	1.0					
2-Hexanone	ND	μg/L	10					
Isopropylbenzene	ND	µg/L	1.0					
4-isopropyltoluene	ND	µg/L	1.0					





Estimated value

Analyte detected below quantitation limits

RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 2nd QTR 4/14/09

Work Order:

0904211

Analyte	Result	Units	PQL	%Rec	LowLimit Hip	ghLimit	%RPD RPI	OLimit Qual
Method: EPA Method 8260B;	VOLATILES							
Sample ID: 5ml rb		MBLK			Batch ID:	R33347	Analysis Date:	4/21/2009 8:37:30 AM
4-Methyl-2-pentanone	ND	µg/L	10					
Methylene Chloride	: ND	µg/L	3.0					
n-Butylbenzene	ND	µg/L	1.0					
n-Propylbenzene	ND	µg/L	1.0					
sec-Butylbenzene	ND	μg/L	1.0				·	
Styrene	ND	μg/L	1.0					
tert-Butylbenzene	ND	μg/L	1.0					
1,1,1,2-Tetrachloroethane	ND	µg/L	1.0					
1,1,2,2-Tetrachloroethane	ND	µg/L	2.0					
Tetrachloroethene (PCE)	ND	μg/L	1.0					
rans-1,2-DCE	ND	hg/r	1.0					
trans-1,3-Dichloropropene	ND	µg/L	1.0					•
1,2,3-Trichtorobenzene	ND	μg/L	1.0					
1,2,4-Trichlorobenzene	ND	µg/L	1.0					
1,1,1-Trichtoroethane	ND	μg/L	1.0					
1,1,2-Trichloroethane	ND	µg/L	1.0					
Trichloroethene (TCE)	ND	μg/L	1.0					
Trichlorofluoromethane	ND	hg/L	1.0					
1,2,3-Trichloropropane	ND	µg/L	2.0					
/inyl chloride	ND	μg/L	1.0					
Kylenes, Total	ND	μg/L	1.5					
Sample ID: b4		MBLK			Batch ID:	R33347	Analysis Date:	4/21/2009 8:24:43 PM
Benzene	ND	µg/L	1.0				•	
Toluene	ND	µg/L	1.0					
Ethylbenzene	ND	μg/L	1.0	•				
Methyl tert-butyl ether (MTBE)	ND	μg/L	1.0					
1,2,4-Trimethylbenzene	ND	μg/L	1.0					
,3,5-Trimethylbenzene	ND	µg/L	1.0					
,2-Dichloroethane (EDC)	ND	μg/L	1.0					
,2-Dibromoethane (EDB)	ND	μg/L	1.0		•			
Naphthalene	ND	µg/L	2.0					
l-Methylnaphthalene	ND	µg/L	4.0					
2-Methylnaphthalene	ND	μg/L	4.0					
Acetone	ND	µg/L	10					
nosione .		und	1.0					
•	ND	μg/L						
Bromobenzene	ND D	μg/L	1.0					
Bromobenzene Bromodichloromethane	ND ND		1.0 1.0			,		
Bromobenzene Bromodichloromethane Bromoform	ND ND ND	μg/L	1.0 1.0 1.0					
Bromobenzene Bromodichloromethane Bromoform Bromomethane 2-Butanone	ND ND ND ND	h8\r h8\r h8\r h8\r	1.0 1.0 1.0 10			•		
Bromobenzene Bromodichloromethane Bromoform Bromomethane 2-Butanone	ND ND ND	µg/L µg/L	1.0 1.0 1.0 10			•		
Bromobenzene Bromodichloromethane Bromoform Bromomethane 2-Butanone Carbon disulfide	ND ND ND ND	h8\r h8\r h8\r h8\r	1.0 1.0 1.0 10 10					
Bromobenzene Bromodichloromethane Bromoform Bromomethane 2-Butanone Carbon disulfide Carbon Tetrachloride	ND ND ND ND ND ND ND	ha\r ha\r ha\r ha\r ha\r ha\r ha\r	1.0 1.0 1.0 10 10 1.0 1.0					
Bromobenzene Bromodichloromethane Bromoform Bromomethane 2-Butanone Carbon disulfide Carbon Tetrachloride Chlorobenzene Chloroethane	ND ND ND ND ND ND	h8\r h8\r h8\r h8\r h8\r	1.0 1.0 1.0 10 10					



E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits



ent: ject: Western Refining Southwest, Inc. Injection Well 2nd QTR 4/14/09

Work Order:

0904211

Analyte	Result	Units	PQL	%Rec	LowLimit H	lighLimit	%RPD R	PDLimit Qual
Method: EPA Method 8260B:	: VOLATILES							
Sample ID: b4		MBLK			Batch ID:	R33347	Analysis Date:	4/21/2009 8:24:43 PN
Chloromethane	ND	μg/L	1.0				•	
2-Chlorotoluene	ND	μg/L	1.0					•
4-Chlorotoluene	ND	μg/L	1.0					
cis-1,2-DCE	ND	μg/L	1.0					
cis-1,3-Dichloropropene	ND	µg/L	1.0	٠				
1,2-Dibromo-3-chloropropane	ND	µg/L	2.0					
Dibromochloromethane	ND	μg/L	1.0					
Dibromomethane	ND	μg/L	1.0					
1,2-Dichlorobenzene	ND	μg/L	1.0					
1,3-Dichlorobenzene	ND	μg/L	1.0					
1,4-Dichlorobenzene	ND 1	µg/L	1.0					
Dichlorodifluoromethane	ND	µg/L	1.0					
1,1-Dichloroethane	ND	µg/L	1.0					
1,1-Dichloroethene	ND	µg/L	1.0					
1,2-Dichloropropane	. ND	μ <b>g</b> /L	1.0					
1,3-Dichloropropane	ND	µ <b>g/</b> L	1.0					•
2,2-Dichloropropane	ND	µg/L	2.0					
1,1-Dichloropropene	ND	μg/L	1.0					
Hexachlorobutadiene	NĎ	μg/L	1.0					
texanone	ND	μg/L	10					
propylbenzene	ND	μg/L	1.0					
4-Isopropyltoluene	ND	μg/L	1.0					
4-Methyl-2-pentanone	ND	μg/L	10					
Methylene Chloride	ND	μg/L	3.0					
n-Butylbenzene	ND	µg/L	1.0					
n-Propylbenzene	ND	μg/L	1.0					
sec-Butylbenzene	ND	μ <b>g</b> /L	1.0					
Styrene	ND	μg/L	1.0					
tert-Butylbenzene	ND	μg/L	1.0					
1,1,1,2-Tetrachioroethane	ND	μg/L	1.0					
1,1,2,2-Tetrachloroethane	ND	μg/L	2.0.					
Tetrachloroethene (PCE)	ND	μg/L	1.0					
trans-1,2-DCE	ND -	μg/L	1.0					
trans-1,3-Dichloropropene	ND	μg/L	1.0					
1,2,3-Trichlorobenzene	ND	µg/L	1.0					
1,2,4-Trichlorobenzene	ND	μg/L	1.0					
1,1,1-Trichloroethane	ND	µg/L	1.0					
1,1,2-Trichloroethane	ND	μg/L	1.0					
Trichloroethene (TCE)	ND	µg/L	1.0					
Trichlorofluoromethane	ND	μg/L	1.0					•
1,2,3-Trichloropropane	ND	µg/L	2.0					
Vinyl chloride	ND	μg/L	1.0					
Kylenes, Total	ND	μg/L	1.5					
Sample ID: 100ng lcs		LCS			Batch ID:	R33347	Analysis Date:	4/21/2009 9:37:16 AM

Qualifiers:



Estimated value

Analyte detected below quantitation limits

RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Date: 04-May-09

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project: Injection Well 2nd QTR 4/14/09

Work Order:

0904211

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD RP	DLimit Qual
Method: EPA Method 8260B:	VOLATILES							
Sample ID: 100ng Ics		LCS			Batch	ID: R33347	Analysis Date:	4/21/2009 9:37:16 AM
Benzene	21.59	μg/L	1.0	108	88	116		
Toluene	19.82	μg/L	1.0	99.1	82.9	112		
Chlorobenzene	22.11	µg/L	1.0	111	71.4	133		
1,1-Dichtoroethene	22.45	µg/L	1.0	112	97.9	140		
Trichtoroethene (TCE)	18.97	µg/L	1.0	94.8	90.5	112		•
Sample ID: 100ng ics_b		LCS			Batch	ID: <b>R33347</b>	Analysis Date:	4/21/2009 9:22:10 PM
Benzene	17.19	μg/L	1.0	85.9	88	116		S
Toluene	22.31	μg/L	1.0	112	82.9	112		
Chlorobenzene	22.16	μg/L	1.0	111	71.4	133		
1,1-Dichloroethene	21.75	µg/L	1.0	109	97.9	140		
Trichloroethene (TCE)	17.51	µg/L	1.0	87.5	90.5	112		\$



E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits



0904211

## QA/QC SUMMARY REPORT

ent: oject: Western Refining Southwest, Inc.

Injection Well 2nd QTR 4/14/09 Work Order:

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C:	: Semivolatiles								
Sample ID: mb-18876		MBLK			Batch	ID: 18876	Analysis I	Date:	4/20/200
Acenaphthene	ND	μg/L	10						
Acenaphthylene	ND	µg/L	10						
Aniline	ND	μg/L	10						
Anthracene	ND	μg/L	10					•	
Azobenzene	ND	μg/L	10						
Benz(a)anthracene	ND	μg/L	10						
Benzo(a)pyrene	ND	μg/L	10						
Benzo(b)fluoranthene	ND	μg/L	10						
Benzo(g,h,i)perylene	ND	µg/L	10						
Benzo(k)fluoranthene	ND	μg/L	10						
Benzoic acid	ND	μg/L	20						
Benzyl alcohol	ND	μg/L	10						
Bis(2-chloroethoxy)methane	ND	µg/L	10						
Bis(2-chloroethyl)ether	ND	µg/L	10						
Bis(2-chloroisopropyl)ether	ND	μg/L	10						
Bis(2-ethylnexyl)phthalate	ND	μg/L	10						
4-Bromophenyl phenyl ether	ND	μg/L	10						
Butyl benzyl phthalate	ND	μg/L	10						
Carbazole	ND	μg/L	10						
hloro-3-methylphenol	ND	μg/L	10						
Chloroaniline	ND	µg/L	10						
2-Chloronaphthalene	ND	μg/L	10						
2-Chlorophenol	ND	μg/L	10						
4-Chlorophenyl phenyl ether	ND	µg/L	10						
Chrysene	ND ·	μg/L	10						
Di-n-butyl phthalate	ND	μg/L	10						
Di-n-octyl phthalate	ND	μg/L	10						
Dibenz(a,h)anthracene	ND	µg/L	10						
Dibenzofuran	ND	µg/L	10						
1,2-Dichlorobenzene	ND	μg/L	5.0						
1,3-Dichlorobenzene	ND	µg/∟	10						
1,4-Dichlorobenzene	. ND	μg/L	5.0						
3,31-Dichlorobenzidine	ND	µg/Ļ	10						
Diethyl phthalate	ND	μg/L	10						
Dimethyl phthalate	ND	μg/L	10						
2,4-Dichlorophenol	ND	μg/L	20						
2,4-Dimethylphenol	ND	μg/L	10						
4,6-Dinitro-2-methylphenol	ND	μg/L	20						
2,4-Dinitrophenol	ND	μg/L	5.0						
2,4-Dinitrotoluene	ND	µg/L	5.0						
2,6-Dinitrotoluene	ND	μg/L	10						
Fluoranthene	ND	µg/L	10						
Fluorene	ND	µg/L	10						
Hexachlorobenzene	ND	µg/L	5.0						





Analyte detected below quantitation limits

RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Date: 04-May-09

### QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project: Injection Well 2nd QTR 4/14/09

Work Order:

0904211

Analyte	Result	Units	PQL	%Rec	LowLimit H	HighLimit	%RPD RI	PDLimit Qual
Method: EPA Method 8270C	: Semivolatiles							`
Sample ID: mb-18876		MBLK			Batch ID	18876	Analysis Date:	4/20/2009
Hexachlorobutadiene	ND ·	µg/L	10	•				
Hexachlorocyclopentadiene	ND	µg/L	10		-			
Hexachloroethane	ND	µg/L	5.0	•				
Indeno(1,2,3-cd)pyrene	ND	µg/L	10					
Isophorone	ND	µg/Ł	10		•			
2-Methylnaphthalene	ND -	μg/L	10					
2-Methylphenol	ND	μg/L	5.0					
3+4-Methylphenol	ND	µg/L	5.0		•			•
N-Nitrosodi-n-propylamine	ND	μg/L	10					
N-Nitrosodimethylamine	ND	µg/L	10					
N-Nitrosodiphenylamine	ND	µg/L	10				4	
Naphthalene	ND	µg/L	10					
2-Nitroaniline	ND ·	µg/L	10					
3-Nitroaniline	ND	µg/L	10					
4-Nitroaniline	ND .	μg/L	10					
Nitrobenzene	ND	µg/L	5.0					
2-Nitrophenol	ND	· µg/L	10					
4-Nitrophenol	ND	µg/L	10					
Pentachlorophenol	ND	µg/L	5.0					
Phenanthrene	ND	µg/L	10					
Phenol	ND	µg/L	10				*	
Pyrene	ND	μg/L	10					
Pyridine	ND	μg/L	5.0					
1,2,4-Trichlorobenzene	ND	µg/L	10					
2,4,5-Trichlorophenol	ND	μg/L	10					
2,4,6-Trichtorophenol	ND	µg/L	10					
Method: EPA Method 7470; M	Mercury							
Sample ID: MB-18932		MBLK			Batch ID:	18932	Analysis Date:	4/24/2009 2:22:57 PM
Mercury	ND .	mg/L	0.00020					
Sample ID: LCS-18932		LCS			Batch ID:	18932	Analysis Date:	4/24/2009 2:24:42 PM
Mercury	0.004984	mg/L	0.00020	98.9	80	120		•
•		~						

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0	ua	li	ĩe	rs:

Estimated value

Analyte detected below quantitation limits

R RPD outside accepted recovery limits

Holding times for preparation or analysis exceeded Η

ND Not Detected at the Reporting Limit

Spike recovery outside accepted recovery limits



jent: oject: Western Refining Southwest, Inc. Injection Well 2nd QTR 4/14/09

Work Order:

0904211

Analyte	Result	Units	PQL	%Rec	LowLimit	High	Limit	%RPD RP	DLimit Qual
Method: EPA 6010B:	Total Recoverable Me	tals							
Sample ID: MB-18866		MBLK			Batch	ID:	18866	Analysis Date:	4/20/2009 9:07:16 A
Arsenic	ND	mg/L	0.020						
Barium	ND	mg/L	0.010					•	
Cadmium	. ND	mg/L	0.0020						
Calcium	ND	mg/L	0.50						
Chromium	ND	mg/L	0,0060						
Lead	ND	mg/L	0.0050						
Magnesium	ND	mg/L	0.50						
Potassium	ND	mg/L	1.0						
Selenium	ND	mg/L	0.050						
Silver	ND	mg/L	0.0050						
Sodium	ND	mg/L	0.50						
Sample ID: MB-18866		MBLK			Batch	ID:	18866	Analysis Date:	4/19/2009 5:51:34 PI
Arsenic	ND	mg/L	0.020						·
Barium	ND	mg/L	0.010						
Cadmium	ND	mg/L	0:0020						
Calcium	ND	mg/L	0.50						
Chromium	ND	mg/L	0.0060						
Lead	ND	mg/L	0.0050						
Magnesium	ND	mg/L	0.50						
assium	ND	mg/L	1.0						
lenium	ND	mg/L	0.050						
Silver	ND	mg/L	0.0050						
Sodium	ND	mg/L	0.50						
Sample ID: LCS-18866		LCS			Batch	ID:	18866	Analysis Date:	4/20/2009 8:31:59 AM
Arsenic	0.5145	mg/L	0.020	103	80	120			
Barium	0.4941	mg/L	0.010	98.8	80	120			
Cadmium	0.4979	mg/L	0.0020	99.6	80	120			
Calcium	51.97	mg/L	0.50	104	80	120			
Chromium	0.4953	mg/L	0.0060	99.1	80	120			
-ead	0.4924	mg/L	0.0050	98.5	80	120			
//Aagnesium	51.02	mg/L	0.50	102	80	120			
Potassium	52.96	mg/L	1.0	106	80	120			
Selenium	0.4778	mg/L	0.050	95.6	80	120			
Silver	0.4988	mg/L	0.0050	99.6	80	120			
Sodium	54.68	mg/L	0.50	109	80	120			
ample ID: LCS-18866		LCS			Batch (	D:	18866	Analysis Date:	4/19/2009 5:54:40 PM
rsenic	0.5018	mg/L	0.020	100	80	120			
arium .	0.4664	mg/L	0.010	93.3	80	120			
admium	0.4711	mg/L	0.0020	94.2	80	120			
alclum	48.32	mg/L	0.50	96.3	80	120			
Chromium	0.4885	mg/L	0.0060	97.7	80	<b>12</b> 0			
ead	0.4853	mg/L	0.0050	97.1	80	120			
1agnesium	46.35	mg/L	0.50	92.6	80	120			





Estimated value

Analyte detected below quantitation limits RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

Date: 04-May-09

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project: Injection Well 2nd QTR 4/14/09

Work Order:

0904211

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD RPI	OLimit Qual
Method: EPA 6010B: Total R	ecoverable Me	tals					,	
Sample ID: LCS-18866		LCS			Batch	ID: <b>1886</b> 6	Analysis Date:	4/19/2009 5:54:40 PM
Potassium	50.17	mg/L	1.0	100	80	120		
Selenium	0.4736	mg/L	0.050	94.7	80	120		
Silver	0.4660	mg/L	0.0050	93.0	80	120		
Sodium	48.74	mg/L	0.50	97.2	80	. 120		
Method: SM2540C MOD: Total	al Dissolved S	olids					•	
Sample ID: MB-18843		MBLK			Batch	D: 18843	Analysis Date:	4/15/2009
Total Dissolved Solids	ND	mg/L	20					
Sample ID: LCS-18843		LCS			Batch 1	ID: 18843	Analysis Date:	4/15/2009
Total Dissolved Solids	1006	mg/L	20	101	80	120		

Oug	lifie	121

E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits



•	Sample Rece	eipt	Checklist			
Client Name WESTERN REFINING SOUT			Date Received	<b>i</b> :	4/15/2009	
Work Order Number 0904211			Received by:	ARS		
Checklist completed by:		4	Sample ID la	bels checked b	y: Initiats	) 
Matrix:	Carrier name; <u>UPS</u>					
Objective contained and an addition?	Yes	V	No 🗀	Not Present		
Shipping container/cooler in good condition?		<b>V</b>	No 🗆		□ Not Shipped	· 🗆
Custody seals intact on shipping container/cooler?	Yes		No 🗀		■ Not Simpped	, ,
Custody seals intact on sample bottles?	Yes		No 🗆	14//		
Chain of custody present?			No 🗆			
Chain of custody signed when relinquished and received		<b>Y</b>	No 🗆			
Chain of custody agrees with sample labels?		_				
Samples in proper container/bottle?			No 🗀			
Sample containers intact?			· No ☐			
Sufficient sample volume for indicated test?			No ∐ □			
All samples received within holding time?		<b>2</b> .	No ☐ Yes 🗹	No∙□		
VValci - VO/V Viais Have 2010 houdspace	OA vials submitted Yes		No 🗌	N/A		
Nater - Preservation labels on bottle and cap match?  Water - pH acceptable upon receipt?		<b>☑</b>	No 🗆	N/A	·	
Container/Temp Blank temperature?	•	4°	<6° C Acceptable If given sufficient			
COMMENTS:						
				ar man and and and		
Client contacted Date co	intacted:		Perso	n contacted	****	
Contacted by: Regardl	Ing:					
Comments:						<del></del>
·						
Corrective Action						
<b>\</b>	and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s					



#### **COVER LETTER**

Friday, July 24, 2009

Cindy Hurtado Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4161 FAX (505) 632-3911

RE: Injection Well 3rd QTR 7/1/09

Dear Cindy Hurtado:

Order No.: 0907049

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 7/2/2009 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

NM Lab # NM9425 AZ license # AZ0682 ORELAP Lab # NM100001 Texas Lab# T104704424-08-TX



Date: 24-Jul-09

CLIENT:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd QTR 7/1/09

Lab Order:

0907049

CASE NARRATIVE

Analytical Comments for METHOD 8260_W, SAMPLE 0907049-01a: pH=7.0



Date: 24-Jul-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0907049

Injection Well 3rd QTR 7/1/09

Project: Lab ID:

0907049-01

Client Sample ID: Injection Well

Collection Date: 7/1/2009 10:30:00 AM

Date Received: 7/2/2009

Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS			· · · · · · · · · · · · · · · · · · ·			Analyst: TAF
Chloride	2200	20		mg/L	200	7/20/2009 10:14:14 AM
Sulfate	570	10		mg/L	20	7/20/2009 9:56:50 AM
EPA METHOD 8270C: SEMIVOLATILES						Analyst: JDC
Acenaphthene	ND	50		μg/L	1	7/7/2009
Acenaphthylene	ND	50		μg/L	1	7/7/2009
Aniline	ND	50		μg/L	1	7/7/2009
Anthracene	ND	50		µg/L	1	7/7/2009
Azobenzene	ND	50		μg/L	1 .	7/7/2009
Benz(a)anthracene	ND.	50		μg/L	1	7/7/2009
Benzo(a)pyrene	ND	50		µg/L	1	7/7/2009
Benzo(b)fluoranthene	ND	50		µg/L	1	7/7/2009
Benzo(g,h,i)perylene	ND	50		μg/L	1	7/7/2009
Benzo(k)fluoranthene	ND	50		μg/L	1	7/7/2009
Benzoic acid	ND	100		μg/L	1	7/7/2009
Benzyl alcohol	ND	50		μg/L	1	7/7/2009
Bis(2-chloroethoxy)methane	ND	50		μg/L	1	7/7/2009
Bis(2-chloroethyl)ether	ND	50		µg/L	1	7/7/2009
Bis(2-chloroisopropyl)ether	ND	50		μg/L	1	7/7/2009
Bis(2-ethylhexyl)phthalate	ND	50		μg/L	1	7/7/2009
4-Bromophenyl phenyl ether	ND	50		µg/L	1	7/7/2009
Butyl benzyl phthalate	ND	50		μg/L	1	7/7/2009
Carbazole	ND	50		μg/L	1	7/7/2009
4-Chloro-3-methylphenol	ND	50		μg/L	1	7/7/2009
4-Chloroaniline	ND	50		μg/L	1	7/7/2009
2-Chloronaphthalene	ND	50		μg/L	1	7/7/2009
2-Chlorophenol	ND	50		µg/L	1	7/7/2009
4-Chlorophenyi phenyl ether	ND	50		μg/L	1	7/7/2009
Chrysene	ND	50		μg/L	1	7/7/2009
Di-n-butyl phthalate	ND	50		µg/L	1	7/7/2009
Di-n-octyl phthalate	ND	50		µg/L	1	7/7/2009
Dibenz(a,h)anthracene	ND	50		μg/L	1	7/7/2009
Dibenzofuran	ND	50		μg/L	1	7/7/2009
1,2-Dichlorobenzene	ND	50		μg/L	1	7/7/2009
1,3-Dichlorobenzene	ND	50		µg/L	1	7/7/2009
1,4-Dichlorobenzene	ND	50		µg/L	1	7/7/2009
3,3'-Dichlorobenzidine	ND	50		µg/L	1	7/7/2009
Diethyl phthalate	ND	50		μg/L	1	7/7/2009
Dimethyl phthalate	ND	50	'-	μg/L	1	7/7/2009
2,4-Dichlorophenol	ND	100		µg/L	1	7/7/2009
2,4-Dimethylphenol	ND	50		µg/L	1	7/7/2009
4,6-Dinitro-2-methylphenol	ND	100		ug/L	1	7/7/2009



- * Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 1 of 6

Date: 24-Jul-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0907049

Project:

Injection Well 3rd QTR 7/1/09

Lab ID:

0907049-01

Client Sample ID: Injection Well

Collection Date: 7/1/2009 10:30:00 AM

Date Received: 7/2/2009

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATIL	.ES				Analyst: JD0
2,4-Dinitrophenol	ND	100	μg/L	1	7/7/2009
2,4-Dinitrotoluene	ND ND	50	μg/L	1	7/7/2009
2,6-Dinitrotoluene	ND	50-	µg/L	1	7/7/2009
Fluoranthene	ND	50	µg/∟	1	7/7/2009
Fluorene	ND	.50	μg/L	1	7/7/2009
Hexachlorobenzene	ND	50	μg/L	. 1	7/7/2009
Hexachlorobutadiene	ND	50	μg/L	1	7/7/2009
Hexachlorocyclopentadiene	. ND	50	μg/L	1	7/7/2009
Hexachloroethane	ND	50	µg/L	1	7/7/2009
Indeno(1,2,3-cd)pyrene	ND	50	μg/L	1	7/7/2009
Isophorone	ND	50	μg/L	1	7/7/2009
2-Methylnaphthalene	ND	50	μg/L	1	7/7/2009
2-Methylphenol	ND	50	µg/L	1	7/7/2009
3+4-Methylphenol	ND	50	μg/L	1	7/7/2009
N-Nitrosodi-n-propylamine	ND	50	μg/L	.1 ⋅ .	7/7/2009
N-Nitrosodimethylamine	ND	50	μg/L	1	7/7/2009
N-Nitrosodiphenylamine	ND	50	µg/L	1	7/7/2009
Naphthalene	ND	50	μg/L	1	7/7/2009
2-Nitroaniline	ND	50	µg/L	1	.7/7/2009
3-Nitroaniline	ND	50	μg/L	1	7/7/2009
4-Nitroaniline	ND	50	μg/L	1	7/7/2009
Nitrobenzene	ND	50	μg/L	1	7/7/2009
2-Nitrophenol	ND	50	μg/L	1	7/7/2009
4-Nitrophenol	ND	50	μg/L	1	7/7/2009
Pentachlorophenol	ND	100	μg/L	1	7/7/2009
Phonanthrene	ND	50	μg/Ľ	1	7/7/2009
Phenof	ND	50	μg/L	1	7/7/2009
Pyrene	ND	50	μg/L	1	7/7/2009
Pyridine	ИD	50	μg/L	1	7/7/2009
1,2,4-Trichlorobenzene	ND	50	μg/L	1	7/7/2009
2,4,5-Trichlorophenol	ND ·	. 50	µg/L	1	7/7/2009
2,4,6-Trichlorophenol	ND	50	μg/L	1	7/7/2009
Surr: 2,4,6-Tribromophenol	70.8	16.6-150	%REC	1.	7/7/2009
Surr: 2-Fluorobiphenyl	77.5	19.6-134	%REC	1	7/7/2009
Surr: 2-Fluorophenol	59.6	9.54-113	%REC	1	7/7/2009
Surr: 4-Terphenyl-d14	76.2	22.7-145	%REC	. 1	7/7/2009
Surr: Nitrobenzene-d5	73.0	14.6-134	%REC	1	7/7/2009
Surr: Phenol-d5	47.2	10.7-80.3	%REC	1	7/7/2009
PA METHOD 8280B: VOLATILES					Analyst: HL
Benzene	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
Toluene	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM



- Value exceeds Maximum Contaminant Level
- E Estimated value
- Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- Analyte detected in the associated Method Blank
- Н Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
  - Reporting Limit



Date: 24-Jul-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order: Project:

Lab ID:

0907049

Injection Well 3rd QTR 7/1/09

0907049-01

Collection Date: 7/1/2009 10:30:00 AM

Date Received: 7/2/2009

Client Sample ID: Injection Well

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	<del></del>		712277		Analyst: HL
Ethylbenzene	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
Methyl tert-butyl ether (MTBE)	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
Naphthalene	ND	2.0	μg/L	1	7/9/2009 3:41:27 PM
1-Methylnaphthalene	ND	4.0	μg/L	1	7/9/2009 3;41:27 PM
2-Methylnaphthalene	ND	4.0	µg/L	1	7/9/2009 3:41:27 PM
Acetone	ND	10	μg/L	1	7/9/2009 3:41:27 PM
Bromobenzene	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
Bromodichloromethane	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
Bromoform	ND	1.0	µg/L	· 1	7/9/2009 3:41:27 PM
Bromomethane	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
2-Butanone	ND	10	μg/L	1	7/9/2009 3:41:27 PM
Carbon disulfide	ND	10	μg/L	1	7/9/2009 3:41:27 PM
Carbon Tetrachloride	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
Chlorobenzene	ND	1.0	µg/∟	1	7/9/2009 3:41:27 PM
Chloroethane	ND	2.0	µg/L	1	7/9/2009 3:41:27 PM
Chloroform	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
Chloromethane	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
2-Chlorotoluene	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
4-Chlorotoluene	ND	1.0	µg/L	. 1	7/9/2009 3:41:27 PM
cis-1,2-DCE	ND	1.0	µg/L	1	7/9/2009 3:41:27 PM
cis-1,3-Dichloropropene	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
1,2-Dibromo-3-chloropropane	, ND	2.0	µg/L	1	7/9/2009 3:41:27 PM
Dibromochloromethane	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
Dibromomethane	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
1,2-Dichlorobenzene	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
1,3-Dichlorobenzene	ND	1.0	µg/L	1	7/9/2009 3:41:27 PM
1,4-Dichlorobenzene	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
Dichlorodifluoromethane	ND	1.0	µg/L	1	7/9/2009 3:41:27 PM
1.1-Dichloroethane	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
1,1-Dichloroethene	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
1,2-Dichloropropane	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
1,3-Dichloropropane	ND	1.0	μg/L	1	7/9/2009 3:41:27 PM
2,2-Dichloropropane	ND	2.0	μg/L	1	7/9/2009 3:41:27 PM
1,1-Dichloropropene	ND	1.0	µg/L	1	7/9/2009 3:41:27 PM
Hexachlorobutadiene	ND	1.0	µg/L	1	7/9/2009 3:41:27 PM
2-Hexanone	ND	10	μg/L	1	7/9/2009 3:41:27 PM
Isopropylbenzene	ND	1.0	µg/L	1	7/9/2009 3:41:27 PM
4-isopropyltoluene	ND	1.0	µg/L	1	7/9/2009 3:41:27 PM

Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
  - RL Reporting Limit

Page 3 of 6

Date: 24-Jul-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0907049

Client Sample ID: Injection Well

Injection Well 3rd QTR 7/1/09

Collection Date: 7/1/2009 10:30:00 AM

Project: Lab ID:

0907049-01

Date Received: 7/2/2009

Matrix: AQUEOUS

Analyses	Result	PQL	Qual U	Jnits	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES	<del></del>					Analyst: HL
4-Methyl-2-pentanone	ND	10	μ	ıg/L	1	7/9/2009 3:41:27 PM
Methylene Chloride	ND	3.0	μ	ıg/L	1 .	7/9/2009 3:41:27 PM
n-Butylbenzene	ND	1.0	μ	g/L	1	7/9/2009 3:41:27 PM
n-Propyibenzene	ND	1.0	μ	g/L	1	7/9/2009 3:41:27 PM
sec-Butylbenzene	ND	1.0	μ	g/L	1	7/9/2009 3:41:27 PM
Styrene	, <b>N</b> D	1.0	μ	g/L	1	7/9/2009 3:41:27 PM
tert-Butylbenzene	ND	1.0	μ	g/L	1	7/9/2009 3:41:27 PM
1,1,1,2-Tetrachloroethane	ND	1.0	μ	g/L	1	7/9/2009 3:41:27 PM
1,1,2,2-Tetrachloroethane	ND	2.0	μ	g/L	1	7/9/2009 3:41:27 PM
Tetrachloroethene (PCE)	ND	1.0	μ	g/L	1	7/9/2009 3:41:27 PM
trans-1,2-DCE	ND	1.0	μ	g/L	1	7/9/2009 3:41:27 PM
trans-1,3-Dichioropropene	ND	1.0	. μ	g/L	1	7/9/2009 3:41:27 PM
1,2,3-Trichlorobenzene	ND	- 1.0	μ	g/L	1	7/9/2009 3:41:27 PM
1,2,4-Trichlorobenzene	ND	1.0	μ	g/L	1	7/9/2009 3:41:27 PM
1,1,1-Trichloroethane	ND	1.0	μ	g/L	1	7/9/2009 3:41:27 PM
1,1,2-Trichloroethane	ND	1.0	μ	g/L	1	7/9/2009 3:41:27 PM
Trichloroethene (TCE)	ND	1.0	μ	g/L	1	7/9/2009 3:41:27 PM
Trichlorofluoromethane	ND	1.0	μ	g/L	1	7/9/2009 3:41:27 PM
1,2,3-Trichloropropane	ND	2.0	μ	g/L	1.	7/9/2009 3:41:27 PM
Vinyl chloride	ND	1.0	μ	g/L	1 .	7/9/2009 3:41:27 PM
Xylenes, Total	ND	1.5	μ	g/L	1	7/9/2009 3:41:27 PM
Surr: 1,2-Dichloroethane-d4	105	68.1-123	- %	%REC	1 .	7/9/2009 3:41:27 PM
Surr: 4-Bromofluorobenzene	95.5	53.2-145	. %	REC .	1	7/9/2009 3:41:27 PM
Surr: Dibromofluoromethane	107	68.5-119	. %	REC .	1	7/9/2009 3:41:27 PM
Surr: Toluene-d8	110	64-131	9/	&REC	¹⁰ 1	7/9/2009 3:41:27 PM
SM 2320B: ALKALINITY						Analyst: DAM
Alkalinity, Total (As CaCO3)	270	20	m	ng/L CaCO3	-1	7/2/2009
Carbonate	26	2.0		ng/L CaCO3	1	7/2/2009
Bicarbonate	240	20	m	ng/L CaCO3	1	7/2/2009
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: DAM
Specific Conductance	6400	0.010	μ	mhos/cm	1	7/2/2009
SM4500-H+B: PH						Analyst: DAM
pH	8.49	0.1	р	H units	1	7/2/2009
SM2540C MOD: TOTAL DISSOLVED SO	oi ins					Analyst: <b>KMS</b>
Total Dissolved Solids	4400	100	m	ng/L	1	7/7/2009
				~		

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- Value exceeds Maximum Contaminant Level
- Ε Estimated value
- Analyte detected below quantitation limits
- Not Detected at the Reporting Limit ND
- Spike recovery outside accepted recovery limits
- В Analyte detected in the associated Method Blank
- Holding times for preparation or analysis exceeded Н
- MCL Maximum Contaminant Level
- Reporting Limit

Page 4 of 6



Date: 24-Jul-09



Western Refining Southwest, Inc.

Lab Order:

0907049

Project:

Injection Well 3rd QTR 7/1/09

Lab ID:

0907049-02

Client Sample ID: TRIP BLANK

Collection Date:

Date Received: 7/2/2009

Matrix: TRIP BLANK

Analyses	Result	PQL Q	ual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Analyst: HL
Benzene	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
Toluene	ND	1.0	µg/L	1	7/9/2009 4:40:51 PM
Ethylbenzene	ND	1.0	µg/L	1	7/9/2009 4:40:51 PM
Methyl tert-butyl ether (MTBE)	NĎ	1.0	µg/L	1	7/9/2009 4:40:51 PM
1,2,4-Trimethylbenzene	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
1,3,5-Trimethylbenzene	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
1,2-Dichloroethane (EDC)	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
1,2-Dibromoethane (EDB)	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
Napřithalene	ND	2.0	μg/L	1	7/9/2009 4:40:51 PM
1-Methylnaphthalene	ND	4.0	μg/L	· 1	7/9/2009 4:40:51 PM
2-Methylnaphthalene	ND	4.0	μg/L	1	7/9/2009 4:40:51 PM
Acetone	ND	10	μg/L	1	7/9/2009 4:40:51 PM
Bromobenzene	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
Bromodichloromethane	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
Bromoform	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
Bromomethane	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
2-Butanone	ND	10	µg/L	1	7/9/2009 4:40:51 PM
Carbon disulfide	ND	10	μg/L	1 .	7/9/2009 4:40:51 PM
Carbon Tetrachloride	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
Chlorobenzene	ND	1.0	µg/L	1	7/9/2009 4:40:51 PM
Chloroethane	ND	2.0	μg/L	1	7/9/2009 4:40:51 PM
Chloroform	ND	1.0	μg/L	1 -	7/9/2009 4:40:51 PM
Chloromethane	ND	1.0	µg/L	1	7/9/2009 4:40:51 PM
2-Chlorotoluene	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
4-Chlorotoluene	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
cis-1,2-DCE	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
cls-1,3-Dichloropropene	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
1,2-Dibromo-3-chloropropane	ND	2.0	μg/L	1	7/9/2009 4:40:51 PM
Dibromochloromethane	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
Dibromomethane	ND	1.0	μg/L	· 1	7/9/2009 4:40:51 PM
1,2-Dichlorobenzene	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
1,3-Dichlorobenzene	ND	1.0	µg/∟	1	7/9/2009 4:40:51 PM
1,4-Dichlorobenzene	ND	1.0	µg/L	1	7/9/2009 4:40:51 PM
Dichlorodifluoromethane	ND	1.0	μ <b>g</b> /L	1	7/9/2009 4:40:51 PM
1,1-Dichloroethane	ND	1.0	µg/L	1	7/9/2009 4:40:51 PM
1,1-Dichloroethene	ND	1.0	µg/L	1	7/9/2009 4:40:51 PM
1,2-Dichloropropane	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
1,3-Dichloropropane	ND	1.0.	μg/L	1	7/9/2009 4:40:51 PM
2,2-Dichloropropane	ND	2.0	µg/L	1 '	7/9/2009 4:40:51 PM
1,1-Dichloropropene	ND	1.0	µg/L	1	7/9/2009 4:40:51 PM
Hexachlorobutadiene	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
2-Hexanone	ND	10	µg/L	1	7/9/2009 4:40:51 PM



- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 5 of 6



Date: 24-Jul-09

CLIENT:

Western Refining Southwest, Inc.

Client Sample ID: TRIP BLANK

Lab Order:

0907049

Collection Date:

Project:

Injection Well 3rd QTR 7/1/09

Date Received: 7/2/2009

Lab ID:

0907049-02

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Analyst: HL
Isopropylbenzene	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
4-Isopropyltoluene	ND	1.0	µg/L	1 .	7/9/2009 4:40:51 PM
4-Methyl-2-pentanone	· ND	10	µg/L	1	7/9/2009 4:40:51 PM
Methylene Chloride	ND	3.0	µg/L	1	7/9/2009 4:40:51 PM
n-Butylbenzene	ND	1.0	µg/L	1	7/9/2009 4:40:51 PM
n-Propylbenzene	ND	. 1.0	μg/L	; <b>1</b>	7/9/2009 4:40:51 PM
sec-Butylbenzene	ND	1.0	µg/L	1	7/9/2009 4:40:51 PM
Styrene	ND	1.0	µg/L	1	7/9/2009 4:40:51 PM
tert-Butylbenzene	ND	1.0	µg/L	1 .	7/9/2009 4:40:51 PM
1,1,1,2-Tetrachloroethane	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
1,1,2,2-Tetrachloroethane	ND	2.0	μg/L	1	7/9/2009 4:40:51 PM
Tetrachloroethene (PCE)	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
trans-1,2-DCE	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
trans-1,3-Dichloropropene	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
1,2,3-Trichlorobenzene	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
1,2,4-Trichlorobenzene	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
1,1,1-Trichloroethane	ND	1.0	µg/L	1	7/9/2009 4:40:51 PM
1,1,2-Trichloroethane	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
Trichloroethene (TCE)	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
Trichlorofluoromethane	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
1,2,3-Trichloropropane	ND	2.0	μg/L	1	7/9/2009 4:40:51 PM
Vinyl chloride	ND	1.0	μg/L	1	7/9/2009 4:40:51 PM
Xylenes, Total	ND	1.5	μg/L	1	7/9/2009 4:40:51 PM
Surr: 1,2-Dichloroethane-d4	103	68.1-123	%REC	1	7/9/2009 4:40:51 PM
Surr: 4-Bromofluorobenzene	100	53.2-145	%REC	1	7/9/2009 4:40:51 PM
Surr: Dibromofluoromethane	107	68.5-119	%REC	1 .	7/9/2009 4:40:51 PM
Surr: Toluene-d8	108	64-131	%REC	1	7/9/2009 4:40:51 PM

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- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 6 of 6







12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758~5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Anne Thorne Hall Environmental Analysis Laborat 4901 Hawkins NE Albuquerque, NM 87109

July 15, 2009

L410913-01

Date Received

07, 2009

ESC Sample # :

Description

July 0907049

Site ID :

Sample ID

INJECTION WELL

Project # :

0907049

Collected By : Collection Date :

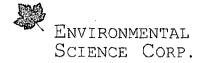
07/01/09 10:30

Parameter	Result	Det. Limit	Units	Method	Date	Dil
Mercury	$\mathtt{BDL}$	0.00020	mg/l	7470A	07/08/09	1
Arsenic	BDL	0.020	mq/1	6010B	07/12/09	1
Barium	0.36	0.0050	mq/1	6010B	07/12/09	1
Cadmium	BDL	0.0050	mq/1	6010B	07/12/09	1
Calcium	170	0.50	mg/1	6010B	07/12/09	1
Chromium	BDI,	0.010	mg/1	6010B	07/12/09	1
Lead	BDL	0.0050	mg/l	6010B	07/12/09	1
Magnesium	43.	0.10	mg/l	6010B	07/12/09	1
Potassium	28.	0.50	mq/l	6010B	07/12/09	1
Selenium	0.021	0.020	mg/l	6010B	07/12/09	ī
Silver	BDL	0.010	mg/l	6010B	07/14/09	1
Sodium	2700	2.5	mg/l	6010B	07/13/09	5

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

Note:
The reported analytical results relate only to the sample submitted.
This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 07/15/09 12:42 Printed: 07/15/09 12:43



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax 1.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Anne Thorne Hall Environmental Analysis Laborat 4901 Hawkins NE Albuquerque, NM 87109

07, 2009

Date Received Description

July 0907049

Sample ID

Collected By : Collection Date :

INJECTION WELL

07/01/09 10:30

L410913-02 ESC Sample # :

Site ID :

July 15, 2009

Project # : 0907049

Parameter Result Det. Limit Units Method Date Dil. Corrosivity Non-Corrosive 9040C 07/14/09 1 D93/1010A 07/09/09 Flashpoint See Footnote deg F 1 Reactive CN (SW846 7.3.3.2) 0.125 9012B BDL mg/l07/14/09 25. 07/10/09 Reactive Sulf. (SW846 7.3.4.1) BDL mg/l9034/9030B

BDL - Below Detection Limit Det. Limit - Practical Quantitation Limit(PQL) Note:

The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 07/15/09 12:42 Printed: 07/15/09 12:43 L410913-02 (FLASHPOINT) - Did Not Flash @ 170F

#### Attachment A List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L410913-01 L410913-02	WG430503 WG430800	SAMP SAMP	Silver Corrosivity	R816846 R816188	Ј6 <b>т</b> 8

### Attachment B Explanation of QC Qualifier Codes

Qualifier	Meaning
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low
Т8	(ESC) - Additional method/sample information: Sample(s) received past/too close to holding time expiration.
	Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable unless qualified as 'R' (Rejected).

# Definitions Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.

- Precision The agreement between a set of samples or between duplicate samples.

  Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate Organic compounds that are similar in chemical composition, extraction, and chromotography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Hall Environmental Analysia Laboratory Anne Thorne 4901 Hawkins NE

Albuquerque, MM 87109

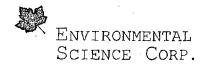
Quality Assurance Report

Level II L410913

July 15, 2009

Analyte	Result		akokyvetanky s 8 r		Limit	Batch I	ate Analyzed
NELEURVING PEURUS (EDVINIO PARS CORPORTANT DE C	21 <b>9</b> 2000	oren etter av <b>hø</b> yt		10.45.EEC.43.H	PPSZWWERST	ATTENNIO DE DE CONTRETE DE CONTRETE DE CONTRETE DE CONTRETE DE CONTRETE DE CONTRETE DE CONTRETE DE CONTRETE DE	7709700,21:3
Reactive Sulf. (SMB46 7.3.4.1) Corrosivity	< 25 3.30	mg/1		<b>.</b>			7/10/09 18:2 7/14/09 09:3
Barium Cadmium Chromium Chromium Lead Magnesium Potassium Selenium	< .00 < .00 < .00 < .01 < .00 < .5 < .5 < .02	mg/1 mg/1 mg/1 mg/1 mg/1 mg/1	NATIVE SAFE			WG430503 0 WG430503 0 WG430503 0 WG430503 0 WG430503 0 WG430503 0 WG430503 0	7/02/09/10:5 7/12/09 10:5 7/12/09 10:5
8301007 75 6 7 7 8 7 7 8 7 7 8 7 7 8 7 7 8 7 7 8 7 7 8 7 7 8 7 7 8 7 7 8 7 7 8 7 7 8 7 7 8 7 8 7 8 7 8 7 8 7 8	< .01	mg/1					7/14/09 18:0
Analyte	Units	Result	uplicate Duplicate	RPD	Limit	Ref Samp	Batch
ercurative and a second	e'my7Io	VATA 0.5033A-1	SELVI OSIO PATE	Lienceo dota	10737120772545	X-7-7.01019630	] ]
Flashpoint Reactive Sulf.(SW846 7.3.4.1)	deg F mg/l	0.00 0.00	0.00 0.00	0.00 0.00	20 20 20	L410913-0 L410913-0	09000000
BEFFRIVLEY AS LINE BEFORE THE TOTAL OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION OF THE SECTION	102002	ALEXESSO OF A PE	corridado estada	Pannaha.	KALUTOS JURI		1.40 MG) 3080
Reactive CN (SW846 7.3.3.2)	mg/l mg/l	0.00 0.00	0.00 0.00	0.00 0.00	20 20 20	L410913-0 L411103-0	WG43050
darium Edulum Calcium	mg/l   mg/l   mg/l	0.0775 0.002 6.43	6,30	0.643 2.04	20	L411103-0 L71610686 L411103-0 L411103-0	1 WG43050:
Chromium Bedraut Jagnesium	mg/l /mg/l mg/l	0.00 AAK 0.0173K// 6.42	0.000500 0.00178 6.30	na Definition 1.89	20 20 20	L411103-0 L411103-0 L411103-0	1316 NG 13050.
otassium 81501000 odium iilver	mg/1 mg/1 mg/1 mg/1	1.90 0.000 0.686 0.00	2.00 2.00 0.770 0.00	5.13	20	L411103-0 1411103-0 L411103-0 L411103-0	1 WG430503 1 WG430503 1 WG430503
malyte	Units		y.controlisu		% Rec	Limit	Batch
WEBUNKA PARAMANANAN AND AND AND AND AND AND AND AND A	Z WANT S		;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	1003245 15VI	\$\$%.406.3000000		W0480207
Plashpoint	deg F	82	82.	.0	100.	96-104	WG430692

hpoint deg F 82 82.0 100.
* Performance of this Analyte is outside of established críteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



12065 Lebanon Rd. Mt. Jullet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Hall Environmental Analysis Laboratory Anne Thorne 4901 Hawkins NE

Quality Assurance Report Level II

Albuquerque, NM 87109

L410913

July 15, 2009

Analyte	Units	Maboratory;	Control Sambl		% Rec	Limit	Batch
	EMBLAREA				TRONO PROTECTION	······································	WG130672
Corrosivity Arsenic Barium Daddion	mg/1 mg/1	9.04 1.13 1.13	8.90 1.14 1.18		98.5 101. 104.	97.4-102.6 85-115 85-115	WG430800 WG430503 WG430503
Calcium Chromium West Chromium Magnesium Potassium	mg/l mg/l mg/l mg/l mg/l	11.3 1.13 1.13 11.3	11.8 1.16 1.18 12.1 11.6		104. 103. 107. 103.	85-115 85-115 05-115 85-115 85-115	WG430503 WG430503 WG430503 WG430503 WG430503
Silving Silver	mg/l mg/l	11.3 11.3 1.13	11.7 11.7 1.05		1.9773 104. 92.9	85-115 85-115	WG430503 WG430503 WG430503
Analyte		apo <b>ratory contr</b> Result Ref	ile gample bub Rec	li <b>eds</b> L	imit	RPD Limit	: Batch
KATOREITERS TON TAKETE TELEFONIST	edeoles.	#0.1017.471.374.1124.	erinaneori	144761444	6-1043/75/7	2.2.479\7847\KH	WGX30692
Reactive Sulf.(SW846 7.3.4.1)	mg/l	9.00 8.	(IAWAAA MIRA	waatii eu	0-130 7.4-102.6	4.88 20 1.12 10	WG430672 WG430800
Analyte	Units	MS Res Ref	Res TV	% Rec	Limit	Ref Samp	Batch
Recommendation of the second second	2007 EUS	04003287746	(\$600E-11.00031.1	TART BALL	776107107170		<b></b>
Arsenic Benjum Cadmium Calcium Throm un	mg/l mg/l mg/l mg/l mg/l	1.19 0 18.0 6 1.18 0	.00 1.13 .0060/1.13 .00011 1.13 .30 11.3 .00050/1.13	101. 1048. 105. 104. 103.	75-125 75-125 75-125 75-125 75-125	L411103-01 L411103-01 L411103-01 L411103-01 L411103-01	WG430503 WG430503 WG430503 WG430503
Magnesium Bocayatom Selenium Sodium SATARA	mg/l /mg/l /mg/l /mg/l /mg/l	1.10	30 11.3 00 1.13 .00 1.13 .770 11.3	105. 21.00 W 97.3 103.	75-125 75-125 75-125 75-125 76-125	L411103-01 L411103-01	₩G430503 ₩G430503 ₩G430503 ₩G430503
Analyte	Units 1	Mathix Spl     Mathix Spl	(e Dupil date.	Limit	RPD	Limit Ref Samp	Batch
Werdury (1)	(k <b>m</b> q73/ (C)	70.0032.17.0700		- To3436543		20436-141-0895-015	WG430207
Arsenic BLICOM Cadmium Calcium Chrontum * Performance of this Analyte is c For additional information, plea		1.21 1.19 17.8 18.0 1/17 1/16 f established c		75-125 75-125 75-125 75-125 75-128	1.67 1.12 (0.858)	20 1411103-01 20 1411103-01 20 1411103-01 20 1411103-01 20 1411103-01	WG430503 WG430503 WG430503 WG430503



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax 1.D. 62-0814289

Est. 1970

Hall Environmental Analysis Laboratory

Anne Thorne 4901 Hawkins NE

Albuquerque, NM 87109

Quality Assurance Report

Level II

July 15, 2009

Analyte .	Units	MAN MSD	PTINEDIK Ref	Moonia Rec	466% Limit	RPD	Limit	kef Sa	mp Batch
Aggresium Potassium Eighnum Sodium Silver	mg/l mg/l	18.5 13.1	18.2 13.3 12.4	108. 98.2	75-125 75-125 75-125 75-125	1.6	3 20 2 <b>20</b> 0 20 23 3 20	L41110	3-01 WG430503 5032 44 WG430503 3-01 WG430503

Batch number /Run number / Sample number cross reference

WG430207: R810349: L410913-01 WG430692: R819907: L410913-02 WG430672: R815006: L410913-02 WG430800: R816188: L410913-02 WG430669: R816207: L410913-02 WG430503: R816846: L410913-01

 $^{^{\}star}$   *  Calculations are performed prior to rounding of reported values  $\,$  .

^{*} Performance of this Analyte is outside of established criteria.

For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd QTR 7/1/09

Work Order: . 0907049

Analyte	Result	Units.	PQL	%Rec	LowLimit HighLimit	%RPD RP	DLimit Qual
Method: EPA Method 300.0:	Anions		· · · · · · · · · · · · · · · · · · ·			***************************************	
Sample ID: MB		MBLK			Batch ID: R34584	Analysis Date:	7/20/2009 9:22:02 AM
Chloride	ND	mg/L	0.10			·	•
Sulfate	ND	mg/L	0.50				
Sample ID: LCS		LCS		•	Batch ID: R34584	Analysis Date:	7/20/2009 9:39:26 AM
Chloride	4.881	mg/L	0.10	97.6	90 110		
Sulfate	10.02	mg/L	0.50	100	90 110		
Method: SM 2320B: Alkalinit	· ·						
Sample ID: MB		MBLK			Batch ID: R34382	Analysis Date:	7/2/2009
Alkalinity, Total (As CaCO3)	ND	mg/L CaC	20			•	
Carbonate	ND	mg/L CaC	2.0				
Bicarbonate	ND	mg/L CaC	20		,		
Sample ID: LCS		LCS			Batch ID: R34382	Analysis Date:	7/2/2009
Alkalinity, Total (As CaCO3)	80.40	mg/L CaC	20	101	80 120		
4							

fiers:

Estimated value E

Analyte detected below quantitation limits

RPD outside accepted recovery limits

Holding times for preparation or analysis exceeded Н

ND Not Detected at the Reporting Limit

Spike recovery outside accepted recovery limits S

# QA/QC SUMMARY REPORT

ient: oject: Western Refining Southwest, Inc.

Injection Well 3rd QTR 7/1/09

Work Order:

0907049

Analyte	Result	Units	PQL	%Rec	LowLimit	High	Limit	%RPD	RPI	DLimit	Qual
Method: EPA Method 8260B:	VOLATILES										
Sample ID: 5ml rb		MBLK -			Batch II	D: 1	R34458	Analysis [	ate:	7/9/20	009 10:46:20 A
Benzene	ND	μg/L	1.0								
Toluene	ND	µg/L	1.0								
Ethylbenzene	ND	μg/L	1.0								
Methyl tert-butyl ether (MTBE)	ND	µg/L	1.0								
1,2,4-Trimethylbenzene	ND	μg/L	1.0								•
1,3,5-Trimethylbenzene	ND	μg/L	1.0								
1,2-Dichloroethane (EDC)	ND	μg/L	1.0								
1,2-Dibromoethane (EDB)	ND	μg/L	1.0								
Naphthalene	ND	µg/L	2.0								
1-Methylnaphthalene	ND	μg/L	4.0								
2-Methylnaphthalene	ND	μg/L	4.0								
Acetone	ND	μg/L	10								
Bromobenzene	ND	μg/L	1.0								
Bromodichloromethane	ND	μg/L	1.0								
Bromoform	ND	μg/L	1.0								
Bromomethane	ND	µg/L	1.0								
2-Butanone	ND	μg/L	10								
Carbon disulfide	ND	μg/L	10								
Carbon Tetrachloride	ND	μg/L	1.0								
hlorobenzene	ND	μg/L	1.0								
loroethane	ND	μg/L	2.0								
Chloroform	, ND	μg/L	1.0								
Chloromethane	ND	μg/L	1.0								
2-Chlorotoluene	ND	μg/L	1.0								
4-Chiorotoluene	ND	μg/L	1.0								
cis-1,2-DCE	ND	μg/L	1.0								
cis-1,3-Dichloropropene	ND	μg/L	1.0								
1,2-Dibromo-3-chloropropane	ND	μg/L	2.0								
Dibromechloromethane	ND	μg/L	1.0								
Dibromomethane	ND	μg/L	1.0								
1,2-Dichlorobenzene	ND	hâ\r hâ\r	1.0								
1,3-Dichlorobenzene	ND	µg/L	1.0								
1,4-Dichlorobenzene	ND	μg/L	1.0								
Dichlorodifluoromethane	ND	μg/L	1.0								
1,1-Dichloroethane	ND	μg/L	1.0								
1,1-Dichloroethene	ND	μg/L	1.0								
1,2-Dichloropropane	ND	μg/L μg/L	1.0								
1,3-Dichloropropane	ND	μg/L μg/L	1.0								
2,2-Dichloropropane	ND	μg/L μg/L	2.0								
1,1-Dichioropropene	ND	μg/L	1.0								
Hexachlorobutadiene	ND	μg/L μg/L	1.0								
2-Hexanone	ND	μg/L μg/L	10								
Isopropylbenzene	ND	μg/L μg/L	1.0								
4-Isopropyltoluene	ND	μg/L	1.0								





Estimated value

Analyte detected below quantitation limits

RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

#### Date: 24-Jul-09

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 3rd QTR 7/1/09

Work Order:

0907049

Analyte	Result	Units	PQL	%Rec	LowLimit F	lighLimit	%RPD	RPDLimit Qual
Method: EPA Method 8260B	VOLATILES							
Sample ID: 5ml rb		MBLK			Batch ID	R34458	Analysis Dat	te: 7/9/2009 10:46:20 AN
4-Methyl-2-pentanone	ND	hg/L	10					
Methylene Chloride	ND	µg/L	3.0					
n-Butylbenzene	ND	µg/L	1.0					
n-Propylbenzene	ND	µg/L	1.0					
sec-Butylbenzene	ND	μg/L	1.0					
Styrene	ND	µg/L	1.0					
tert-Butylbenzene	ND	µg/L	1.0		-			
1,1,1,2-Tetrachloroethane	ND	µg/L	1.0					
1,1,2,2-Tetrachloroethane	ND	μg/L	2.0					
Tetrachloroethene (PCE)	ND	μg/L	1.0					
trans-1,2-DCE	ND	μg/L	1.0					
trans-1,3-Dichloropropene	ND	μg/L	1.0					
1,2,3-Trichlorobenzene	ND	μg/L	1.0					
1,2,4-Trichlorobenzene	ND	μg/L	1.0					
1,1,1-Trichloroethane	ND	μg/L	1.0					
1,1,2-Trichloroethane	ND	µg/L	1.0				•	
Trichloroethene (TCE)	ND	μg/L	1.0					
Trichlorofluoromethane	ND	μg/L	1.0					
1,2,3-Trichioropropane	ND	μg/L	2.0					
Vinyl chloride	ND	μg/L	1.0					
Xylenes, Total	ND .	μg/L	1.5					
Surr: 1,2-Dichloroethane-d4	10.42	μg/L	0	104	68.1	123		
Surr: 4-Bromofluorobenzene	11.26	μg/L	0	113	53.2	145		
Surr: Dibromofluoromethane	11.26	μg/L	0	113	68.5	119		
Surr: Toluene-d8	9.824	μg/L	0	98.2	64	131		
Sample ID: 100ng lcs		LCS			Batch ID:	R34458	Analysis Dat	te: 7/9/2009 11:44:36 AM
Benzene	20.62	μg/L	1.0	103	76.7	114		
Toluene	20.57	μg/L	1.0	103	78.4	117		
Chlorobenzene	20.21	μg/L	1.0	101	80.7	127		•
1,1-Dichloroethene	23.91	μg/L	1.0	120	80.2	128		
Trichloroethene (TCE)	21.14	μg/L	1.0	106	77.4	115		•
Surr: 1,2-Dichloroethane-d4	10.29	μg/L	0	103	68.1	123 .		
Surr: 4-Bromofluorobenzene	10.86	µg/L	. 0	109	53.2	145		
Surr: Dibromofluoromethane	10.93	μg/L	0	109	68.5	119		
Surr: Toluene-d8	10.53	μg/L	0	105	64	131		

Q	ual	ifi	er	s:

E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits



# QA/QC SUMMARY REPORT

lient: oject: Western Refining Southwest, Inc.

Injection Well 3rd QTR 7/1/09

Work Order:

0907049

Analyte	Result	Units	PQL	%Rec	LowLimit	Hig	hLimit	%RPD	RPDLimit	Qual	<u>.</u>
Method: EPA Method 8270C	: Semivolatiles										
Sample ID: mb-19539		MBLK			Batch	ID:	19539	Analysis I	Date:		7/7/200
Acenaphthene	ND	µg/L	10	•							
Acenaphthylene	ND .	μg/L	10								
Aniline	ND	μg/L	10								
Anthracene	ND	µg/L	10								
Azobenzene	ND	μg/L	10								
Benz(a)anthracene	ND	hâ\r hâ\r	10								
Benzo(a)pyrene	ND	μg/L	10								
Benzo(b)fluoranthene	ND	μg/L	10								
Benzo(g,h,i)perylene	ND	μg/L	10								
Benzo(k)fluoranthene	ND	μg/L	10								
Benzoic acid	ND	µg/L	20								
Benzyl alcohol	ND	μg/L	10								
Bis(2-chloroethoxy)methane	ND	μg/L	10								
Bis(2-chloroethyl)ether	ND	μg/L	10								
Bis(2-chloroisopropyl)ether	ND	μg/L	10								
Bis(2-ethylhexyl)phthalate	ND	μg/L μg/L	10								
4-Bromophenyl phenyl ether	ND .	μg/L	10								
			10								
Butyl benzyl phthalate Carbazole	ND ND	μg/L μg/L	10								
Chloro-3-methylphenol	ND		10								
Chloroaniline		μg/L	10								
2-Chloronaphthalene	ND .	μg/L	10								
•	ND ND	μg/L	10								
2-Chlorophenol	ND	μg/L									
4-Chlorophenyl phenyl ether	ND ND	μg/L	10						*		
Chrysene	ND	μg/L	10								
Di-n-butyl phthalate	ND	µg/L	10								
Di-n-octyl phthalate	ND	μg/L	10								
Dibenz(a,h)anthracene	ND	µg/L	10								
Dibenzofuran	ND	µg/L	10								
1,2-Dichlorobenzene	ND	μg/L	10								
1,3-Dichlorobenzene	ND	μg/L	10								
1,4-Dichlorobenzene	ND	µg/L	10								
3,3'-Dichlorobenzidine	ND	μg/L ··-/	10								
Diethyl phthalate	ND	μg/L	10								
Dimethyl phthalate	ND	µg/L	10								
2,4-Dichlorophenol	ND	μg/L	20								
2,4-Dimethylphenol	ND	µg/L	10								
4,6-Dinitro-2-methylphenol	ND ND	µg/L	20 20								
2,4-Dinitrophenol	ND	pg/L	20 10								
2,4-Dinitrotoluene	ND	μg/L ug/l	10 10								
2,6-Dinitrotoluene Fluoranthene	ND	μg/L	10 10								
	ND ND	μg/L	10								
Fluorene	ND	μg/L	10								
Hexachlorobenzene	ND	µg/L	10								





Estimated value

Analyte detected below quantitation limits ...

RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

# Date: 24-Jul-09

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project: Injection Well 3rd QTR 7/1/09

Work Order:

0907049

Analyte	Result.	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Method: EPA Method 8270C;	Semivolatiles								<b></b>	
Sample ID: mb-19539		MBLK .			Batch	ID: <b>1953</b> 9	Analysis Da	ate:		7/7/200
Hexachlorobutadiene	ND	µg/L	10							
Hexachlorocyclopentadiene	ND	µg/L	10							
Hexachloroethane	ND	µg/L	10							
indeno(1,2,3-cd)pyrene	ND	μg/L	10							
tsophorone	ND	μg/L	10							
2-Methylnaphthalene	ND	μg/L	10							
2-Methylphenol	ND	µg/L	10							
3+4-Methylphenol	ND	μg/L	10							
N-Nitrosodi-n-propylamine	ND	µg/∟	10							
N-Nitrosodimethylamine	ND	μg/L	10							
N-Nitrosodiphenylamine	ND	μg/L	10							
Naphthalene	ND	μg/L	10							
2-Nitroaniline	ND	μg/L	10							
3-Nitroaniline	ND	μg/L	10							
4-Nitroaniline	ND .	μg/L	10							
Nitrobenzene	ND	μg/L	10	,						
2-Nitrophenol	ND	μ <b>g</b> /L	10			•				
4-Nitrophenol	ND	μg/L	10							
Pentachlorophenol	ND	μg/L	20							
Phenanthrene	ND	μg/Ĺ	10							
Phenol	, ND	μg/L	10							
Pyrene .	ND	μg/L	10							
Pyridine	ND	μg/L	10							
1,2,4-Trichiorobenzene	ND	μg/L	10							
2,4,5-Trichlorophenol	ND	µg/L	10							
2,4,6-Trichlorophenol	ND	μg/L	10							
Surr: 2,4,6-Tribromophenol	173.1	μg/L	0	86.6	16.6	150				
Surr: 2-Fluorobiphenyl	99.28	μg/L	0	99.3	19.6	134	•			
Surr: 2-Fluorophenol	158.7	µg/L	0	79.3	9.54	113		•		
Surr: 4-Terphenyl-d14	141.4	μg/L	0	141	22.7	145				
Surr: Nitrobenzene-d5	97.54	µg/L	0	97.5	14.6	134				
Surr: Phenol-d5	102.2	μg/L	0	51.1	10.7	80:3				
Sample ID: lcs-19539		LCS .			Batch I	D: 19539	Analysis Da	ite:		7/7/2009
Acenaphihene	81.48	µg/L	10	81.5	33.2	88.1				
4-Chloro-3-methylphenol	144.8	μg/L	10	72.4	26.5	101				
2-Chlorophenol	138.8	μg/L	10	69.4	27.5	88.7				
1,4-Dichlorobenzene	75.04	μg/L	10	75.0	27.2	74.1			S	
2,4-Dinitrotoluene	67.16	µg/L	10	67.2	32.6	107				
N-Nitrosodi-n-propylamine	80.24	μg/L	10	80.2	27.1	96.3				
4-Nitrophenol	74.64	μg/L	10	37.3	6.78	74.7				
Pentachlorophenol	129.8	μg/L	20	64.9	14.8	113				
Phenol	86.90	μg/L μg/L	10	43.5	17	53.4				
Pyrene '	120.1	μg/L	10	120	27	96.3			S	
1,2,4-Trichlorobenzene	82.94	μg/L μg/L	10	82.9	30	77.9			s	



E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits



Date: 24-Jul-09

# QA/QC SUMMARY REPORT

ent:

Western Refining Southwest, Inc.

Injection Well 3rd QTR 7/1/09

Work Order:

0907049

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Wethod: EPA Method 8270C: S	iemivolatiles									
Sample ID: ics-19539		LCS			Batch	ID: 19539	Analysis E	Date:		7/7/200
Surr: 2,4,6-Tribromophenol	160.2	μg/L	0	80.1	16.6	150				
Surr: 2-Fluoroblphenyl	90.38	μg/L	0	90.4	19.6	134				
Surr: 2-Fluorophenol	141.5	μg/L	0	70.8	9.54	113				
Surr: 4-Terphenyl-d14	126.4	μg/L	0	126	22.7	145				
Surr: Nitrobenzene-d5	83.56	µg/L	0	83.6	14.6	134				
Surr: Phenol-d5	106.4	µg/∟	0	53.2	10.7	80.3				
Sample ID: lcsd-19539		LCSD			Batch	ID: 19539	Analysis E	ate:		7/7/200
Acenaphthene	76.20	μg/L	· 10	76.2	33.2	88.1	6.70	30.5		
1-Chloro-3-methylphenol	145.7	μg/L	10	72.9	26.5	101	0.619	28.6		
2-Chlorophenol	135.8	μg/L	10	67.9	27.5	88.7	2.18	107		
I,4-Dichlorobenzene	74.80	µg/L	10	74.8	27.2	74.1	0.320	62.1	S	
2,4-Dinitrotoluene	67.00	µg/L	10	67.0	32.6	107	0.239	14.7		
N-Nitrosodi-n-propylamine	76.28	µg/L	10	76.3	27.1	96.3	5.06	30.3		
I-Nitrophenol	65.22	μg/L	10	32.6	6.78	74.7	13.5	36.3		
Pentachiorophenol	116.2	µg/L	20	58.1	14.8	113	11.1	49		
Phenol	83.98	µg/L	10	42.0	17	53.4	3.42	52.4		
Pyrene	133.1	μg/L	10	133	27	96.3	10.2	16.3	S	
,2,4-Trichlorobenzene	82.66	µg/L	10	82.7	30	77.9	0.338	36.4	S	
Surr: 2,4,6-Tribromophenol	148.5	μg/L	0	74.2	16.6	150	0	0		
Surr: 2-Fluorobiphenyl	86.90	µg/L	0	86.9	19.6	134	0	0		
Surr: 2-Fluorophenol	137.0	μg/L	0	68.5	9.54	113	0	0		
Surr: 4-Terphenyl-d14	130.0	μg/L	0	130	22.7	145	0	O		
Surr: Nitrobenzene-d5	80.06	µg/L	0	80.1	14.6	134	0	0		
Surr: Phenol-d5	101.8	µg/L	0	50.9	10.7	80.3	0	0		
Лethod: EPA 120.1: Specific Co	onductance									
Sample ID: 0907003-01B DUP		DUP			Batch I	D: <b>R34382</b>	Analysis D	ate:		7/2/2009
Specific Conductance	15600	µmhos/cm	0.010				0.957	20		
flethod: SM4500-H+B: pH										
Sample ID: 0907003-01B DUP		DUP			Batch I	D: <b>R34382</b>	Analysis D	ate:		7/2/2009
Н	7.020	pH units	0.1				0.710	15		
flethod: SM2540C MOD: Total	Dissolved Sc	llds								
ample ID: 0907049-01CMSD		MSD			Batch I	D: <b>19553</b>	Analysis D	ate:		7/7/2009
otal Dissolved Solids	9475	mg/L	100	101	80	120	0.945	20		
ample ID: MB-19553		MBLK			Batch I		Analysis D			7/7/2009
otal Dissolved Solids	ND	mg/L	20				•			
ample ID: LCS-19553	110	LCS	20		Batch II	D: <b>19553</b>	Analysis D	ate.		7/7/2009
•	4040		0.0	404			. maryolo D	<b>4.0</b> .		1112008
otal Dissolved Solids	1012	mg/L	20	101	80 Batala II	120	A	-4		7/7/200
ample ID: 0907049-01CMS		MS			Batch II		Analysis D	are:		7/7/2009
otal Dissolved Solids	9565	mg/L	100	103	80	120		-		



Estimated value

Analyte detected below quantitation limits

RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

#### Sample Receipt Checklist

Client Name WESTERN REFINING SOUT			I	Date Re	sceived	:		7/2/2009
Work Order Number 0907049				Receiv	ved by:	TLS	;	
Checklist completed by:			1/2	Sampl	le ID lai	oels check	ed by:	trittals
Signature	1	Da	6	<u>/                                    </u>				
Matrix: Carrier name:	UPS	ļ					• -	· .
Shipping container/cooler in good condition?	Yes	V		No 🗌		Not Prese	nt 🗆	
Custody seals intact on shipping container/cooler?	Yes	V		No 🗆		Not Prese	nt 🗆	Not Shipped
Custody seals intact on sample bottles?	Yes			No 🗆		N/A	$\checkmark$	
Chain of custody present?	Yes	V		No 🗆				
Chain of custody signed when relinquished and received?	Yes	V		No 🗌				
Chain of custody agrees with sample labels?	Yes	V		No 🗆				
Samples in proper container/bottle?	Yes	V		No 🗆				
Sample containers intact?	Yes	V		No 🗆				
Sufficient sample volume for indicated test?	Yes	$\checkmark$		No 🗆				
All samples received within holding time?	Yes	V		No 🗆				Number of preserved bottles checked for
Water - VOA vials have zero headspace? No VOA vials sub-	nitted		Υ	es 🗹		No		pH:
Water - Preservation labels on bottle and cap match?	Yes	$\checkmark$		No 🗆		N/A		5
Water - pH acceptable upon receipt?	Yes	Y		No 🗀		N/A (		C3 >12 unless noted below.
Container/Temp Blank temperature?	2.	6°		C Acc	•			
COMMENTS:			lf g	iven suf	Micient 1	time to coo	1.	
		===						
					٠,	•		•
								V.
Client contacted Date contacted:					Perso	n contacte	d	
Contacted by: Regarding:							<del></del>	
Comments:								
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							,	
Corrective Action								
	<del>-</del>							
								1144



	HALL ENVIRONMENTAL	www.hallenvironmental.com	4901 Hawkins NE - Albuquerque, NM 87109	5-345-3975 Fax 505-345-4107	halysis		OS'*O	Z80°1°2°1°2°1°2°1°2°1°2°1°2°1°2°1°2°1°2°1°	(AO)	16t8 10,10 (A(0) (A(0) 1,0	TPH (Methern Prions (F, 18081 Pesti 8081 Pesti 8270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Sem 18270 (Se	×	×	×	*	×	×	×	×	×						b-contracted data will be clearly notated on the analytical report.
			4901 H	Tel. 505		(VII	no seĐ	) На	<u> </u>	38T	M + X3T8 rheM H9T													Remarks:		ibility. Any su
Turn-Around Time:	☐ Standard □ Rush		INJECTION Well 3 LOTE July, 09			Project Manager:		Sampler: Bah			Container Preservative Factoring + Type Type Type Type Factoring Type House Type House Factoring Type House Factoring Type House Factoring Type House Factoring Factoring Type House Factoring Type Factoring Factoring Factoring Type Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Factoring Facto	3-voA Hel 1	1-Liter Amber	1-500m1 HNO3	1-500 ml N/A 1	1-500 m1 Nx OH		FSBMI NJA 1	1-20m H250y 1	1-50m N/A 1	2-102			7) Sate Time (1015)	Received by Date Time	If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratones. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report
in-of-Custody Record	Client Western Refining		Mailing Address: # 50 CR 4890	Bloomfield, NW 87413	Phone #: 505-632-4/6/	,	OA/OC Package:	□ Other	□ EDD (Type)		Date Time Matrix Sample Request ID	7-1-09 10:30 Has injection well									1 TRIP BLANK	-	į.	Date: Irme: Relinquished by. 7-69 2:30 (Later Frake)	Time:	If necessary, samples submitted to Hall Environmental may be sub-



#### **COVER LETTER**

Monday, October 26, 2009

Cindy Hurtado Western Refining Southwest, Inc. #50 CR 4990 Bloomfield, NM 87413

TEL: (505) 632-4161 FAX (505) 632-3911

RE: Injection Well 4th QTR 10/1/09

Dear Cindy Hurtado:

Order No.: 0910042

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 10/2/2009 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Laboratory Manager

NM Lab # NM9425 AZ license # AZ0682 ORELAP Lab # NM100001 Texas Lab# T104704424-08-TX



Date: 26-Oct-09

CLIENT:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10/1/09

Lab Order:

0910042

# Work Order Sample Summary

Lab Sample ID	Client Sample ID	Batch ID	Test Name	Collection Date
0910042-01A	Injection Well	R35601	EPA Method 8260B: VOLATILES	10/1/2009 10:10:00 AM
0910042-01A	Injection Well	R35601	EPA Method 8260B; VOLATILES	10/1/2009 10:10:00 AM
0910042-01A	Injection Well	R35601	EPA Method 8260B: VOLATILES	10/1/2009 10:10:00 AM
.0910042-01B	Injection Well	20263	EPA Method 8270C: Semivolatiles	10/1/2009 10:10:00 AM
0910042-01C	Injection Well	R35577	EPA Method 300.0: Anions	10/1/2009 10:10:00 AM
0910042-01C	Injection Well	R35559	EPA Method 300.0: Anions	10/1/2009 10:10:00 AM
0910042-01C	Injection Well	R35559	EPA Method 300.0: Anions	10/1/2009 10:10:00 AM
0910042-01C	Injection Well	R35564	SM4500-H+B: pH	10/1/2009 10:10:00 AM
0910042-01C	Injection Well	R35564	SM 2320B: Alkalinity	10/1/2009 10:10:00 AM
0910042-01C	Injection Well	20238	SM 2540 C: Total Dissolved Solids	10/1/2009 10:10:00 AM
0910042-01C	Injection Well	R35564	EPA 120.1: Specific Conductance	10/1/2009 10:10:00 AM
0910042-01D	Injection Well	20279	EPA Method 7470; Mercury	10/1/2009 10:10:00 AM
0910042-01D	Injection Well	20291	EPA 6010B: Total Recoverable Metals	10/1/2009 10:10:00 AM
0910042-01D	Injection Well	20291	EPA 6010B: Total Recoverable Metals	10/1/2009 10:10:00 AM
0910042-01D	Injection Well	20291	EPA 6010B: Total Recoverable Metals	10/1/2009 10:10:00 AM
0910042-02A	TRIP BLANK	R35624	EPA Method 8260B: VOLATILES	
0910042-02A	TRIP BLANK	R35601	EPA Method 8260B: VOLATILES	



Date: 26-Oct-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0910042

Project:

Injection Well 4th QTR 10/1/09

Lab ID:

0910042-01

Client Sample ID: Injection Well

Collection Date: 10/1/2009 10:10:00 AM

Date Received: 10/2/2009

Matrix: AQUEOUS

Analyses	Result	PQL	Qual U	nits	DF	Date Analyzed
EPA METHOD 300.0: ANIONS	<del></del>	<u> </u>				Analyst: TAF
Chloride	1200	10	m	ng/L	100	10/5/2009 10:25:09 PM
Sulfate	180	50	· m	ıg/L	100	10/5/2009 10:25:09 PM
EPA METHOD 7470: MERCURY		•				Analyst: MMS
Mercury	0.00044	0.00020	m	ng/L	1	10/9/2009 4:02:44 PM
EPA 6010B: TOTAL RECOVERABLE	METALS					Analyst: SNV
Arsenic	ND	0.020	m	ıg/L	1	10/16/2009 1:38:07 PM
Barium	0.27	0.020	m	g/L	1	10/16/2009 1:38:07 PM
Cadmium	ND	0.0020	m	ig/L	1	10/16/2009 1:38:07 PM
Calcium	100	1.0	m	g/L	1	10/16/2009 1:38:07 PM
Chromium	ND	0.0060		g/L	1	10/16/2009 1:38:07 PM
Lead	0.0072	0.0050	m	g/L	1	10/16/2009 1:38:07 PM
Magnesium	24	1.0	m	g/L	. 1	10/16/2009 1:38:07 PM
Potassium	17	1.0	m	g/L	1	10/16/2009 1:38:07 PM
Selenium	ND	0.050	m	g/L	1	10/16/2009 1:38:07 PM
Silver	ND	0.0050		g/L	1	10/16/2009 1:38:07 PM
Sodium	770	10		g/L	10	10/22/2009 2:46:11 PM
EPA METHOD 8270C: SEMIVOLATILI	Eq					Analyst: JDC
Acenaphthene	ND ND	50	μg	3/1	1	10/13/2009 2:46:46 PM
Acenaphthylene	ND	50	μg		1	10/13/2009 2:46:46 PM
Aniline	60	50	μg		1	10/13/2009 2:46:46 PM
Anthracene	ND	50	µg		1	10/13/2009 2:46:46 PM
Azobenzene	ND	50	µg		1	10/13/2009 2:46:46 PM
Benz(a)anthracene	ND ND	50	на рд		1	10/13/2009 2:46:46 PM
Benzo(a)pyrene	ND	50	րց		1	10/13/2009 2:46:46 PM
Benzo(b)fluoranthene	ND	50	pg.	•	1	10/13/2009 2:46:46 PM
Benzo(g,h,i)perylene	ND ND	50	µg.		1	10/13/2009 2:46:46 PM
Benzo(k)fluoranthene	ND	50	μg.		1	10/13/2009 2:46:46 PM
Benzoic acid	ND	100	pg.		1	10/13/2009 2:46:46 PM
Benzyl alcohol	ND	50	pg.		1	10/13/2009 2:46:46 PM
Bis(2-chloroethoxy)methane	ND	50	µg.		1	10/13/2009 2:46:46 PM
Bis(2-chloroethyl)ether	ND	50	µg.		1	10/13/2009 2:46:46 PM
Bis(2-chloroisopropyl)ether	ND	50	μg		1	10/13/2009 2:46:46 PM
Bis(2-ethylhexyl)phthalate	ND	50	μg/		1	10/13/2009 2:46:46 PM
4-Bromophenyl phenyl ether	ND	50	µg/		1	10/13/2009 2:46:46 PM
Butyl benzyl phthalate	ND	50	µg/		1	10/13/2009 2:46:46 PM
Carbazole	ND	50	μg/		1	10/13/2009 2:46:46 PM
4-Chloro-3-methylphenol	ND ND	50	hā\ hā\		1	10/13/2009 2:46:46 PM
4-Chloroaniline	ND ND	50	μg/ μg/		1	10/13/2009 2:46:46 PM



- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
  - RL Reporting Limit

Page 1 of 7



Date: 26-Oct-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0910042

0910042

Injection Well 4th QTR 10/1/09

Project: Lab ID:

0910042-01

Client Sample ID: Injection Well

Collection Date: 10/1/2009 10:10:00 AM

Date Received: 10/2/2009

Matrix: AQUEOUS

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATI	LES	* *			Analyst: JD0
2-Chlorophenol	ND	50	μg/L	1	10/13/2009 2:46:46 PM
4-Chlorophenyl phenyl ether	ND	50	μg/L	1	10/13/2009 2:46:46 PN
Chrysene	ND	50	µg/L	1	10/13/2009 2:46:46 PN
Di-n-butyl phthalate	ND	50	µg/L	1	10/13/2009 2:46:46 PN
Di-n-octyl phthalate	ND	50	μg/L	1	10/13/2009 2:46:46 PM
Dibenz(a,h)anthracene	ND	50	· µg/L	1	10/13/2009 2:46:46 PN
Dibenzofuran	ND	50	µg/L	1	10/13/2009 2:46:46 PN
1,2-Dichlorobenzene	ND	50	µg/L	1	10/13/2009 2:46:46 PN
1,3-Dichtorobenzene	ND	50	μg/L	1	10/13/2009 2:46:46 PM
1,4-Dichlorobenzene	ND	50	μg/L	1	10/13/2009 2:46:46 PM
3,3'-Dichlorobenzidine	ND	50	µg/L	1	10/13/2009 2:46:46 PM
Diethyl phthalate	, ND	50	µg/L	1	10/13/2009 2:46:46 PN
Dimethyl phthalate	ND	50	µg/L	1	10/13/2009 2:46:46 PN
2,4-Dichlorophenol	· ND	100	μg/L	1	10/13/2009 2:46:46 PM
2,4-Dimethylphenol	120	50	μg/L	1	10/13/2009 2:46:46 PM
4,6-Dinitro-2-methylphenol	ND	100	µg/L	1	10/13/2009 2:46:46 PM
2,4-Dinitrophenol	ND	100	µg/L	1	10/13/2009 2:46:46 PN
2,4-Dinitrotoluene	ND	50	µg/L	. 1	10/13/2009 2:46:46 PN
2,6-Dinitrotoluene	ND	50	μg/L	1	10/13/2009 2:46:46 PN
Fluoranthene	ND	50	µg/L	1	10/13/2009 2:46:46 PM
Fluorene	. ND	50	µg/L	1	10/13/2009 2:46:46 PN
Hexachlorobenzene	ND	-50	μg/L	1	10/13/2009 2:46:46 PN
Hexachlorobutadiene	ND	50	µg/L	1	10/13/2009 2:46:46 PN
Hexachlorocyclopentadiene	ND	50	µg/L	1	10/13/2009 2:46:46 PN
Hexachloroethane	ND	50	μg/L	· 1	10/13/2009 2:46:46 PM
indeno(1,2,3-cd)pyrene	ND	50	μg/L	1	10/13/2009 2:46:46 PN
Isophorone	ND	50	μg/L	1	10/13/2009 2:46:46 PN
2-Methylnaphthalene	ND	50	μg/L	1	10/13/2009 2:46:46 PN
2-Methylphenol	ND	50	μg/L	1	10/13/2009 2:46:46 PN
3+4-Methylphenol	ND	50	μg/L	1	10/13/2009 2:46:46 PN
N-Nitrosodi-n-propylamine	ND	50	μg/L	1	10/13/2009 2:46:46 PN
N-Nitrosodimethylamine	ND	50	μg/L	1	10/13/2009 2:46:46 PN
N-Nitrosodiphenylamine	ND	50	μg/L	1	10/13/2009 2:46:46 PM
Naphthalene	ND	50	μ <b>g</b> /L	1	10/13/2009 2:46:46 PM
2-Nitroaniline	ND	50	µg/L	1	10/13/2009 2:46:46 PN
3-Nitroaniline	ND	50	µg/L	1	10/13/2009 2:46:46 PN
4-Nitroaniline	ND	- 50	μg/L	1	10/13/2009 2:46:46 PN
Nitrobenzene	ND	50	µg/L	1	10/13/2009 2:46:46 PN
2-Nitrophenol	ND	50	μg/L	1	10/13/2009 2:46:46 PN
4-Nitrophenol	ND	50	µg/L	1	10/13/2009 2:46:46 PN
Pentachlorophenol	ND	100	μg/L	1	10/13/2009 2:46:48 PN
Phenanthrene	, ND	50	μg/L	1	10/13/2009 2:46:46 PM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level.
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 2 of 7

Date: 26-Oct-09



CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0910042

Project:

Injection Well 4th QTR 10/1/09

Lab ID:

0910042-01

Client Sample ID: Injection Well

Collection Date: 10/1/2009 10:10:00 AM

Date Received: 10/2/2009

Matrix: AQUEOUS

Analyses	Result	PQL (	dual Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES					Analyst: JDC
Phenol	ND	50	µg/L	1	10/13/2009 2:46:46 PM
Pyrene	ND	50	µg/L	1	10/13/2009 2:46:46 PM
Pyridine	ND	50	μg/L	1	10/13/2009 2:46:46 PM
1,2,4-Trichlorobenzene	ND	50	µg/L	1	10/13/2009 2:46:46 PM
2,4,5-Trichlorophenol	ND	50	μg/L	1	10/13/2009 2:46:46 PM
2,4,6-Trichlorophenol	ND	50	µg/L	1	10/13/2009 2:46:46 PM
Surr: 2,4,6-Tribromophenol	58.0	16.6-150	%REC	1	10/13/2009 2:46:46 PM
Surr: 2-Fluorobiphenyl	56.1	19.6-134	%REC	1	10/13/2009 2:46:46 PM
Surr: 2-Fluorophenol	34.1	9.54-113	%REC	1	10/13/2009 2:46:46 PM
Surr: 4-Terphenyl-d14	57.0	22.7-145	%REC	1	10/13/2009 2:46:46 PM
Surr: Nitrobenzene-d5	51.3	14.6-134	%REC	1	10/13/2009 2:46:46 PM
Surr: Phenol-d5	29.6	10.7-80.3	%REC	1	10/13/2009 2:46:46 PM
EPA METHOD 8260B: VOLATILES					Analyst: HL
Benzene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
Toluene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
Ethylbenzene	ND	5.0	µg/L	5	10/6/2009 9:23:19 PM
Methyl tert-butyl ether (MTBE)	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
1,2,4-Trimethylbenzene	ND	5.0	µg/L	5	10/6/2009 9:23:19 PM
1,3,5-Trimethylbenzene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
1,2-Dichloroethane (EDC)	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
1,2-Dibromoethane (EDB)	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
Naphthalene	ND	10	μg/L	5	10/6/2009 9:23:19 PM
1-Methylnaphthalene	ND	20	μg/L	5	10/6/2009 9:23:19 PM
2-Methylnaphthalene	ND	20	μg/L	5	10/6/2009 9:23:19 PM
Acetone	3200	500	μg/L	50	10/6/2009 8:47:29 PM
Bromobenzene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
Bromodichloromethane	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
Bromoform	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
Bromomethane	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
2-Butanone	280	50	μg/L	5	10/6/2009 9:23:19 PM
Carbon disulfide	ND	50	μg/L	5	10/6/2009 9:23:19 PM
Carbon Tetrachloride	ND	5.0	μg/L	-5	10/6/2009 9:23:19 PM
Chlorobenzene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
Chloroethane	ND	10	μg/L	5	10/6/2009 9:23:19 PM
Chloroform	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
Chloromethane	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
2-Chlorotoluene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
4-Chlorotoluene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
cis-1,2-DCE	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
cis-1,3-Dichloropropene	ND	5.0	µg/L	5	10/6/2009 9:23:19 PM
1,2-Dibromo-3-chloropropane	ND	10	μg/L	5	10/6/2009 9:23:19 PM
· •					



- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 3 of 7



Date: 26-Oct-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0910042

Injection Well 4th QTR 10/1/09

Project: Lab ID:

0910042-01

Client Sample ID: Injection Well

Collection Date: 10/1/2009 10:10:00 AM

Date Received: 10/2/2009

Matrix: AQUEOUS

Analyses	Result	PQL Q	ual Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Analyst: HL
Dibromochloromethane	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
Dibromomethane	. ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
1,2-Dichlorobenzene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
1,3-Dichlorobenzene	ND	5.0	µg/∟	5	10/6/2009 9:23:19 PM
1,4-Dichlorobenzene	. ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
Dichlorodifluoromethane	· ND	5.0	µg/L	5	10/6/2009 9:23:19 PM
1,1-Dichloroethane	ND	5.0	µg/L	. 5	10/8/2009 9:23:19 PM
1,1-Dichloroethene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
1,2-Dichloropropane	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
1,3-Dichloropropane	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
2,2-Dichloropropane	· ND	10	μg/L	5	10/6/2009 9:23:19 PM
1,1-Dichloropropene	ND	5.0	µg/∟	5	10/6/2009 9:23:19 PM
Hexachlorobutadiene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
2-Hexanone	ND	50	μg/L	5	10/6/2009 9:23:19 PM
Isopropylbenzene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
4-isopropyltoluene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
4-Methyl-2-pentanone	ND	50	µg/L	5	10/6/2009 9:23:19 PM
Methylene Chloride	ND	15	µg/L	5	10/6/2009 9:23:19 PM
n-Butylbenzene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
n-Propylbenzene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
sec-Butylbenzene	ND	5.0	· μg/L	5	10/6/2009 9:23:19 PM
Styrene	ND	5.0	µg/L	5	10/6/2009 9:23:19 PM
tert-Butylbenzene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
1,1,1,2-Tetrachioroethane	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
1,1,2,2-Tetrachloroethane	ND ·	10	μg/L	5	10/6/2009 9:23:19 PM
Tetrachloroethene (PCE)	ND	5.0	µg/L	- 5	10/6/2009 9:23:19 PM
trans-1,2-DCE	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
trans-1,3-Dichloropropene	ND	5.0	μg/L	5.	10/6/2009 9:23:19 PM
1,2,3-Trichlorobenzene	ND	5.0	μg/L	5	10/6/2009 9:23:19 PM
1,2,4-Trichlorobenzene	ND	5.0	µg/L	5	10/6/2009 9:23:19 PM
1,1,1-Trichloroethane	ND	5.0	μg/L	. 5	10/6/2009 9:23:19 PM
1,1,2-Trichloroethane	, ND	5.0	μg/∟	5	10/6/2009 9:23:19 PM
Trichloroethene (TCE)	ND	5.0	μ <b>g</b> /L	5	10/6/2009 9:23:19 PM
Trichlorofluoromethane	ND	5.0	µg/L	5	10/6/2009 9:23:19 PM
1,2,3-Trichloropropane	ND	10	μg/L	5	10/6/2009 9:23:19 PM
Vinyl chloride	ND	5.0	µg/L	5	10/6/2009 9:23:19 PM
Xylenes, Total	ND	7.5	µg/L	5	10/6/2009 9:23:19 PM
Surr: 1,2-Dichloroethane-d4	98.4	54.6-141	%REC	5	10/6/2009 9:23:19 PM
Surr: 4-Bromofluorobenzene	101	60.1-133	%REC	5	10/6/2009 9:23:19 PM
Surr: Dibromofluoromethane	93.7	78.5-130	· %REC	5	10/6/2009 9:23:19 PM
Surr: Toluene-d8	96.9	79.5-126	%REC	5	10/6/2009 9:23:19 PM

Qualifiers:

Page 4 of 7

Value exceeds Maximum Contaminant Level

Estimated value Ε

Analyte detected below quantitation limits J

ND Not Detected at the Reporting Limit

Spike recovery outside accepted recovery limits

В Analyte detected in the associated Method Blank

Н Holding times for preparation or analysis exceeded

MCL Maximum Contaminant Level

Reporting Limit

Date: 26-Oct-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0910042

Project:

Injection Well 4th QTR 10/1/09

Lab ID:

0910042-01

Client Sample ID: Injection Well

Collection Date: 10/1/2009 10:10:00 AM

Date Received: 10/2/2009

Matrix: AQUEOUS

Analyses	Result	PQL Qua	l Units	DF	Date Analyzed
SM 2540 C: TOTAL DISSOLVED SOLI	DS	· · · · · · · · · · · · · · · · · · ·			Analyst: MMS
Total Dissolved Solids	2630	20.0	mg/L	1	10/5/2009
SM 2320B: ALKALINITY					Analyst: NSB
Alkalinity, Total (As CaCO3)	680	20	mg/L CaCO3	1	10/2/2009 5:08:00 PM
Carbonate	ND	2.0	mg/L CaCO3	1	10/2/2009 5:08:00 PM
Bicarbonate	680	20	mg/L CaCO3	1	10/2/2009 5:08:00 PM
EPA 120.1: SPECIFIC CONDUCTANC	<b>E</b>				Analyst: NSB
Specific Conductance	4500	0.010	µmhos/cm	1	10/2/2009 5:08:00 PM
SM4500-H+B: PH	•				Analyst: NSB
pH	7.84	0.1	pH units	1	10/2/2009 5:08:00 PM



Value exceeds Maximum Contaminant Level

E Estimated value

.J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

B Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

MCL Maximum Contaminant Level

RL Reporting Limit

Page 5 of 7



Date: 26-Oct-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0910042

Project:

Injection Well 4th QTR 10/1/09

Lab ID:

0910042-02

Client Sample ID: TRIP BLANK

Collection Date:

Date Received: 10/2/2009

Matrix: TRIP BLANK

Analyses	Result	PQL Qua	I Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES					Anaiyst: HL
Benzene	ND	1.0	μg/L	1	10/7/2009 10:51:37 PM
Toluene	ND	1.0	μg/L	1	10/7/2009 10:51:37 PM
Ethylbenzene	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
Methyl tert-butyl ether (MTBE)	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
1,2,4-Trimethylbenzene	ND	1.0	µg/L	1 .	10/7/2009 10:51:37 PM
1,3,5-Trimethylbenzene	1 ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
1,2-Dichloroethane (EDC)	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
1,2-Dibromoethane (EDB)	ND	1.0	μ <b>g/</b> L	1	10/7/2009 10:51:37 PM
Naphthalene	ND	2.0	µg/L	1	10/7/2009 10:51:37 PM
1-Methylnaphthalene	ND	4.0	μg/L	1	10/7/2009 10:51:37 PM
2-Methylnaphthalene	ND	4.0	μg/L	1	10/7/2009 10:51:37 PM
Acetone	ND	10	μg/L	1	10/7/2009 10:51:37 PM
Bromobenzene	ND	1.0	μg/L	1	10/7/2009 10:51:37 PM
Bromodichloromethane	ND	- 1.0	μg/L	1	10/7/2009 10:51:37 PM
Bromoform	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
Bromomethane	ND	1.0	μg/L	1	10/7/2009 10:51:37 PM
2-Butanone	ND	10	µg/L	1	10/7/2009 10:51:37 PM
Carbon disulfide	ND	10	µg/L	1	10/7/2009 10:51:37 PM
Carbon Tetrachloride	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
Chlorobenzene	ND	1.0	μg/L	1	10/7/2009 10:51:37 PM
Chloroethane	ND	2.0	μg/L	1	10/7/2009 10:51:37 PM
Chioroform	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
Chloromethane	ND	1.0	μg/L	1	10/7/2009 10:51:37 PM
2-Chlorotoluene	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
4-Chlorotoluene	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
cis-1,2-DCE	ND	1.0	μg/L	. 1	10/7/2009 10:51:37 PM
cis-1,3-Dichloropropene	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
1,2-Dibromo-3-chioropropane	ND	2.0	μg/L	1	10/7/2009 10:51:37 PM
Dibromochloromethane	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
Dibromomethane	ND	1.0	μg/L	1	10/7/2009 10:51:37 PM
1,2-Dichlorobenzene	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
1,3-Dichlorobenzene	ND.	1.0	μg/L	· 1	10/7/2009 10:51:37 PM
1,4-Dichlorobenzene	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
Dichlorodifluoromethane	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
1,1-Dichloroethane	ND	1.0 -	μg/L	1	10/7/2009 10:51:37 PM
1,1-Dichloroethene	ND	1.0	μg/L	1	10/7/2009 10:51:37 PM
1,2-Dichloropropane	ND	1.0	μg/L	1	10/7/2009 10:51:37 PM
1,3-Dichloropropane	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
2,2-Dichloropropane	ND	2.0	μg/L	1	10/7/2009 10:51:37 PM
1,1-Dichioropropene	ND	1.0	µg/L	1	10/7/2009 10:51:37 PM
Hexachlorobutadiene	ND	1.0	μg/L	1	10/7/2009 10:51:37 PM
2-Hexanone	ND	10	μg/L"	1	10/7/2009 10:51:37 PM

#### Qualifiers:

- Value exceeds Maximum Contaminant Level
- E Estimated value
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- S Spike recovery outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- MCL Maximum Contaminant Level
- RL Reporting Limit

Page 6 of 7

Date: 26-Oct-09

CLIENT:

Western Refining Southwest, Inc.

Lab Order:

0910042

0910042

Injection Well 4th QTR 10/1/09

Project: Lab ID:

0910042-02

Client Sample ID: TRIP BLANK

**Collection Date:** 

Date Received: 10/2/2009

Matrix: TRIP BLANK

Analyses	Result	PQL	Qual U	nits	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: HL
Isopropylbenzene	ND	1.0	μ	g/L	1	10/7/2009 10:51:37 PM
4-Isopropyltoluene	ND	1.0	μ	g/L	1	10/7/2009 10:51:37 PM
4-Methyl-2-pentanone	ND	10	μ	g/L	1	10/7/2009 10:51:37 PM
Methylene Chloride	ND	3.0	μ	g/L	1	10/7/2009 10:51:37 PM
n-Butylbenzene	ND	1.0	μ	g/L	1	10/7/2009 10:51:37 PM
n-Propylbenzene	ND	1.0	μį	g/L	1	10/7/2009 10:51:37 PM
sec-Butylbenzene	ND	1.0	. µg	g/L	1	10/7/2009 10:51:37 PM
Styrene	, ND	1.0	μ	g/L	1	10/7/2009 10:51:37 PM
tert-Butylbenzene	ND	1.0	րն	g/L	1	10/7/2009 10:51:37 PM
1,1,1,2-Tetrachloroethane	ND	1.0	μį	g/L	1	10/7/2009 10:51:37 PM
1,1,2,2-Tetrachioroethane	ND	2.0	μί	g/L	1	10/7/2009 10:51:37 PM
Tetrachloroethene (PCE)	ND	1.0	μg	g/L	1	10/7/2009 10:51:37 PM
trans-1,2-DCE	ND	1.0	μί	g/L	1	10/7/2009 10:51:37 PM
trans-1,3-Dichloropropene	ND	1.0	μς	g/L	1	10/7/2009 10:51:37 PM
1,2,3-Trichlorobenzene	ND	1.0	μg	g/L	1	10/7/2009 10:51:37 PM
1,2,4-Trichlorobenzene	ND	1.0	μς	g/L	1	10/7/2009 10:51:37 PM
1,1,1-Trichloroethane	ND	1.0	μ	g/L	1	10/7/2009 10:51:37 PM
1,1,2-Trichloroethane	ND	1.0	μς	J/L	1	10/7/2009 10:51:37 PM
Trichloroethene (TCE)	ND	1.0	μg	3/L	1	10/7/2009 10:51:37 PM
Trichlorofluoromethane	ND	1.0	μ	g/L	1	10/7/2009 10:51:37 PM
1,2,3-Trichloropropane	ND	2.0	μ	3/L	1	10/7/2009 10:51:37 PM
Vinyl chloride	ND	1.0	ցւլ	g/L	1	10/7/2009 10:51:37 PM
Xylenes, Total	ND	1.5	μg	ı/L	1	10/7/2009 10:51:37 PM
Surr: 1,2-Dichloroethane-d4	92.5	54.6-141	%	REC	1	10/7/2009 10:51:37 PM
Surr: 4-Bromofluorobenzene	93.0	60.1-133	%	REC	1	10/7/2009 10:51:37 PM
Surr: Dibromofluoromethane	94.2	78.5-130	%	REC	1	10/7/2009 10:51:37 PM
Surr: Toluene-d8	99.0	79.5-126	%	REC	1	10/7/2009 10:51:37 PM

Qualifiers:

Value exceeds Maximum Contaminant Level

E Estimated value

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

B Analyte detected in the associated Method Blank

H Holding times for preparation or analysis exceeded

MCL Maximum Contaminant Level

RL Reporting Limit



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Anne Thorne Hall Environmental Analysis Laborat 4901 Hawkins NE Albuquerque, NM 87109

October 12, 2009

Date Received

06, 2009

ESC Sample # : L425671-01

Description

October 0910042

Site ID :

Sample ID

INJECTION WELL

Project # : 0910042

Collected By : Collection Date :

10/01/09 10:10

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Corrosivity	Non-Corrosive			9040C	10/10/09	1
Flashpoint	See Footnote		deg F	D93/1010A	10/08/09	1
Reactive CN (SW846 7.3.3.2)	BDL	0.125	mg/l	9012B	10/09/09	1
Reactive Sulf.(SW846 7.3.4.1)	39.	25.	mg/l	9034/9030B	10/09/09	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note: The reported analytical results relate only to the sample submitted. This report shall not be reproduced, except in full, without the written approval from ESC.

. Reported: 10/12/09 11:17 Printed: 10/12/09 14:23 L425671-01 (FLASHPOINT) - Did Not Flash @ 170F

#### Attachment A List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L425671-01	WG445108 WG444644	SAMP SAMP	Corrosivity Reactive Sulf.(SW846 7.3.4.1)	R943948 R940988	тв J3

#### Attachment B Explanation of QC Qualifier Codes

Qualifier	Meaning
J3 ·	The associated batch QC was outside the established quality control range for precision.
Т8 .	(ESC) - Additional method/sample information: Sample(s) received past/too close to holding time expiration.

#### Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC, Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable unless qualified as 'R' (Rejected).

- Definitions

  Accuracy The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision The agreement between a set of samples or between duplicate samples.

  Relates to how close together the results are and is represented by Relative Percent Difference.
- Organic compounds that are similar in chemical composition, extraction, and chromotography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses. Surrogate -
- Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, TIC or surrogates.



12065 Lebanon Rd. Mt. Juliet, TN 37122 (615) 758-5858 1-800-767-5859 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Hall Environmental Analysis Laboratory Anne Thorne 4901 Hawkins NE

Albuquerque, NM 87109

Quality Assurance Report

Level II L425671

October 12, 2009

·		6.16	boráfo	ry Blank		<del></del>			<del></del>
Analyte	Result	L L	nits	\$ Rec	2	Limit	Bato	h Dat	e Analyzed
Reactive Suit ISW846 7-374:17	76 F25		<b>岭</b> 70年1	erneenen	Child.		( ) WO 44	4644,107	09709709:0
Corrosivity	6.20						WG44	5108 10/	10/09 14:2
Analyte	Units	Result	1960 D	Cafe uplicate	RPD	Limit	Ref	Samp	Batch
Flashpoint	deg F	0 / 10 / 10 / 10 / 10 / 10 / 10 / 10 /	[*/*/F0, 0	Mickel		20 7.3 20		5457+137 5939-01	WG44465 WG44465
Readtive soult vews as of the action	(mg/1)	6.000000000000000000000000000000000000	(E. 1.1.1)	9/07/2014/9	25.5		\$	5671901	W044464
Reactive CN (SW846 7.3.3.2) Corrosivity	mg/l	0	0 (444) 0	(j. 1849.72)	0	20 10		5671-01 5671-01	WG444642 WG445108
		Labora	tory co	ontrol Samp					
Analyte	Units	Known	vaı	Kes	ult	% Rec	Limi		Batch
Flashdoint	deg	62	DV4CLA	80,0		97.76	96-1	04	. WG44465
Reactive Sulf.(SWB46 7.3.4.1) Corrosivity	mg/l	100 9.68	indrote	89.0 9.70	18.EZ 290.E	89.0 100.	70-1 97.9	30 -100.8	WG44464
	wäh:	Laboratory	744FF81	on alomes	ol tear	· ·			<del>, ,,, , ,, ,, ,, ,, ,, ,, ,</del>
Analyte	Units	Result	Ref	Rec \$	hra <i>ka</i> ee	Limit	RPD	Limit	Batch
Flashpoint	deg F	79.0	90,0	96.0		96-104		w.L. Cons	₩ <b>Ğ</b> 444653
Reactive Sulf.(SW846 7.3.4.1)	mg/l	89.0	89.0	89.0	iwaseer	70-130	0 VII) 18 CVIII)	20	WG444544
Corrosivity	e ay mara n	9.70	9.70	100.	2021 NASSON NEWS	97.9-100.8	0	10	WG445108

Batch number /Run number / Sample number cross reference

WG444653; R940428: L425671-01 WG444644: R940988: L425671-01 WG444642: R942048: L425671-01 WG445108: R943948: L425671-01

Calculations are performed prior to rounding of reported values .
 Performance of this Analyte is outside of established criteria.
 For additional information, please see Attachment A 'List of Analytes with OC Qualifiers.'

DATES REPORT

# Hall Environmental Analysis Laboratory, Inc.

Western Refining Southwest, Inc.	
Client:	

0910042

Lab Order:

Injection Well 4th OTR 10/1/09	
Project:	

Sample ID	Client Sample ID	Collection Date	Matrix	Sample ID Client Sample ID Collection Date Matrix Test Name Instrument Run ID QC Batch ID Pr	Instrument Run ID QC Batch ID	QC Batch ID		p Date Analysis Date
0910042-01A	Injection Well	10/1/2009 10:10:00 AM Aqueous	Aqueous	EPA Method 8260B: VOLATILES	JEPTUNE_091006/	R35601	was the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of t	10/6/2009
				EPA Method 8260B: VOLATILES	JEPTUNE_091006/	R35601		10/6/2009
			,	EPA Method 8260B: VOLATILES	JEPTUNE_091006/	R35601		10/6/2009
0910042-01B				EPA Method 8270C: Semivolatiles	ELMO_091013A	20263	10/7/2009	10/13/2009
0910042-01C				EPA 120.1: Specific Conductance	OSEIDON_091002	R35564		10/2/2009
				EPA Method 300.0: Anions	TRITON_091002A	R35559		10/2/2009
				EPA Method 300.0: Anions	TRITON_091002A	R35559		10/2/2009
				EPA Method 300.0: Anions	ORION_091005A	R35577		10/5/2009
				SM 2320B: Alkalinity	OSELDON_091002.	R35564		10/2/2009
				SM 2540 C: Total Dissolved Solids	WC_091005F	20238		10/5/2009
				SM4500-H+B: pH	OSEIDON_091002.	R35564		10/2/2009
0910042-01D				EPA 6010B: Total Recoverable Metals	ISIS_091022A	20291	10/12/2009	10/22/2009
				EPA 6010B: Total Recoverable Metals	ISIS_091016A	20291	10/12/2009	10/16/2009
				EPA 6010B: Total Recoverable Metals	ISIS_091016A	20291	10/12/2009	10/16/2009
				EPA Method 7470. Mercury	NEMO_091009A	20279	10/9/2009	10/9/2009
0910042-02A	TRIP BLANK	•	Trip Blank	EPA Method 8260B: VOLATILES	JEPTUNE_091007/	R35624		10/7/2009
			•	EPA Method 8260B: VOLATILES	4EPTUNE_091006/	R35601		10/6/2009

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc. Injection Well 4th QTR 10/1/09

Work Order:

0910042

vect: injection v	ven 4th Q1 k	10/1/09						Work	Order: 09	10042
Analyte	Result	Units	PQL	SPK Va S	SPK ref	%Rec L	owLimit Hi	ghLimit %RPD	RPDLimit C	Qual
Method: SM 2540 C: Total Di	ssolved Solid									<b>.</b>
Sample ID: MB-20238		MBLK				Batch ID:	20238	Analysis Date:	1	0/5/2009
Total Dissolved Solids	ND	mg/L	20.0						•	
Sample ID: LCS-20238		LCS				Batch ID:	20238	Analysis Date:	1	0/5/2009
Total Dissolved Solids	1038	mg/L	20.0	1000	16	102	80	120		
Method: EPA Method 300.0:	Anions									
Sample ID: MB		MBLK				Batch ID:	R35569	Analysis Date:	10/2/2009 9:4	7: <b>25</b> AN
Chloride	ND	mg/L	0.10							
Sulfate	ND	mg/L	0.50							
Sample ID: MB		MBLK				Batch ID:	R35577	Analysis Date:	10/5/2009 2:5	2:30 PM
Chloride	ND	mg/L	0.10							
Sulfate	ND	mg/L	0.50							
Sample ID: LCS		LCS				Batch ID:	R35559	Analysis Date:	10/2/2009 10:0	4:50 AM
Chloride	5.291	mg/L	0.10	5	0	106	90	110		
Sulfate	10.65	mg/L	0.50	10	0	107	90	110		
Sample ID: LCS		LCS				Batch ID:	R35577	Analysis Date:	10/5/2009 3:0	9:54 PM
Chloride	4.992	mg/L	0.10	5	0	99.8	90	110		
Sulfate	10.18	mg/L	0.50	10	0	102	90	110		
Method: SM 2320B: Alkalinity	•									
ample ID: MB		MBLK				Batch ID:	R35564	Analysis Date:	10/2/2009 1:4	1:00 PM
linity, Total (As CaCO3)	ND	mg/L Ca	20							
Carbonate	ND	mg/L Ca	2.0							
Bicarbonate	ND	mg/L Ca	20							
Sample ID: 80PPM LCS		LCS				Batch ID:	R35564	Analysis Date:	10/2/2009 1:4	7:00 PM
Alkalinity, Total (As CaCO3)	79.44	mg/L Ca	20	80	0	99.3	80	120	,	





Estimated value

Analyte detected below quantitation limits

RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10/1/09

Work Order:

0910042

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	wLimit Hig	hLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B	: VOLATILES									
Sample ID: 6ml rb		MBLK			Batch ID:	R35601	Analysi	s Date:	10/6/2009	9:23:18 Af
Benzene	ND	μg/L	1.0							
Toluene	ND	µg/L	1.0							
Ethylbenzene	ND .	µg/L	1.0							
Methyl tert-butyl ether (MTBE)	ND	μg/L	1.0							
1,2,4-Trimethylbenzene	ND	μg/L	1.0							
1,3,5-Trimethylbenzene	, <b>N</b> D	μg/L	1.0							
1,2-Dichloroethane (EDC)	ND	µg/L	1.0							
1,2-Dibromoethane (EDB)	<b>N</b> D	µg/L	1.0							
Naphthalene	ND	μg/L	2.0							
1-Methylnaphthalene	ND	µg/L	4.0							
2-Methylnaphthalene	ND	µg/L	4.0							
Acetone	ND	μg/L	10							•
Bromobenzene	ND	µg/L	1.0							
Bromodichloromethane	ND	μg/L	1.0							
Bromoform	ND	μg/L	1.0							
Bromomethane	ND	µg/L	1.0			•				
2-Butanone	ND	µg/L	10							
Carbon disulfide	ND	µg/L	10							
Carbon Tetrachloride	ND	μg/L	. 1.0							
Chlorobenzene	ND	µg/L	1.0							
Chloroethane	ND	μg/L	2.0					'		
Chloroform	ND	μg/L	1.0							
Chloromethane	ND	μg/L	1.0							
2-Chlorotoluene	ND	μg/L	1.0							
4-Chlorotoluene	ND	µg/L	1.0			,				
cis-1,2-DCE	ND	µg/L	1.0							
cis-1,3-Dichloropropene	ND	µg/L	1.0							
1,2-Dibromo-3-chloropropane	ND .	μg/L	2.0							
Dibromochloromethane	ND	μg/L	1.0			,				
Dibromomethane	ND	μg/L	1.0							
1,2-Dichlorobenzene	ND	μg/L	1.0							
1,3-Dichtorobenzene	ND	μg/L	1.0							
1,4-Dichlorobenzene	ND	μg/L	1.0			į				
Dichlorodifluoromethane	ND	µg/L	1.0	•						
1,1-Dichloroethane	ND	µg/L	1.0							
1,1-Dichloroethene	ND	<b>µ</b> g/L	1.0							
1,2-Dichloropropane	ND	µg/L	1.0					-		
1,3-Dichloropropane	ND	μg/L	1.0							
2,2-Dichloropropane	ND	μg/L	2.0							
1,1-Dichloropropene	ND	µg/L	1.0						,	
Hexachlorobutadiene	ND	µg/L	1.0							
2-Hexanone	ND	µg/L	10							
sopropylbenzene	ND	µg/L	1.0							
4-Isopropyltoluene	ND	μg/L	1.0							



E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits



# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

roject: Injection Well 4th QTR 10/1/09

Work Order:

0910042

Analyte	Result	Units	PQL	SPK Va SPK i	ef	%Rec L	owLimit Hi	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B:	VOLATILES									4 <u>.</u>	
Sample ID: 5ml rb		MBLK				Batch ID:	R35601	Analys	is Date:	10/6/2009 9	9:23:18 A
4-Methyl-2-pentanone	ND	μg/L	10								
Methylene Chloride	ND	μg/L	3.0								
n-Butylbenzene	ND	.µg/L	1.0								
n-Propylbenzene	ND	μg/L	1.0								
sec-Butylbenzene	ND	μg/L	1.0								
Styrene	ND	μg/L	1.0								
tert-Butylbenzene	ND	μg/L	1.0								
1,1,1,2-Tetrachloroethane	ND	μg/L	1.0								
1,1,2,2-Tetrachloroethane	ND	µg/L	2.0	•							
Tetrachloroethene (PCE)	ND	µg/L	1.0								
trans-1,2-DCE	ND	µg/L	1.0								
trans-1,3-Dichloropropene	ND	μg/L	1.0								
1,2,3-Trichlorobenzene	ND	µg/L	1.0								
1,2,4-Trichlorobenzene	ND	µg/L	1.0								
1,1,1-Trichioroethane	ND	µg/L	1.0								
1.1.2-Trichloroethane	ND	μg/L	1.0	•							
Trichloroethene (TCE)	ND	μg/L	1.0								
Trichlorofluoromethane	ND	μg/L	1.0								
1,2,3-Trichtoropropane	ND	µg/L	2.0								
Vinyl chloride	ND	μg/L	1.0								
ylenes, Total	ND	μg/L	1.5								
Surr: 1,2-Dichloroethane-d4	9.772	μg/L	0	10 0		97.7	54.6	141			•
Surr: 4-Bromofluorobenzene	10.02	μg/L	0	10 0		100	60.1	133			
Surr: Dibromofluoromethane	9.571	µg/L	0	10 0		95.7	78.5	130			
Surr: Toluene-d8	9.885	μg/L	0	10 0		98.8	79.5	126			
Sample ID: b3		MBLK				Batch ID:	R35601	Analysi	s Date:	10/7/2009 3	:22:21 AM
Benzene	ND	µg/L	1.0								
Toluene	ND	μg/L	1.0								
Ethylbenzene	ND	μg/L	1.0								
Methyl tert-butyl ether (MTBE)	ND	µg/L	1.0								
1,2,4-Trimethylbenzene	ND	μg/L	1.0								
1,3,5-Trimethylbenzene	ND	µg/L	1.0								
1,2-Dichloroethane (EDC)	<b>N</b> D	μg/L	1.0								
1,2-Dibromoethane (EDB)	ND	μg/L	1.0								
Naphthalene	ND	μg/L	2.0								
1-Methylnaphthalene	ND	µg/L	4.0								
2-Methylnaphthalene	ND	μg/L	4.0								
Acetone	ND	µg/L	10								
Bromobenzene	ND	μg/L	1.0								
Bromodichloromethane	ND	µg/L	1.0								
Bromoform	ND	μg/L	1.0								
Bromomethane	ND	µg/L	1.0								
2-Butanone	ND	µg/L	10								
Carbon disulfide	ND	μg/L	10								

Qualifiers:

E Estimated value

Analyte detected below quantitation limits

RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10/1/09

Work Order:

0910042

Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec Lo	owLimit His	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B	: VOLATILES									
Sample ID: b3		MBLK			Batch ID:	R35601	Analys	is Date:	10/7/2009	3:22:21 AM
Carbon Tetrachloride	ND	μg/L	1.0							
Chlorobenzene	ND	μg/L	1.0							
Chloroethane	ND	μg/L	2.0							
Chloroform	ND	μg/L	1.0							
Chloromethane	ND	μg/L	1.0							
2-Chlorotoluene	ND	µg/L	1.0							
4-Chlorotoluene	ND	μg/L	1.0							
cis-1,2-DCE	ND	µg/L	1.0							
cis-1,3-Dichloropropene	ND	µg/L	1.0							
1,2-Dibromo-3-chloropropane	ND	µg/∟	2.0							
Dibromochloromethane	ND	μg/L	1.0							
Dibromomethane	ND	μg/L	1.0							
1,2-Dichlorobenzene	ND	μg/L	1.0							
1,3-Dichlorobenzene	ND	µg/L	1.0							
1,4-Dichlorobenzene	ND	μg/L	1.0							
Dichlorodifluoromethane	ND .	μg/L	1.0							
1,1-Dichloroethane	ND	hã/r	1.0							
1,1-Dichloroethene	ND	μg/L	1.0							
1,2-Dichloropropane	ND	μg/L	1.0							
1,3-Dichloropropane	ND .	μg/L	1.0							
2,2-Dichloropropane	ND .	μg/L	2.0							
1,1-Dichloropropene	ND	hã/F	1.0							
Hexachlorobutadiene	ND	µg/L	1.0							
2-Hexanone	ND	µg/∟	10							
Isopropylbenzene	ND	μg/L	1.0		•					
4-Isopropyltoiuene	ND	μg/L	1.0							
4-Methyl-2-pentanone	ND	µg/L	10							
Methylene Chloride	ND	μg/L	3.0							
n-Butylbenzene	ND	μg/L	1.0							
n-Propylbenzene	ND	μg/L	1.0							
sec-Butylbenzene	ND	μg/L	1.0		,					
Styrene	ND	ha\r ha\r	1.0							
tert-Butylbenzene	ND	μg/L	1.0							
1,1,1,2-Tetrachloroethane	ND	μg/L	1.0			•				
1,1,2,2-Tetrachloroethane	ND	μg/L	2.0							
Tetrachloroethene (PCE)	ND	µg/L	1.0							
trans-1,2-DCE	ND	μg/L	1.0							
trans-1,3-Dichloropropene	ND	μg/L	1.0							
1,2,3-Trichlorobenzene	ND	µg/L	1.0							
1,2,4-Trichlorobenzene	ND	μg/L	1.0							
1,1,1-Trichloroethane	ND	ha\r ha\r	1.0							
1,1,2-Trichloroethane	ND	μg/L	1.0							
Trichloroethene (TCE)	ND	μg/L	1.0					•		
Trichlorofluoromethane	· ND	μg/L	1.0							
- ingalototiacioniane	176	F8, C	,							

Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

# QA/QC SUMMARY REPORT

Client: roject: Western Refining Southwest, Inc.

Injection Well 4th QTR 10/1/09

Work Order:

0910042

Analyte	Result	Units	PQL	SPK Va S	PK ref	%Rec L	owLimit Hi	ghLimlt %RPD	RPDLimit Qual
Method: EPA Method 8260B:	VOLATILES								
Sample ID: b3		MBLK				Batch ID:	R35601	Analysis Date:	10/7/2009 3:22:21 AM
1,2,3-Trichloropropane	ND	μg/L	2.0						
Vinyl chloride	ND	μg/L	1.0						
Xylenes, Total	ND	μg/L	1.5						
Surr: 1,2-Dichloroethane-d4	9.409	µg/L	0	10	0	94.1	54.6	141	•
Surr: 4-Bromofluorobenzene	9.794	μg/L	0	10	0	97.9	60.1	133	
Surr: Dibromofluoromethane	9.467	µg/L	0	10	0	94.7	78.5	130	
Surr: Toluene-d8	9.811	μg/L	0	10	0	98.1	<b>79</b> .5	126	
Sample ID: 6ml rb		MBLK				Batch ID:	R35624	Analysis Date:	10/7/2009 11:42:07 AN
Benzene	ND	μg/L	1.0					•	
	ND		1.0					•	•
Toluene	ND ND	μg/L	1.0						
Ethylbenzene Mathyl tart bulyl ather (MTRE)		μg/L ug/l							
Methyl tert-butyl ether (MTBE)  1,2,4-Trimethylbenzene	ND ND	μg/L	1.0 1.0						
•		µg/L	1.0						
1,3,5-Trimethylbenzene	ND	μg/L							
1,2-Dichloroethane (EDC)	ND	µg/L	1.0						
1,2-Dibromoethane (EDB)	ND	µg/L	1.0						
Naphthalene	ND	µg/L	2.0						
1-Methylnaphthalene	ND	μg/L	4.0						
2-Methylnaphthalene	ND ND	μg/L	4.0						
Acetone	ND	μg/L	10						
omobenzene	ND	µg/L	1.0						
oromodichloromethane	ND	μg/L	1.0						
Bromoform	ND	μg/L	1.0						
Bromomethane	ND	hg/r	1.0				•		
2-Butanone	ND	μg/L	10						
Carbon disulfide	ND .	μg/L 	10						
Carbon Tetrachloride	ND	μg/L 	1.0						
Chlorobenzene	ND	μg/L	1.0						
Chloroethane	ND	μg/L	2.0						•
Chloroform	ND	μg/L	1.0						
Chloromethane	ND	µg/L	1.0						
2-Chlorotoluene	ND	μg/L	1.0						
4-Chlorotoluene	ND	µg/L	1.0						
cis-1,2-DCE	ND	µg/L	1.0						
cis-1,3-Dichloropropene	ND	µg/L	1.0						
1,2-Dibromo-3-chloropropane	ND	µg/L	2.0						
Dibromochloromethane	ND	µg/L	1.0				,		
Dibromomethane	ND	µg/L	1.0						
1,2-Dichlorobenzene	ND	μg/L	1.0						
1,3-Dichlorobenzene	ND	µg/L	1.0						
1,4-Dichlorobenzene	ND	µg/L	1.0						
Dichlorodifluoromethane	ND	μg/L	1.0						
1,1-Dichtoroethane	ND	µg/L 	1.0						
1,1-Dichloroethene	ND	µg/L	1.0					,	

Qualifiers:

E

Estimated value

Analyte detected below quantitation limits

RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project: Injection Well 4th QTR 10/1/09

Work Order:

0910042

Analyte	Result	Units	PQL	SPK Va SPK re	f %Reci	∟owLimit Hi	ighLimit %	6RPD	RPDLimit	Qual
Method: EPA Method 8260B	: VOLATILES									
Sample ID: 6ml rb		MBLK			Batch ID:	R35624	Analysis D	Date:	10/7/2009 1	1:42:07 AN
1,2-Dichloropropane	ND	μg/L	1.0							•
1,3-Dichloropropane	ND	µg/L	1.0						#	
2,2-Dichloropropane	ND	μg/L	2.0				•		#	
1,1-Dichloropropene	ND	μg/L	1.0							
Hexachiorobutadiene	ND	μg/L	1.0							
2-Hexanone	ND	µg/L	10							
Isopropylbenzena	ND	µg/L	1.0							
4-Isopropyltoluene	ND	μg/L	1.0							
4-Methyl-2-pentanone	ND	µg/L	10							
Methylene Chloride	ND	μg/L	3.0		•					
n-Butylbenzene	ND	μg/L	1.0							
n-Propylbenzene	ND	μg/L	1.0							
sec-Butylbenzene	ND	µg/L	1.0							
Styrene	ND	μg/L	1.0							
tert-Butylbenzene	ND.	μg/L	1.0							
1,1,1,2-Tetrachloroethane	ND	μg/L	1.0						*	
1,1,2,2-Tetrachloroethane	ND	µg/L	2.0							
Tetrachloroethene (PCE)	ND	μg/L	1.0							
trans-1,2-DCE	ND	μg/L	1.0							
frans-1,3-Dichloropropene	ND	μg/L	1.0							
1,2,3-Trichlorobenzene	ND	μg/L	1.0							
1,2,4-Trichlorobenzene	ND	µg/L	1.0							
1,1,1-Trichloroethane	ND	μg/L	1.0							
1,1,2-Trichloroethane	ND	µg/L	1.0							
Trichloroethene (TCE)	ND	µg/L	1.0							
Trichlorofluoromethane	ND	µg/∟	1.0						•	
1,2,3-Trichloropropane	ND	µg/L	2.0							
Vinyl chloride	ND	µg/L	1.0							
Xylenes, Total	ND	μg/L	1.5							
Surr: 1,2-Dichloroethane-d4	9.099	μg/L	.0	10 0	91.0	54.6	141			
Surr: 4-Bromofluorobenzene	9.415	µg/L	0	10 0	94.1	60.1	133			
Surr: Dibromofluoromethane	9.148	μg/L	0	10 0	91.5	78.5	130			
Surr: Toluene-d8	9.541	μg/L	0.	10 0	95.4	79.5	126			
Sample ID: b6		MBLK			Batch ID:	R35624	Analysis D	ate:	10/8/2009 1	:10:13 AM
Benzene	ND	μg/L	1.0				•			
Toluene	ND	μg/L	1.0							
Ethylbenzene	ND	μg/L μg/L	1.0							,
	ND	μg/L μg/L	1.0						•	
Methyl tert-butyl ether (MTBE) 1,2,4-Trimethylbenzene	ND ND	ha/r ha/r	1.0							
1,2,4-1 illinethylbenzene	ND	µg/L	1.0							
1,3,5-11methylbenzene 1,2-Dichloroethane (EDC)	ND ND	µg/L µg/L	1.0							
1,2-Dichioroethane (EDB)	ND	μg/L μg/L	1.0	•						
Naphthalene	ND ND	μg/L	2.0							
· '	ND		4.0			:				
1-Methylnaphthalene	טא	µg/L	41.0							

Qualifiers:

Ε Estimated value

'Analyte detected below quantitation limits

RPD outside accepted recovery limits

Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Spike recovery outside accepted recovery limits

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Injection Well 4th QTR 10/1/09

Work Order:

0910042

				· · · · · · · · · · · · · · · · · · ·						0510012
Analyte	Result	Units	PQL	SPK Va SPK ref	%Rec L	owLimit Hi	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260E	3: VOLATILES								er.	
Sample ID: b6		MBLK			Batch ID:	R35624	Analysi	s Date:	10/8/2009	1:10:13 AM
2-Methylnaphthalene	ND	µg/L	4.0							
Acetone	ND	μg/L	10							
Bromobenzene	ND	μg/L	1.0							
Bromodichloromethane	ND	ug/L	1.0							
Bromoform	ND	µg/L	1.0				-			
Bromomethane	ND	μg/L	1.0							
2-Butanone	ND	μg/L	10							
Carbon disulfide	ND	μg/L	10							
Carbon Tetrachloride	ND	µg/L	1.0							
Chlorobenzene	ND	µg/L	1.0							
Chloroethane	ND	µg/L	2.0							
Chloroform	ND	µg/L	1.0							
Chloromethane	ND	μg/L	1.0							
2-Chlorotoluene	ND	µg/L	1.0							
4-Chlorotoluene	ND	μg/L	1.0							
cis-1,2-DCE	ND	μg/Ľ	1.0							
cis-1,3-Dichloropropene	ND	µg/L	1.0							
1,2-Dibromo-3-chloropropane	ND	µg/L	2.0							
Dibromochloromethane	ND	µg/∟ µg/L	1.0							
Dibromomethane	ND	µg/L	1.0							
2-Dichlorobenzene	ND	μg/L	1.0							
s-Dichlorobenzene	ND	µg/L	1.0							
1,4-Dichlorobenzene	ND	μg/L	1.0							
Dichlorodifluoromethene	ND	µg/L	1.0							
1,1-Dichloroethane	ND	µg/L µg/L	1.0							
	ND									
1,1-Dichloroethene		µg/L	1.0							
1,2-Dichloropropane	ND ND	μg/L	1.0							
1,3-Dichloropropane	ND	µg/L	1.0							
2,2-Dichloropropane	ND ND	μg/L	2.0							
1,1-Dichloropropene	ND ND	µg/L	1.0							
Hexachlorobutadiene	ND	µg/L	1.0							
2-Hexanone	ND ND	µg/L	10							
Isopropylbenzene	ND	μg/L	1.0							
4-Isopropyltoluene	ND ND	µg/L	1.0							
4-Methyl-2-pentanone Methylene Chloride	ND ND	μg/L	10							
•	ND ND	µg/L	3.0	-						
n-Butylbenzene	ND	μg/L	1.0							
n-Propylbenzene	ND ND	µg/L	1.0 1.0							
sec-Butylbenzene	ND ND	µg/L								
Styrene	ND ND	µg/L	1.0							
tert-Butylbenzene	ND .	µg/L	1.0							
1,1,1,2-Tetrachloroethane	ND	μg/L	1.0							
1,1,2,2-Tetrachloroethane	ND	µg/L	2.0							
Tetrachloroethene (PCE)	ND	μg/L	1.0							





Estimated value

Analyte detected below quantitation limits

RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project: Injection Well 4th QTR 10/1/09

Work Order:

0910042

Analyte	Result	Units	PQL	SPK Va S	PK ref	%Rec L	owLimit Hi	ghLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B:	VOLATILES										,
Sample ID: b6		MBLK				Batch ID:	R35624	Analysis	Date:	10/8/2009	I:10:13 AM
trans-1,2-DCE	ND	µg/L	1.0								
trans-1,3-Dichloropropene	ND	μg/L	1.0						•		*
1,2,3-Trichlorobenzene	ND	μg/L	1.0								
1,2,4-Trichlorobenzene	ND	µg/L	1.0								
1,1,1-Trichtoroethane	ND	μg/L	1.0								
1,1,2-Trichloroethane	ND	µg/L	1.0								
Trichloroethene (TCE)	ND	μg/L	1.0								
Trichlorofluoromethane	ND	. μg/L	1.0								
1,2,3-Trichloropropane	ND	µg/L	2.0								
Vinyl chloride	ND	µg/L	1.0								
Xylenes, Total	ND	µg/L	1.5								
Surr: 1,2-Dichloroethane-d4	9.352	μg/L	0	10	0	93.5	54.6	141			
Surr: 4-Bromofluorobenzene	9.646	μg/L	0	10	0	96.5	60.1	133			
Surr: Dibromofluoromethane	9.479	µg/L	0	10	0	94.8	78.5	130			
Surr: Toluene-d8	9.853	μg/L	0	10	0	98.5	79.5	126			
Sample ID: 100ng lcs		LCS				Batch ID:	R35601	Analysis	Date:	10/6/2009 1	:00:31 PM
Benzene	17.98	μg/L	1,0	20	0	89.9	76.7	114			
Toluene	19.55	µg/L	1.0	20	0	97.8	78.4	117			
Chlorobenzene	19.30	μg/L	1.0	20	0	96.5	80.7	127			
1,1-Dichloroethene	- 21.15	μg/L	1.0	20	0	106	80.2	128			
Trichloroethene (TCE)	17.49	μg/L	1.0	20	0	87.4	77.4	115			
Surr: 1,2-Dichloroethane-d4	28.53	μg/L	٥	30	0	<b>9</b> 5.1	54.6	141		•	
Surr: 4-Bromofluorobenzene	28.82	μg/L	0	30	0	96.1	60.1	133			
Surr: Dibromofluoromethane	26.94	μg/L	0	30	0	89.8	<b>78</b> .5	130			
Surr: Toluene-d8	28.07	μg/L	0	30	0	93.6	79.5	126			
Sample ID: 100ng lcs_b		LCS				Batch ID:	R35601	Analysis	Date:	10/7/2009 4	:34:12 AM
Benzene	17.88	μg/L	1.0	20	0	89.4	76.7	114			
Foluene	18.96	µg/L	1.0	20	0	94.8	78.4	117			
Chlorobenzene	18.85	µg/L	1.0	20	0	94.2	80.7	127			
1,1-Dichloroethene	18.98	μg/L	1.0	20	O	94.9	80.2	128			
Frichloroethene (TCE)	15.42	µg/L	1.0	20	0	77.1	77.4	115			S
Surr: 1,2-Dichloroethane-d4	9.507	μg/L	O	10	0	95.1	54.6	141			
Surr: 4-Bromofluorobenzene	9.864	µg/L	0	10	0	98.6	60.1	133			
Surr: Dibromofluoromethane	9.519	µg/L	0	10	0	95.2	78.5	130			
Surr: Toluene-d8	9.387	µg/L	0	10	0	93.9	79.5	126			
Sample ID: 100ng Ics		LCS				Batch ID:	R35624	Analysis	Date:	10/7/2009 12	:37:37 PM
3enzene	18.32	μg/L	1.0	20	0	91.6	76.7	114			
Toluene	20.24	µg/L	1.0	20	0	101	78.4	117			
Chlorobenzene	19.84	μg/L	1.0	20	0	99.2	80.7	127			
1,1-Dichloroethene	21.05	µg/L	1.0	20	0	105	80.2	128			
Frichloroethene (TCE)	16.12	µg/L	1.0	- 20	0	80.6	77.4	115			
Surr: 1,2-Dichloroethane-d4	9.237	µg/L	0	10	0	92.4	54.6	141			
Surr: 4-Bromofluorobenzene	9.250	µg/L	. 0	10	0	92.5	60.1	133			
Surr: Dibromofluoromethane	9.086	μg/L	0	10	0	90.9	78.5	130			



E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits



# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Injection Well 4th QTR 10/1/09

Work Order:

0910042

Analyte	Result	Units	PQL	SPK Va SF	K ref	%Rec L	owLimit Hi	ghLimit %RPD	RPDLimit Qual
Method: EPA Method 8260B:	VOLATILES							,	
Sample ID: 100ng ics		LCS				Batch ID:	R35624	Analysis Date:	10/7/2009 12:37:37 PM
Surr: Toluene-d8	9.619	μg/L	0	10	0	96.2	79.5	126	
Sample ID: 100ng lcs_b		LCS				Batch ID:	R35624	Analysis Date:	10/8/2009 12:42:31 AM
Benzene	17.75	µg/L	1.0	20	0	88.7	76.7	114	
Toluene	19.37	μg/L	1.0	` 20	0	96.9	78.4	117	
Chlorobenzene	18.70	µg/∟	1.0	20	0	93.5	80.7	127	
1,1-Dichloroethene	20.73	μg/L	1.0	20	0	104	80.2	128	
Trichloroethene (TCE)	15.58	µg/L	1.0	20	0	77.9	77.4	115	
Surr: 1,2-Dichloroethane-d4	9.129	μg/L	0	10	0	91.3	54.6	141	
Surr: 4-Bromofluorobenzene	8.964	μg/L	0	10	0	89.6	60.1	133	
Surr: Dibromofluoromethane	9.427	μ <b>g/L</b>	0	10	0	94.3	78.5	130	
Surr: Toluene-d8	9.529	րց/բ	0	10	0	95.3	79.5	126	





Estimated value

Analyte detected below quantitation limits RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10/1/09

Work Order:

0910042

				_ <del></del>						Qual
	Semivolatiles									
Sample ID: mb-20263		MBLK			Batch ID:	20263	Analysis	Date:	10/13/2009	8:22:08 PM
Acenaphthene	ND	µg/L	10							
Acenaphthylene	· ND	μg/L	10							
Anlline	ND	µg/L	10							
Anthracene	ND	μg/L	10							
Azobenzene	ND	µg/L	10							
Benz(a)anthracene	ND	μg/L	10							
Benzo(a)pyrene	ND	µg/L	10			•	•			
Benzo(b)fluoranthene	ND	µg/L	10							
Benzo(g,h,i)perylene	ND	μg/L	10							
Benzo(k)fluoranthene	ND	µg/L	10							
Benzoic acid	ND	μg/L	20							
Benzyl alcohol	ND	µg/L	10							
Bis(2-chloroethoxy)methane	ND	μg/L	10							
Bis(2-chloroethyl)ether	ND	μg/L	10							
Bis(2-chloroisopropyl)ether	ND	μg/L	10							
Bis(2-ethylhexyl)phthalate	ND	μg/L	10							
4-Bromophenyl phenyl ether	ND	μg/L	10							
Butyl benzyl phthalate	ND	μg/L	10							
Carbazole	ND	μg/L	10							
4-Chloro-3-methylphenol	ND	μg/L	10							
4-Chloroaniline	ND	μg/L	10							
2-Chloronaphthalene	ND	μg/L	10							
2-Chlorophenol	ND	µg/L	10							
1-Chlorophenyl phenyl ether	ND	µg/L	10							
Chrysene	ND	μg/L	10							
Di-n-butyl phthalate	ND	μg/L	10							
Di-n-octyl phthalate	ND	μg/L	10							
Dibenz(a,h)anthracene	ND	µg/L	10							
Dibenzofuran	ND	µg/L	10		•					
,2-Dichlorobenzene	ND	μg/L	10							
1,3-Dichlorobenzene	ND	μg/L	10							
1,4-Dichlorobenzene	ND	µg/L	10							
3.3'-Dichlorobenzidine	ND	μg/L	10							
Diethyl phthalate	ND	μg/L	10							
Dimethyl phthalate	ND	µg/L	10							
2,4-Dichlorophenol	ND	µg/L	20							
2,4-Dimethylphenol	ND	µg/L	10					•		
4,6-Dinitro-2-methylphenol	ND .	µg/L	20							
2,4-Dinitrophenol	ND	μg/L	20							
2,4-Dinitrotoluene	ND	µg/L	10							
2,6-Dinitrotoluene	ND .	μg/L	10							
luoranthene	ND	μg/L	10							
Fluorene	ND.	µg/L	10							
dexachlorobenzene	ND	µg/L	10							



E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits



# QA/QC SUMMARY REPORT

Client: Dject: Western Refining Southwest, Inc.

Injection Well 4th QTR 10/1/09

Work Order:

0910042

Analyte	Result	Units PQL SPK Va SPK ref		%Rec	LowLimit H	%RPD	D RPDLimit Qual				
Method: EPA Method 8270C	Semivolatile	s									
Sample ID: mb-20263		MBLK				Batch ID:	20263	Analys	is Date:	10/13/2009	8:22:08 Pf
Hexachlorobutadiene	ND	µg/L	10								
Hexachlorocyclopentadiene	ND	μg/L	10								
Hexachloroethane	ND	μg/L	10								
Indeno(1,2,3-cd)pyrene	ND	μg/L	10								
Isophorone	ND	μg/L	10								
2-Methylnaphthalene	ND.	μg/L	10								
2-Methylphenol	ND	μg/L	10								
3+4-Methylphenol	ND	µg/L	10								
N-Nitrosodi-n-propylamine	ND	μg/L	10								
N-Nitrosodimethylamine	ND -	μg/L	10								
N-Nitrosodiphenylamine	ND	μg/L	10								
Naphthalene	ND	µg/L	10								
2-Nitroaniline	ND	µg/L	10								
3-Nitroaniline	ND	μg/L	10								
4-Nitroaniline	ND	µg/L	10								
Nitrobenzene	ND	µg/L	10						•		
2-Nitrophenol	ND	µg/L	10								
4-Nitrophenol	ND	µg/L	10								
Pentachiorophenol	ND	µg/L	20								
Phenanthrene	ND	µg/L	10								
nol	ND	μg/L	10								
ene	ND	µg/L	10								
Pyridine	ND	µg/L	10								
1,2,4-Trichlorobenzene	ND	μg/L	10								
2,4,5-Trichlorophenol	ND	μg/L	10								
2,4,6-Trichlorophenol	ND	μg/L	10								
Surr: 2,4,6-Tribromophenol	125.5	µg/L	0	200	0	62.7	16.6	150			
Surr: 2-Fluorobiphenyl	67.08	µg/L	0	100	0	67.1	19.6	134			
Surr: 2-Fluorophenol	81.92	µg/L	0	200	0	41.0	9.54	<b>1</b> 13			
Surr: 4-Terphenyl-d14	55.72	μg/L	0	100	0	55.7	22.7	145			
Surr: Nitrobenzene-d5	63.14	μg/L	0	100	0	63.1	14.6	134			
Surr: Phenol-d5	78.32	μg/L	0	200	0	39.2	10.7	80.3			
Sample ID: Ics-20263		LCS				Batch ID:	20263	Analysi	is Date:	10/13/2009 1	:45:48 PM
Acenaphthene	68. <b>7</b> 6	μg/L	10	100	0	68.8	33.2	88.1			
4-Chloro-3-methylphenol	126.1	µg/L	10	200	0	63.0	26.5	101			
2-Chlorophenol	115.8	µg/L	10	200	0	57.9	27.5	88.7			
1,4-Dichlorobenzene	54.96	μg/L	10	100	0	55.0	27.2	74.1			
2,4-Dinitrotoluene	79.68	µg/L	10	100	0	79.7	32.6	107			
N-Nitrosodi-n-propylamine	66.70	μg/L	10	100	0	66.7	27.1	96.3			
4-Nitrophenol	92.92	µg/L	10	200	0	46.5	6.78	74.7			
Pentachlorophenol	141.7	µg/L	20	200	0	70.9	14.8	113			
Phenol	63.86	μg/L	10	200	0	31.9	17	53.4			
Pyrene	64.12	µg/L	10	100	0	64.1	27	96.3			
-	62.24	μg/L	10	100	0	62.2	30	77.9			

Qualifiers:



Estimated value

Analyte detected below quantitation limits RPD outside accepted recovery limits

Holding times for preparation or analysis exceeded

Not Detected at the Reporting Limit

S Spike recovery outside accepted recovery limits

# QA/QC SUMMARY REPORT

Client:

Western Refining Southwest, Inc.

Project:

Injection Well 4th QTR 10/1/09

Work Order:

0910042

Analyte	Result	Units	PQL	SPK V	a SPK ref	%Rec L	owLimit Hi	ghLimit %RPD	RPDLimit Qual
Method: EPA Method 8270C:	Semivolatiles	3							
Sample ID: Ics-20263		LCS				Batch ID:	20263	Analysis Date:	10/13/2009 1:45:48 PM
Surr: 2,4,6-Tribromophenol	166.5	µg/L	0	200	0	83.3	16.6	150	
Surr: 2-Fluorobiphenyl	69.02	µg/L	0	100	0	69.0	19.6	134	
Surr: 2-Fluorophenol	91.20	μg/L	0	200	0	45.6	9.54	113	•
Surr: 4-Terphenyl-d14	65.48	µg/L	0	100	0	65.5	22.7	145	
Surr: Nitrobenzene-d5	70.80	µg/L	0	100	0	70.8	14.6	134	
Surr: Phenol-d5	71.74	µg/Ł	0	200	0	35.9	10.7	80.3	
Method: EPA 120.1: Specific	Conductance	D.UD				Batch ID:	Dagge	Analysis Data	10/2/2009 2:35:00 PM
Sample ID: 0910020-04A DUP		DUP				Daton ID.	R35564	Analysis Date:	
Specific Conductance	704.1	µmhos/c	0.010					0.566	•
Sample ID: 0910025-01GDUP		DUP				Batch ID:	R35564	Analysis Date:	10/2/2009 6:12:00 PM
Specific Conductance	47950	µmhos/c	0.10					0.208	20
Method: EPA 6010B: Total Re	coverable Me	tals							
Sample ID: MB-20291		MBLK				Batch ID:	20291	Analysis Date:	10/14/2009 1:09:21 AM
Lead	ND	mg/L	0.0050						·
Sample ID: MB-20291		MBLK	•			Batch ID:	20291	Analysis Date:	10/16/2009 12:46:37 PM
Arsenic	ND	mg/L	0.020						
Barium	ND	mg/∟	0.010						
Cadmium	ND	mg/L	0.0020						
Calcium	ND	mg/L	0.50						
Chromium	ND	mg/L	0.0060						
Lead	ND	mg/L	0.0050						
Magnesium	ND	mg/L	0.50						
Potassium	ND	mg/L	1.0						•
Sélenium	ND	mg/L	0.050						
Silver	ND	mg/L	0.0050						
Sodium	ND	mg/L	0.50					•	
Sample ID: LCS-20291		LCS				Batch ID:	20291	Analysis Date:	10/14/2009 1:11:54 AM
Lead	0.4668	mg/L	0.0050	0.5	0	93.4	80	120	
Sample ID: LCS-20291		LCS				Batch ID:	20291	Analysis Date:	10/16/2009 12:49:47 PM
Arsenic	0.4714	mg/L	0.020	0.5	0	94.3	80	120	
Barium	0.4770	mg/L	0.010	0.5	0	95.4	80	120	
Cadmium	0.4819	mg/L	0.0020	0.5	0.0008	96.2	80	120	
Calcium	49.19	mg/L	0.50	50	0	98.4	80	120	i e
Chromium	0.4753	mg/L	0.0060	0.5	0	95.1	80	120	
Lead	0.4767	mg/L	0.0050	0.5	0	95.3	80	120	
Magnesium	49.91	mg/L	0.50	50	0	99.8	80	120	
Potassium	51.79	mg/L	1.0	50	0	104	80	120	
Selenium	0.4668	mg/L	0.050	0.5	0	93.4	80	120	
Silver	0.4967	mg/L	0.0050	0.5	0.0022	98.9	80	120	
Sodium	53.73	mg/L	0.50	EΛ	0.4055	107	80	120	

Qualifiers:

E Estimated value

J Analyte detected below quantitation limits

R RPD outside accepted recovery limits Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

Spike recovery outside accepted recovery limits



# QA/QC SUMMARY REPORT

SPK Va SPK ref

Client: oject: Western Refining Southwest, Inc.

Result

7.500

Injection Well 4th QTR 10/1/09

Work Order:

0910042

Analyte

pΗ

SM4500-H+B: pH

Sample ID: 0910025-01GDUP

pH units

Units

PQL

0.1

%Rec LowLimit HighLimit

%RPD RPDLimit Qual

Method:

DUP

Batch ID:

R35564

Analysis Date:

10/2/2009 6:12:00 PM

0

Qualifiers:

Estimated value

Analyte detected below quantitation limits RPD outside accepted recovery limits

Н Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

\$ Spike recovery outside accepted recovery limits

# Hall Environmental Analysis Laboratory, Inc.

# Sample Receipt Checklist

Client Name WESTERN REFINING SOUT		Date Receiv	Date Received: 10/2/2009					
Work Order Number 0910042				Received b	y: TLS	1		
Checklist completed by:	\$	· 	/ C	Sample ID	labels checked by -	/: Initials		
Matrix:	Carrier name:	<u>UPS</u>	<u>3</u>					
Shipping container/cooler in good condition?	•	Yes	$\mathbf{Z}$	No 🗌	Not Present			
Custody seals intact on shipping container/cool	er?	Yes	¥	No 🗌	Not Present [	Not Shipped		
Custody seals intact on sample bottles?		Yes		No 🗆	N/A	Ø		
Chain of custody present?		Yes	V	No 🗌		•		
Chain of custody signed when relinquished and	received?	Yes	V	No 🗌				
Chain of custody agrees with sample labels?	•	Yes	V	No 🗆				
Samples in proper container/bottle?		Yes	$\checkmark$	No 🗌				
Sample containers intact?		Yes	V	No 🗌				
Sufficient sample volume for indicated test?		Yes	$\checkmark$	No 🗌				
All samples received within holding time?		Yes	V	No 🗌	•	Number of		
Water - VOA vials have zero headspace?	No VOA vials subm	itted		Yes 🗹	No 🗌	bottles che pH:	icked for	
Water - Preservation labels on bottle and cap m	atch?	Yes	$\mathbf{Z}$	No 🗌	N/A	<u> </u>	<b></b>	
Water - pH acceptable upon receipt?		Yes	Y	No 🗀	N/A	<2 >12 unie below.	ess noted	
Container/Temp Blank temperature?		4.	.3°	<6° C Accepta		Delow.		
COMMENTS:				If given sufficier	nt time to cool.			
·								
						:		
							•	
•	•					•	•	
Client contacted	Date contacted:			Per	son contacted			
Contacted by:	Regarding:							
Comments:								
							,	
					· · · · · · · · · · · · · · · · · · ·		<del></del>	
·								
					·			
Corrective Action					<del></del>			
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# Hall Environmental Analysis Laboratory

# **QUALITY ASSURANCE PLAN**

Effective Date: January 31st 2009

Revision 9.0

www.hallenvironmental.com

Control Number: 0000082

Approved By:

Nancy McDuffie

Laboratory Manager

Date

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Full list of approved analytes, methods, analytical techniques and fields of testing Reserved, available upon request

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Full list of approved analytes, methods, analytical techniques and fields of testing Reserved, available upon request

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Reserved, available upon request

## Appendix F Terms and Definitions

Reserved, available upon request

# Appendix G Chain of Custody Record

Reserved, available upon request

# Appendix H HEAL Forms

Analyst Ethics and Data Integrity Agreement IDOC Certificate
ADOCP Certificate
Training Forms
Reserved, available upon request

#### 3.0 Introduction

## **Purpose of Document**

The purpose of this Quality Assurance Plan is to formally document the quality assurance policies and procedures of Hall Environmental Analysis Laboratory, Inc. (HEAL), for the benefit of its employees, clients, and accrediting organizations. HEAL continually implements all aspects of this plan as an essential and integral part of laboratory operations in order to ensure that high quality data is produced in an efficient and effective manner.

## **Objectives**

The objective of HEAL is to achieve and maintain excellence in environmental testing. This is accomplished by developing, incorporating and documenting the procedures and policies specified by each of our accrediting authorities and outlined in this plan. A laboratory staff that is analytically competent, well qualified, and highly trained carries out these activities. An experienced management team, knowledgeable in their area of expertise, monitors them. Finally, a comprehensive quality assurance program governs laboratory practices and ensures that the analytical results are valid, defensible, reproducible, reconstructable and of the highest quality.

HEAL establishes and thoroughly documents its activities to ensure that all data generated and processed will be scientifically valid and of known and documented quality. Routine laboratory activities are detailed in method specific standard operating procedures (SOP). All data reported meets the applicable requirements for the specific method that is referenced, ORELAP, TCEQ, EPA, client specific requirements and/or State Bureaus. In the event that these requirements are ever in contention with each other, it is HEAL's policy to always follow the most prudent requirement available. For specific method requirements refer to HEAL's Standard Operating Procedures (SOP's), EPA methods, Standard Methods 20th edition, ASTM methods or state specific methods.

HEAL management ensures that this document is correct in terms of required accuracy, data reproducibility, and that the procedures contain proper quality control measures. HEAL management additionally ensures that all equipment is reliable, well maintained and appropriately calibrated. The procedures and practices of the laboratory are geared towards not only strictly following our regulatory requirements but also allowing the flexibility to conform to client specific specifications. Meticulous records are maintained for all samples and their respective analyses so that results are well documented and defensible in a court of law.

The HEAL Quality Assurance/Quality Control Officer (QA/QCO) and upper management are responsible for supervising and administering this quality assurance program, and ensuring each individual is responsible for its proper implementation. All HEAL management remains committed to the encouragement of excellence in analytical testing and will continue to provide the necessary resources and environment conducive to its achievement.

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#### **Policies**

Understanding that quality cannot be mandated, it is the policy of this laboratory to provide an environment that encourages all staff members to take pride in the quality of their work. In addition to furnishing proper equipment and supplies, HEAL stresses the importance of continued training and professional development. Further, HEAL recognizes the time required for data interpretation. Therefore, no analyst should feel pressure to sacrifice data quality for data quantity. Each staff member must perform with the highest level of integrity and professional competence, always being alert to problems that could compromise the quality of their technical work.

Management and senior personnel supervise analysts closely in all operations. Under no circumstance is the willful act or fraudulent manipulation of analytical data condoned. Such acts must be reported immediately to HEAL management. Reported acts will be assessed on an individual basis and resulting actions could result in dismissal. The laboratory staff is encouraged to speak with lab managers or senior management if they feel that there are any undo commercial, financial, or other pressures, which might adversely affect the quality of their work; or in the event that they suspect that data quality has been compromised in any way. HEALs Quality Assurance/Quality Control Officer is available if any analyst and/or manager wishes to anonymously report any suspected or known breaches in data integrity.

All proprietary rights and client information at HEAL (including national security concerns) are considered confidential. No information will be given out without the express verbal or written permission of the client. All reports generated will be held in the strictest of confidence.

This is a controlled document. Each copy is assigned a unique tracking number and when released to a client or accrediting agency the QA/QCO keeps the tracking number on file. This document is reviewed on an annual basis to ensure that it is valid and representative of current practices at HEAL.

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## 4.0 Organization and Responsibility

# Company

HEAL is accredited in accordance with the 2003 NELAC standard (see NELAC accredited analysis list in the appendix), through ORELAP and TCEQ and by the Arizona Department of Health Services. Additionally, HEAL is qualified as defined under the State of New Mexico Water Quality Control Commission regulations and the New Mexico State Drinking Water Bureau. HEAL is a locally owned small business that was established in 1991. HEAL is a full service environmental analysis laboratory with analytical capabilities that include both organic and inorganic methodologies and has performed analyses of soil, water, air as well as various other matrices for many sites in the region. HEAL's client base includes local, state and federal agencies, private consultants, commercial industries as well as individual homeowners. HEAL has performed as a subcontractor to the state of New Mexico and to the New Mexico Department of Transportation. HEAL has been acclaimed by its customers as producing quality results and as being adaptive to client-specific needs.

The laboratory is divided into an organic section, and an inorganic section. Each section has a designated manager/technical director. The technical directors report directly to the laboratory manager, who oversees all operations.

## Certifications

ORELAP - NELAC Oregon Primary accrediting authority.

TCEQ - NELAC Texas Secondary accrediting authority.

The Arizona Department of Health Services

The New Mexico Drinking Water Bureau

See appendix B-E for copies of current licenses and licensed parameters, or refer to our current list of certifications online at <a href="https://www.hallenvironmental.com">www.hallenvironmental.com</a>.

## Personnel

HEAL management ensures the competence of all who operate equipment, perform environmental tests, evaluate results, and sign test reports. Personnel performing specific tasks shall be qualified on the basis of appropriate education, training, experience and /or demonstrated skills.

All personnel shall be responsible for complying with HEALs quality assurance/quality control requirements that pertain to their technical function. Each technical staff member must have a combination of experience and education to adequately demonstrate specific knowledge of their

particular function and a general knowledge of laboratory operations, test methods, quality assurance/quality control procedures and records management.

All employees training certificates and diplomas are kept on file with demonstrations of capability for each method they perform. An Organizational Chart can be found in Appendix A.

# **Laboratory Director**

The Laboratory Director is responsible for overall technical direction and business leadership of HEAL. The Laboratory Manager, the Project Manager and Quality Assurance/Quality Control Officer report directly to the Laboratory Director. Someone with a minimum of 7 years of directly related experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

# Laboratory Manager/Lead Technical Director

The Laboratory Manager shall exercise day—to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results. The Laboratory Manager shall be experienced in the fields of accreditation for which the laboratory is approved or seeking accreditation. The Laboratory Manager shall certify that personnel with appropriate educational and/or technical background perform all tests for which HEAL is accredited. Such certification shall be documented.

The Laboratory Manager shall monitor standards of performance in quality control and quality assurance and monitor the validity of the analyses performed and data generated at HEAL to assure reliable data.

The Laboratory Manager is responsible for the daily operations of the laboratory. The Laboratory Manager is the lead technical director of the laboratory and in conjunction with the section technical directors is responsible for coordinating activities within the laboratory with the overall goal of efficiently producing high quality data with in a reasonable time frame.

In events where employee scheduling or current workload is such that new work cannot be incorporated, with out missing hold times, the Laboratory Manager has authority to modify employee scheduling, re-schedule projects or, when appropriate, allocate the work to approved subcontracting laboratories.

Additionally, the laboratory manager reviews and approves new analytical procedures and methods, and performs a final review of most analytical results. The Laboratory Manager provides technical support to both customers and HEAL staff.

The Laboratory Manager also observes the performance of supervisors to ensure good laboratory practices and proper techniques are being taught and utilized, assisting in overall quality control implementation, and strategic planning for the future of the company. Other duties include assisting in establishing laboratory policies which lead to the fulfillment of requirements for various certification programs, assuring that all Quality

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Assurance and Quality Control documents are reviewed and approved, and assisting in conducting Quality Assurance Audits.

The laboratory manager addresses questions or complaints that cannot be answered by the section managers.

The Laboratory Manager shall have a bachelor's degree in a chemical, environmental, biological sciences, physical sciences or engineering field, and at least five years of experience in the environmental analysis of representative inorganic and organic analytes for which the laboratory seeks or maintains accreditation.

## Quality Assurance Quality Control Officer

The Quality Assurance/Quality Control Officer (QA/QCO) serves as the focal point for QA/QC and shall be responsible for the oversight and/or review of quality control data. The QA/QCO functions independently from laboratory operations and shall be empowered to halt unsatisfactory work and/or prevent the reporting of results generated from an out-of-control measurement system. The QA/QCO shall objectively evaluate data and perform assessments without any outside/managerial influence. The QA/QCO shall have direct access to the highest level of management at which decisions are made on laboratory policy and/or resources. The QA/QCO shall notify laboratory management of deficiencies in the quality system in periodic, independent reports.

The QA/QCO shall have general knowledge of the analytical test methods, for which data review is performed, have documented training and/or experience in QA/QC procedures and in the laboratory's quality system. The QA/QCO will have a minimum of a BS in a scientific or related field and a minimum of three years of related experience.

The QA/QCO shall schedule and conduct internal audits as per the Internal Audit SOP at least annually, monitor and trend Corrective Action Reports as per the Data Validation SOP, periodically review control charts for out of control conditions and initiate any appropriate corrective actions.

The QA/QCO shall oversee the analysis of proficiency testing in accordance with our standards and monitor any corrective actions issued as a result of this testing.

The QA/QCO reviews all standard operating procedures and statements of work in order to assure their accuracy and compliance to method and regulatory requirements.

The QA/QCO shall be responsible for maintaining and updating this quality manual.

#### Business/Project Manager

The role of the business/project manager is to act as a liaison between HEAL and our clients. The project manager reviews reports, updates clients on the status of projects inhouse, prepares quotations for new work, and is responsible for HEALs marketing effort.

All new work is assessed by the project manager and reviewed with the other managers so as to not exceed the laboratories capacity. In events where employee scheduling or current workload is such that new work cannot be incorporated with out missing hold times, the Project Manager has authority to re-schedule projects.

It is also the duty of the project manager to work with the Laboratory Manager and QA/QCO to insure that before new work is undertaken the resources required and accreditations requested are available to meet the client's specific needs.

Additionally, the Project Manager can initiate the review of the need for new analytical procedures and methods, and performs a final review of some analytical results. The Project Manager provides technical support to customers. Someone with a minimum of 2 years of directly related experience and a bachelor's degree in a scientific or engineering discipline should fill this position.

# Section Manager/Technical Directors

The Section Manager/Technical Directors are full-time members of the staff at HEAL who exercise day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results for their department within HEAL. A Technical Director's duties shall include, but not be limited to, monitoring standards of performance in quality control and quality assurance; monitoring the validity of the analyses performed and the data generated in their sections to ensure reliable data, overseeing training and supervising departmental staff, schedule incoming work for their sections and monitor laboratory personnel to ensure that proper procedures and techniques are being utilized. They supervise and implement new Quality Control procedures as directed by the QA/QCO, update and maintain quality control records including, but not limited to, training forms, IDOCs, ADOCPs, MDLs and evaluate laboratory personnel in their Quality Control activities. In addition technical directors are responsible for upholding the spirit and intent of HEAL's data integrity procedures.

They are the technical director of the associated section and review analytical data to acknowledge that data meets all criteria set forth for good Quality Assurance practices. Someone with a minimum of 2 years of experience in the environmental analysis of representative analytes for which HEAL seeks or maintains accreditation and a bachelor's degree in a scientific or related discipline should fill this position.

## Health and Safety / Chemical Hygiene Officer

Refer to the most recent version of the Health and Safety and Chemical Hygiene Plans for the rolls, responsibilities and basic requirements of the Health and Safety Officer (H&SO) and the Chemical Hygiene Officer (CHO). These jobs can be executed by the same employee.

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## Chemist I, II and III

Chemists are responsible for the analysis of various sample matrices including, but not limited to, solid, aqueous, and air as well as the generation of high quality data in accordance with the HEAL SOPs and QA/QC guidelines in a reasonable time as prescribed by standard turnaround schedules or as directed by the Section Manager or Laboratory Manager.

Chemists are responsible for making sure all data generated is entered in the database in the correct manner and the raw data is reviewed, signed and delivered to the appropriate peer for review. A Chemist reports daily to the section manager and will inform them as to material needs of the section specifically pertaining to the analyses performed by the chemist. Additional duties may include preparation of samples for analysis, maintenance of lab instruments or equipment, cleaning and providing technical assistance to lower level laboratory staff.

The senior chemist in the section may be asked to perform supervisory duties as related to operational aspects of the section. The chemist may perform all duties of a lab technician.

The position of Chemist is a full or part time hourly position and is divided into three levels, Chemist I, II, and III. All employees hired into a Chemist position at HEAL must begin as a Chemist I and remain there at a minimum of three months regardless of their education and experience. Chemist I must have a minimum of an AA in a related field or equivalent experience (equivalent experience means years of related experience can be substituted for the education requirement). A Chemist I is responsible for analysis, instrument operation and data reduction. Chemist II must have a minimum of an AA in a related field or equivalent experience and must have documented and demonstrated aptitude to perform all functions of a Chemist II. A Chemist II is responsible for the full analysis of their test methods, routine instrument maintenance, purchase of consumables as dictated by their Technical Director, advanced data reduction and basic data review. Chemist II may also assist Chemist III in method development and as dictated by their Technical Director may be responsible for the review and/or revision of their method specific SOPs. Chemist III must have Bachelors degree or equivalent experience and must have documented and demonstrated aptitude to perform all functions of a Chemist III. Chemist III are responsible for all tasks completed by a Chemist I and II as well as advanced data review, non-routine instrument maintenance, assisting their technical director in basic supervisory duties and method development.

# Laboratory Technician

A laboratory technician is responsible for providing support in the form of sample preparation, basic analysis, general laboratory maintenance, glassware washing, chemical inventories and sample kit preparation. This position can be filled by someone without the education and experience necessary to obtain a position as a chemist.

## Sample Control Manager

The sample control manager is responsible for receiving samples and reviewing the sample login information after it has been entered into the computer. The sample control manager also checks the samples against the chain-of-custody for any sample and/or labeling discrepancies prior to distribution.

The sample control manager is responsible for sending out samples to the sub-contractors along with the review and shipping of field sampling bottle kits. The sample control manager acts as a liaison between the laboratory and field sampling crew to ensure that the appropriate analytical test is assigned. If a discrepancy is noted the sample control manager or sample custodian will contact the customer to resolve any questions or problems. The sample control manager is an integral part the customer service team.

This position should be filled by someone with a high school diploma and a minimum of 2 years of related experience and can also be filled by a senior manager.

# Sample Custodians

Sample Custodians work directly under the Sample Control Manager. They are responsible for sample intake into the laboratory and into the LIMS. Sample Custodians take orders from our clients and prepare appropriate bottle kits to meet the client's needs. Sample Custodians work directly with the clients in properly labeling and identifying samples as well as properly filling out legal COCs. When necessary, Sample Custodians contact clients to resolve any questions or problems associated with their samples. Sample Custodians are responsible for distributing samples throughout the laboratory and are responsible for notifying analysts of special circumstances such as short holding times or improper sample preservation upon receipt.

### Delegations in the Absence of Key Personnel

Planned absences shall be preceded by notification to the Laboratory Manager. The appropriate staff members shall be informed of the absence. In the case of unplanned absences, the organizational superior shall either assume the responsibilities and duties or delegate the responsibilities and duties to another appropriately qualified employee.

In the event that the Laboratory Manager is absent for a period of time exceeding fifteen consecutive calendar days, another full-time staff member meeting the basic qualifications and competent to temporarily perform this function will be designated. If this absence exceeds thirty-five consecutive calendar days, HEAL will notify ORELAP in writing of the absence and the pertinent qualifications of the temporary laboratory manager.

# Laboratory Personnel Qualification and Training

All personnel joining HEAL shall undergo orientation and training. During this period the new personnel shall be introduced to the organization and their responsibilities, as well as

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the policies and procedures of the company. They shall also undergo on the job training and shall work with trained staff. They will be shown required tasks and be observed while performing them.

When utilizing staff undergoing training, appropriate supervision shall be dictated and overseen by the appropriate section technical director. Prior to analyzing client samples, a new employee, or an employee new to a procedure, must meet the following basic requirements. The SOP and Method for the analysis must be read and signed by the employee indicating that they read, understood and intend to comply with the requirements of the documents. The employee must undergo documented training. conducted by a senior analyst familiar with the procedure and overseen by the section Technical Director. This training is documented by any means deemed appropriate by the trainer and section Technical Director, and kept on file in the employees file located in the QA/QCO's office. The employee must perform a successful Initial Demonstration of Proficiency (IDOC). See Appendix H for the training documents and checklists utilized at HEAL to ensure that all of these requirements are met. Once all of the above requirements are met it is incumbent upon the section Technical Director to determine at which point the employee can begin to perform the test unsupervised. A Certification to Complete Work Unsupervised (see Appendix H) is them filled out by the employee and technical director.

All IDOCs shall be documented through the use of the certification form which can be found in Appendix H. IDOCs are performed by analyzing four Laboratory Control Spikes (LCSs). Using the results of the LCSs the mean recovery is calculated in the appropriate reporting units and the standard deviations of the population sample (n-1) (in the same units) as well as the relative percent difference for each parameter of interest. When it is not possible or pertinent to determine mean and standard deviations HEAL assesses performance against establish and documented criteria dictated in the method SOP. The mean and standard deviation are compared to the corresponding acceptance criteria for precision and accuracy in the test method (if applicable) or in laboratory-generated acceptance criteria. In the event that the HEAL SOP or test method fail to establish the pass/fail criteria the default limits of +/- 20% for calculated recovery and <20% relative percent difference based on the standard deviation will be utilized. If all parameters meet the acceptance criteria, the IDOC is successfully completed. If any one of the parameters do not meet the acceptance criteria, the performance is unacceptable for that parameter and the analyst must either locate and correct the source of the problem and repeat the test for all parameters of interest or repeat the test for all parameters that failed to meet Repeat failure, however, confirms a general problem with the measurement system. If this occurs the source of the problem must be identified and the test repeated for all parameters of interest.

New employees that do not have prior analysis experience will not be allowed to perform analysis until they have demonstrated attention to detail with minimal errors in the assigned tasks. To ensure a sustained level of quality performance among staff members, continuing demonstration of capability shall be performed at least once a year. These are as an Annual Documentation of Continued Proficiency (ADOCP).

At least once per year an ADOCP must be completed by: the acceptable performance of a blind sample (this is typically done using a PT sample but can be a single blind sample to the analyst), by performing another IDOC, or by summarizing the data of four consecutive

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laboratory control samples with acceptable levels of precision and accuracy (these limits are those currently listed in the LIMS for an LCS using the indicated test method.) ADOCPs are documented using a standard form and are kept on file in each analysts employee folder.

Each new employee shall be provided with data integrity training as a formal part of their new employee orientation. Each new employee will sign an ethics and data integrity agreement to ensure that they understand that data quality is our main objective. Every HEAL employee recognizes that although turn around time is important, quality is put above any pressure to complete the task expediently. Analysts are not compensated for passing QC parameters nor are incentives given for the quantity of work produced. Data Integrity and Ethics training are performed on an annual basis in order to remind all employees of HEAL's policy on data quality. Employes are required to understand that any infractions of the laboratory data integrity procedures will result in a detailed investigation that could lead to very serious consequences including immediate termination, debarment or civil/criminal prosecution.

Training for each member of HEALs technical staff is further established and maintained through documentation that each employee has read, understood, and is using the latest version of this Quality Assurance Manual. Training courses or workshops on specific equipment, analytical techniques or laboratory procedures are documented through attendance sheets, certificates of attendance, training forms, or quizzes. This training documentation is located in either analyst specific employee folders in the QA/QCO Office or in the current years group training folder, also located in the QA/QCO Office. On the front of all methods, SOPs and procedures for HEAL there is a signoff sheet that is signed by all pertinent employees, indicating that they have read, understood and agreed to perform the most recent version of the document.

## 5.0 Receipt and Handling of Samples

## Sampling

#### **Procedures**

HEAL does not provide field sampling for any projects. Sample kits are prepared and provided for clients upon request. The sample kits contain the appropriate sampling containers (with a preservative when necessary), labels, blue ice, a cooler, chain-of-custody forms, plastic bags, bubble wrap, and any special sampling instructions. Sample kits are reviewed prior to shipment for accuracy and completeness.

#### Containers

Containers which are sent out for sampling are purchased by HEAL from a commercial source. Glass containers are certified "EPA Cleaned" QA level 1. Plastic containers are certified clean when required. These containers are received with a Certificate of Analysis verifying that the containers have been cleaned according to the EPA wash procedure. Containers are used once and discarded. If the samples are collected and stored in inappropriate containers the laboratory may not be able to accurately quantify the amount of the desired components. In this case re-sampling may be required.

#### Preservation

If sampling for an analyte(s) requires preservation, the sample custodians fortify the containers prior to shipment to the field, or provide the preservative for the sampler to add in the field. The required preservative is introduced into the vials in uniform amounts and done so rapidly to minimize the risk of contamination. Vials that contain a preservative are labeled appropriately. If the samples are stored with inappropriate preservatives the laboratory may not be able to accurately quantify the amount of the desired components. In this case re-sampling may be required.

Refer to the current Login SOP and/or the current price book for detailed sample receipt and handling procedures, appropriate preservation and holding time requirements.

# Sample Custody

## Chain-of-Custody Form

A Chain-of-Custody (CoC) form is used to provide a record of sample chronology from the field to receipt at the laboratory. HEALs CoC contains the client's name, address, phone and fax numbers, the project name and number, the project manager's name.

and the field sampler's name. It also identifies the date and time of sample collection, sample matrix, field sample ID number, number/volume of sample containers, sample temperature upon receipt, and any sample preservative information.

There is also a space to record the HEAL ID number assigned to samples after they are received. Next to the sample information is a space for the client to indicate the desired analyses to be performed. There is a section for the client to indicate the data package level as well as any accreditation requirements. Finally, there is a section to track the actual custody of the samples. The custody section contains lines for signatures, dates and times when samples are relinquished and received. The CoC form also includes a space to record special sample related instructions, sampling anomalies, time constraints, and any sample disposal considerations.

It is paramount that all CoCs arrive at HEAL complete and accurate so that the samples can be processed and allocated for testing in a timely and efficient manor. A sample chain-of-custody form can be found in Appendix G or on line at www.hallenvironmental.com.

## **Receiving Samples**

Samples are received by authorized HEAL personnel. Upon arrival, the CoC is compared to the respective samples. After the samples and CoC have been determined to be complete and accurate, the sampler signs over the CoC. The HEAL staff member in turn signs the chain-of-custody, also noting the current date, time and sample temperature. This relinquishes custody of the samples from the sampler and delegates sample custody to HEAL. The third (pink) copy of the CoC form is given to the person who has relinquished custody of the samples.

## Logging in Samples and Storage

Standard Operating Procedures have been established for the receiving and tracking of all samples (refer to the current HEAL Login SOP). These procedures ensure that samples are received and properly logged into the laboratory, and that all associated documentation, including chain of custody forms, are complete and consistent with the samples received. Each sample set is given a unique HEAL tracking ID number. Individual sample locations within a defined sample set are given a unique sample ID suffix-number. Labels with the HEAL numbers, and tests requested, are generated and placed on their respective containers. The pH of preserved, non-volatile samples is checked and noted if out of compliance. Due to the nature of the samples, the pHs of volatiles samples are checked after analysis. Samples are reviewed prior to being distributed for analysis.

Samples are distributed for analysis based upon the requested tests. In the event that sample volume is limited and different departments at HEAL are required to share the

sample, volatile work takes precedence and will always be analyzed first before the sample is sent to any other department for analysis.

Each project (sample set) is entered into the Laboratory Information Management System (LIMS) with a unique ID that will be identified on every container. The ID tag includes the Lab ID, Client ID, date and time of collection, and the analysis/analyses to be performed. The LIMS continually updates throughout the lab. Therefore, at any time, an analyst or manager may inquire about a project and/or samples status. For more information about the login procedures, refer to the Sample Login SOP.

## Disposal of Samples

Samples are held at HEAL for a minimum of thirty days and then transferred to the HEAL warehouse for disposal. Analytical results are used to characterize their respective sample contamination level(s) so that the proper disposal can be performed. These wastes will be disposed of according to their hazard as well as their type and level of contamination. Refer to the Hall Environmental Analysis Laboratory Chemical Hygiene Plan and current Sample Disposal SOP for details regarding waste disposal.

Waste drums are provided by an outside agency. These drums are removed by the outside agency and disposed of in a proper manner.

The wastes that are determined to be non-hazardous are disposed of as non-hazardous waste in accordance with the Chemical Hygiene Plan and Sample Disposal SOP.

#### 6.0 Analytical Procedures

All analytical methods used at HEAL incorporate necessary and sufficient Quality Assurance and Quality Control practices. A Standard Operating Procedure (SOP) is used for each method to provide the necessary criteria to yield acceptable results. These procedures are reviewed at least annually and revised as necessary and are attached as a pdf file in the Laboratory Information Management System (LIMS) for easy access by each analyst. The sample is often consumed or altered during the analytical process. Therefore, it is important that each step in the analytical process be correctly followed in order to yield valid data.

When unforeseen problems arise, the analyst, technical director, and, when necessary, laboratory manager meet to discuss the factors involved. The analytical requirements are evaluated and a suitable corrective action or resolution is established. The client is notified in the case narrative with the final report or before, if the validity of their result is in question.

#### List of Procedures Used

Typically, the procedures used by HEAL are EPA approved methodologies or 20th edition Standard Methods. However, proprietary methods for client specific samples, are sometimes used. The following tables list EPA and Standard Methods Method numbers with their corresponding analytes and/or instrument classification.

#### Methods Utilized at HEAL

Methodiology	Tittle of Method				
120.1	"Conductance(Specific Conductance, uohms at 25 ° C)"				
180.1	"Turbidity (Nephelometric)"				
200.2	"Sample Preparation Procedure For Spectrochemical Determination of Total Recoverable Elements"				
200.7	"Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry"				
245.1	"Mercury (Manual Cold Vapor Technique)"				
300.0	"Determination of Inorganic Anions by Ion Chromatography"				
413.2	"Oil and Grease"				
418.1	"Petroleum Hydrocarbons (Spectrophotometric, Infrared)"				
420.3	"Phenolics (Spectrophotometric, MBTH With Distillation)"				
504.1	"EDB, DBCP and 123TCP in Water by Microextraction and Gas Chromatography"				

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505	"Analysis of Organohalide Pesticides and Commercial Polychlorinated Biphenyl (PCB) Products in Water by Microextraction and Gas Chromatography"					
515.1	"Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron Capture Delector"					
524.2	"Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry"					
531.1	"Measurement of N-Methylcarbomoyloximes and N-Methylcarbamates in Water by Direct Aqueous Injection HPLC with Post Column Dervivatization"					
547	"Determination of Glyphosate in Drinking Water by Direct-Aqueous Injection—HPLC, Post-Column Derivatization, and Fluorescence Detection"					
552.1	"Determination of Haloacetic Acids and Dalapon in Drinking Water by Ion- Exchange Liquid-Solid Extraction and Gas Chromatography with an Electron Capture Detector"					
1311	"Toxicity Characteristic Leaching Procedure"					
1311ZHE	"Toxicity Characteristic Leaching Procedure"					
3005A	"Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by FLAA or ICP Spectroscopy"					
3010A	"Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by FLAA or ICP Spectroscopy"					
3050B	"Acid Digestion of Sediment, Sludge, and Soils"					
3510C	"Separatory Funnel Liquid-Liquid Extraction"					
3540	"Soxhlet Extraction"					
3545	"Pressurized Fluid Extraction(PFE)"					
3665	"Sulfuric Acid/Permanganate Cleanup"					
5030B	"Purge-and-Trap for Aqueous Samples"					
5035	"Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples"					
6010B	"Inductively Coupled Plasma-Atomic Emission Spectrometry"					
7470A	"Mercury in Liquid Waste (Manual Cold-Vapor Technique)"					
7471A	"Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)"					
8021B	"Aromatic and Halogenated Volatiles By Gas Chromatography Using Photoionization and/or Electrolytic Conductivity Detectors"					
8015B	"Nonhalogenated Volatile Organics by Gas Chromatography" (Gasoline Range and Diesel Range Organics)					

8015AZ	"C10-C32 Hydrocarbons in Soil-8015AZ"				
8081A	"Organochlorine Pesticides by Gas Chromatography"				
8082	"Polychlorinated Biphenyls (PCBs) by Gas Chromatography"				
8260B	"Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)"				
8270C	Semivolatile Organic Compounds by Gas Chromatography/ Mass spectrometry (GC/MS)"				
8310	"Polynuclear Aromatic Hydrocarbons"				
9045C	"Soil and Waste pH"				
9056	"Determination of Inorganic Anions by Ion Chromatography"				
9060	"Total Organic Carbon"				
9067	"Phenolics (Spectrophotometric, MBTH With Distillation)"				
9095	Paint Filter				
Walkley/Black	FOC/TOC WB				
SM2320 B	"Alkalinity"				
SM2540 B	"Total Solids Dried at 103-105° C"				
SM2540 C	"Total Dissolved Solids Dried at 180° C"				
SM2540 D	"Total Suspended Solids Dried at 103-105° C"				
SM 3500 Fe+2	Ferrous Iron				
SM4500-H+B	"pH Value"				
SM4500-NH3 C	"4500-NH3" Ammonia				
SM4500-Norg C	"4500-Norg" Total Kjeldahl Nitrogen (TKN)				
SM4500-P B	"4500-P" Total Phosphorous				
SM4500-S2 F	"4500-S2" Sulfide				
SM5310 B	"5310" Total Organic Carbon (TOC)				

#### Criteria for Standard Operating Procedures

HEAL has Standard Operating Procedures (SOPs) for each of the test methods listed above. These SOPs are based upon the listed methods and detail the specific procedure and equipment utilized as well as the quality requirements necessary to prove the integrity of the data. SOPs are reviewed or revised every twelve months or sooner if necessary. The review/revision is documented in the Master SOP Logbook filed in the QA/QC Office. All SOPs are available in the LIMS linked under the specific test method. Administrative SOPs, which are not linked in the LIMS are available on desktops throughout the laboratory in the link to administrative SOPs folder.

Each HEAL test method SOP shall include or reference the following topics where applicable:

Identification of the test method;

Applicable matrix or matrices;

Limits of detection and quantitation;

Scope and application, including parameters to be analyzed;

Summary of the test method;

Definitions:

Interferences;

Safety;

Equipment and supplies;

Reagents and standards:

Sample collection, preservation, shipment and storage;

Quality control parameters;

Calibration and standardization:

Procedure:

Data analysis and calculations;

Method performance;

Pollution prevention;

Data assessment and acceptance criteria for quality control measures;

Corrective actions for out-of-control data:

Contingencies for handling out-of-control or unacceptable data;

Waste management:

References; and

Any tables, diagrams, flowcharts and validation data.

#### 7.0 Calibration

All equipment and instrumentation used at HEAL are operated, maintained and calibrated according to manufacturers guidelines, as well as criteria set forth in applicable analytical methodology. Personnel who have been properly trained in their procedures perform operation and calibration. Brief descriptions of the calibration processes for our major laboratory equipment and instruments are found below.

#### **Thermometers**

The thermometers in the laboratory are used to measure the temperatures of the refrigerators/freezers, ovens, water baths, hot blocks, ambient laboratory conditions, TCLP Extractions, digestion blocks and samples at the time of log-in. All NIST traceable thermometers are either removed from use upon their documented expiration date or they are checked annually with a NIST certified thermometer and a correction factor is noted on each thermometer log. See the most current Login SOP for detailed procedures on this calibration procedure.

Dickson Data Loggers are used to record sample and standard storage refrigerators over the weekend when the appropriate staff is not available to record the temperatures. These data loggers are shipped back to the manufacturer once a year to be re calibrated.

# Refrigerators/Freezers

Each laboratory refrigerator or freezer contains a thermometer capable of measuring to a minimum precision of 1°C. The thermometers are kept with the bulb immersed in liquid. Each workday, the temperatures of the refrigerators are recorded in a designated logbook to insure that the refrigerators are within the required designated range. Samples are stored separately from the standards to reduce the risk of contamination.

See the current catastrophic Failure SOP for the procedure regarding how to handle failed refrigerators or freezers.

#### Ovens

The ovens contain thermometers graduated by 1° C. The ovens are calibrated quarterly against NIST thermometers and checked daily as required and in which ever way is dictated by or appropriate for the method in use.

#### Analytical and Table Top Balances

The table top balances are capable of weighing to a minimum precision of 0.01 grams. The analytical balances are capable of weighing to a minimum precision of 0.0001 grams. Records are kept of daily calibration checks for the balances in use. Working weights are used in these checks. The balances are annually certified by an outside source and the certifications are on file with the QA/QCO.

Balances, unless otherwise indicated by method specific SOPs, will be checked daily with at least two weights that will bracket the working range of the balance for the day. Daily balance checks will be done using working weights that are calibrated annually against Class S weights. Class S weights are calibrated as required by an external provider. The Class S weights are used once a year or more frequently if required, to assign values to the Working Weights. During the daily balance checks the working weights are compared to their assigned values and must pass within 5% of their assigned value in order to validate the calibration of the balance. The assigned values for the working weights, as well as the daily checks, are recorded in the balance logbook for each balance.

#### Instrument Calibration

An instrument calibration is the relationship between the known concentrations of a set of calibration standards introduced into an analytical instrument and the measured response they produce. Calibration curve standards are a prepared series of aliquots at various known concentrations levels from a primary source reference standard. Specific mathematical types of calibration techniques are outlined in SW-846 8000B. The entire initial calibration must be performed prior to sample analyses.

The lowest standard in the calibration curve must be at or below the required reporting limit.

Refer to the current SOP to determine the minimum requirement for calibration points.

Most compounds tend to be linear and a linear approach should be favored when linearity is suggested by the calibration data. Non-linear calibration should be considered only when a linear approach cannot be applied. It is not acceptable to use an alternate calibration procedure when a compound fails to perform in the usual manner. When this occurs it is indicative of instrument issues or operator error.

If a non-linear calibration curve fit is employed, a minimum of six calibration levels must be used for second-order (quadratic) curves.

When more than 5 levels of standards are analyzed in anticipation of using second-order calibration curves, all calibration points MUST be used regardless of the calibration option employed. The highest or lowest calibration point may be excluded for the purpose of narrowing the calibration range, and meeting the requirements for a specific calibration option. Otherwise, unjustified exclusion of calibration data is expressly forbidden.

Page 23 of 48 Quality Assurance Plan Effective January 31, 2009 Analytical methods vary in QC acceptance criteria. HEAL follows the method specific guidelines for QC acceptance. The specific acceptance criteria are outlined in the analytical methods and its corresponding SOP.

#### pH Meter

The pH meter measures to a precision of 0.01 pH units. The pH calibration logbook contains the calibration before each use, or each day, if used more than once per day. It is calibrated using a minimum of 3 certified buffers. Also available with the pH meter is a magnetic stirrer with a temperature sensor. See the current pH SOP (SM4500 H+ B) for specific details regarding calibration of the pH probe.

#### Other Analytical Instrumentation and Equipment

The conductivity probe is calibrated as needed and checked daily when in use.

Eppendorf (or equivalent brands) pipettes are checked gravimetrically prior to use.

#### Standards

All of the source reference standards used are ordered from a reliable commercial vendor. A Certificate of Analysis (CoA), which verifies the quality of the standard, accompanies the standards from the vendor. The Certificates of Analysis are dated and stored on file by the Technical Directors or their designee. These standards are traceable to the National Institute of Standards (NIST). When salts are purchased and used as standards the certificate of purity must be obtained from the vendor and filed with the CoAs.

All standard solutions, calibration curve preparations, and all other quality control solutions are labeled in a manner that can be traced back to the original source reference standard. All source reference standards are entered into the LIMS with an appropriate description of the standard. Dilutions of the source reference standard (or any mixes of the source standards) are fully tracked in the LIMS. Standards are labeled with the date opened for use, and an expiration date.

As part of the quality assurance procedures at HEAL, analysts strictly adhere to manufacture recommendations for storage times/expiration dates and policies of analytical standards and quality control solutions.

#### Reagents

HEAL ensures that the reagents used are of acceptable quality for their intended purpose. This is accomplished by ordering high quality reagents and adhering to good laboratory

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practices so as to minimize contamination or chemical degradation. All reagents must meet any specifications noted in the analytical method. Refer to the current Purchase of Consumables SOP for details on how this is accomplished and documented.

Upon receipt, all reagents are assigned a separate ID number, and logged into the LIMS. All reagents shall be labeled with the date received into the laboratory and again with the date opened for use. Recommended shelf life shall be documented and controlled. Dilutions or solutions prepared shall be clearly labeled, dated, and initialed. These solutions are traceable back to their primary reagents.

All gases used with an instrument shall meet specifications of the manufacturer. All safety requirements that relate to maximum and/or minimum allowed pressure, fitting types, and leak test frequency, shall be followed. When a new tank of gas is placed in use, it shall be checked for leaks and the date put in use will be written in the instrument maintenance logbook.

HEAL continuously monitors the quality of the reagent water and provides the necessary indicators for maintenance of the purification systems in order to assure that the quality of laboratory reagent water meets established criteria for all analytical methods.

Reagent blank samples are also analyzed to ensure that no contamination is present at detectable levels. The frequency of reagent blank analysis is typically the same as calibration verification samples. Refrigerator storage blanks are stored in the volatiles refrigerator for a period of one week and analyzed and replaced once a week.

#### 8.0 Maintenance

Maintenance logbooks are kept for each major instrument and all support equipment in order to document all repair and maintenance. In the front of the logbook, the following information is included:

Unique name of the item or equipment
Manufacturer
Type of Instrument
Model Number
Serial Number
Date received and date placed into service
Location of Instrument
Condition of instrument upon receipt

For routine maintenance, the following information shall be included in the log:

Maintenance Date
Maintenance Description
Maintenance Performed by Initials

A manufacturer service agreement (or equivalent) covers most major instrumentation to assure prompt and reliable response to maintenance needs beyond HEAL instrument operator capabilities.

Refer to the current Maintenance and Troubleshooting SOP for each section in the laboratory for further information.

# 9.0 Data Integrity

For HEAL's policy on ethics and data integrity see section 3.0 of this document. Upon being hired and annually there after, all employees at HEAL undergo documented data integrity training. All new employees sign an Ethics and Data Integrity Agreement, documenting their understanding of the high standards of integrity required at HEAL and outlining their responsibilities in regards to ethics and data integrity. See Appendix H for a copy of this agreement.

In instances of ethical concern analysts are required to report the known or suspected concern to their Technical Director, the Laboratory Manager or the QA/QCO. This will be done in a confidential and receptive environment, allowing all employees to privately discuss ethical issues or report items of ethical concern.

Once reported and documented the ethical concern will be immediately elevated to the Laboratory Manager and the need for an investigation, analyst remediation or termination will be determined on a case by case basis.

All reported instances of ethical concern will be thoroughly documented and handled in a manner sufficient to rectify any breaches in data integrity with an emphasis on preventing similar incidences from happening in the future.

# 9.0 Quality Control

# Internal Quality Control Checks

HEAL utilizes various internal quality control checks, including duplicates, matrix spikes, matrix spike duplicates, method blanks, laboratory control spikes, laboratory control spike duplicates, surrogates, internal standards, calibration standards, quality control charts, proficiency tests and calculated measurement uncertainty.

Refer to the current method SOP to determine the frequency and requirements of all quality controls. In the event that the frequency of analysis is not indicated in the method specific SOP, duplicate samples, laboratory control spikes (LCS), Method Blanks (MB) and matrix spikes and matrix spike duplicates (MS/MSD) are analyzed for every batch of twenty samples.

When sample volume is limited on a test that requires an MS/MSD an LCSD shall be analyzed to demonstrate precision and accuracy and when possible a sample duplicate will be analyzed.

Duplicates, are identical tests repeated for the same sample or matrix spike in order to determine the precision of the test method. A Relative Percent Difference (RPD) is calculated as a measure of this precision. Unless indicated in the SOP, the default acceptance limit is </= 30%.

Matrix Spikes and Matrix Spike Duplicates are spiked samples (MS/MSD) that are evaluated with a known added quantity of a target compound. This is to help determine the accuracy of the analyses and to determine the matrix affects on analyte recovery. A percent recovery is calculated to assess the quality of the accuracy. In the event that the acceptance criteria is not outlined in the SOP a default limits of 70-130% will be utilized. When an MSD is employed an RPD is calculated and when not indicated in the SOP shall be acceptable at </= 30%.

When appropriate for the method, a Method Blank should be analyzed with each batch of samples processed to assess contamination levels in the laboratory. MBs consist of all the reagents measured and treated as they are with samples, except without the samples. This enables the laboratory to ensure clean reagents and procedures. Guidelines should be in place for accepting or rejecting data based on the level of contamination in the blank. In the event that these guidelines are not dictated by the SOP or in client specific work plans, the MB should be less than the MDL reported for the analyte being reported.

A Laboratory Control Spike and Laboratory Control Spike Duplicate (LCS/LCSD) are reagent blanks, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes. It is generally used to establish intra-laboratory or analyst-specific precision and bias or to assess the performance of all or a portion of the measurement system. Guidelines are outline in each

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SOP for the frequency and pass fail requirements for LCS and LCSDs. These limits can be set utilizing control charts as discussed below.

Surrogates are utilized when dictated by method and are substances with properties that mimic the analytes of interest. The surrogate is an analyte that is unlikely to be found in environmental samples. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for surrogates.

Internal Standards are utilized when dictated by the method and are known amounts of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method. Refer to the appropriate Method and SOP for guidelines on pass/fail requirements for Internal Standards.

Proficiency Test (PT) Samples are samples provided by an unbiased third party. They are typically analyzed twice a year, or at any other interval defined in the method SOP. They contain a pre-determined concentration of the target compound, which is unknown to HEAL. HEAL's management and all analyst shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates and other procedures as used when analyzing routine samples.

With regards to analyzing PT Samples HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seeks accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall not attempt to obtain the assigned value of any PT sample from the PT Provider.

Calibration standards are standards run to calibrate. Once the calibration is established the same standards can be analyzed as Continuing Calibration Verifications (CCV), used to confirm the consistency of the instrumentation. Calibration standards can be utilized at the beginning and end of each batch, or more frequently as required. Typically Continuing Calibration Blanks (CCB) are run in conjunction with CCVs. Refer to the current method SOP for frequency and pass/fail requirements of CCVs and CCBs.

Control Limits are limits of acceptable ranges of the values of quality control checks. If a value falls outside the appropriate range, immediate evaluation and assessment of the procedure is required. Data generated with laboratory control samples that fall outside of the established control limits are judged to be generated during an "out-of-control" situation. These data are considered suspect and shall be repeated or reported with qualifiers.

Control limits should be established and updated according to the requirements of the method being utilized. When the method does not specify, and control limits are to be generated or updated for a test, the following guidelines shall be utilized.

Page 29 of 48 Quality Assurance Plan Effective January 31, 2009 Control Limits should be updated periodically and at least annually. The Limits should be generated utilizing the most recent 20-40 data values and Control Charts should be printed when these limits are updated in the LIMS. The data values used shall not reuse values that were included in the previous Control Limit update. The data values shall also be reviewed by the LIMS for any Grubbs Outliers, and if identified, the outliers must be removed prior to generating new limits. Once new Control Limits have been established and updated in the LIMS, the printed Control Chart shall be reviewed by the appropriate technical director and primary analyst performing the analysis for possible trends and compared to the previous Control Charts. The technical director initials the control charts, indicating that they have reviewed and determined the updated Limits to be accurate and appropriate. These initialed charts are then filed in the QA/QCO office.

Calculated Measurement Uncertainty is calculated annually using LCSs in order to determine the laboratory specific uncertainty associated with each test method. These uncertainty values are available to our clients upon request and are utilized as a trending tool internally to determine the effectiveness of new variables introduced into the procedure over time.

#### Precision, Accuracy, Detection Levels

#### Precision

The laboratory uses sample duplicates, laboratory control spike duplicates and matrix spike duplicates to assess precision in terms of relative percent difference (RPD). HEAL requires the RPD to fall within the 99% confidence interval of established control charts or an RPD of less than 30% if control charts are not available. RPD's greater than these limits are considered out-of-control and require an appropriate response.

RPD = 2 x (Sample Result – Duplicate Result) X 100 (Sample Result + Duplicate Result)

#### Accuracy

The accuracy of an analysis refers to the difference between the calculated value and the actual value of a measurement. The accuracy of a laboratory result is evaluated by comparing the measured amount of QC reference material recovered from a sample and the known amount added. Control limits can be established for each analytical method and sample matrix. Recoveries are assessed to determine the method efficiency and/or the matrix effect.

Analytical accuracy is expressed as the percent recovery (%R) of an analyte or parameter. A known amount of analyte is added to an environmental sample before

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the sample is prepared and subsequently analyzed. The equation used to calculate percent recovery is:

%Recovery = {(concentration* recovered)/(concentration* added)} X 100

*or amount

HEAL requires that the Percent Recovery to fall within the 99 % confidence interval of established control limits. A value that falls outside of the confidence interval requires a warning and process evaluation. The confidence intervals are calculated by determining the mean and sample standard deviation. If control limits are not available, the range of 70 to 130% is used unless the specific method dictates otherwise. Percent Recoveries outside of this range mandate additional action such as analyses by Method of Standard Additions, additional sample preparation(s) where applicable, method changes, out-of-control action or data qualification.

#### **Detection Limit**

Current practices at HEAL define the Detection Limit (DL) as the smallest amount that can be detected above the baseline noise in a procedure within a stated confidence level.

HEAL presently utilizes an Instrument Detection Limit (IDL), a Method Detection Limit (MDL), and a Practical Quantitation Limit (PQL). The relationship between these levels is approximately

IDL: MDL: PQL = 1:5:5.

The IDL is a measure of the sensitivity of an analytical instrument. The IDL is the amount which, when injected, produces a detectable signal in 99% of the analyses at that concentration. An IDL can be considered the minimum level of analyte concentration that is detectable above random baseline noise.

The MDL is a measure of the sensitivity of an analytical method. An MDL determination (as required in 40CFR part 136 Appendix B) consists of replicate spiked samples carried through all necessary preparation steps. The spike concentration is three times the standard deviation of three replicates of spikes. At least seven replicates are spiked and analyzed and their standard deviation (s) calculated. Routine variability is critical in passing the 10 times rule and is best achieved by running the MDLs over different days and when possible over several calibration events. The method detection limit (MDL) can be calculated using the standard deviation according to the formula:

MDL = s * t (99%)

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Where t (99%) is the student's t value for the 99% confidence interval. It depends on the number of trials used in calculating the sample standard deviation, so choose the appropriate value according to the number of trials.

Number of Trials	t(99%)
6	3.36
7	3.14
8	3.00
9	2.90

The calculated MDL must not be less than 10 times the spiked amount or the study must be performed again with a lower concentration.

The PQL is significant because different laboratories can produce different MDLs although they may employ the same analytical procedures, instruments and sample matrices. The PQL is about two to five times the MDL and represents a practical, and routinely achievable, reporting level with a good certainty that the reported value is reliable. It is often determined by regulatory limits. The reported PQL for a sample is dependent on the dilution factor utilized during sample analysis.

#### **Quality Control Parameter Calculations**

#### Mean

The sample mean is also known as the arithmetic average. It can be calculated by adding all of the appropriate values together, and dividing this sum by the number of values.

Average = 
$$(\Sigma x_i) / n$$

 $x_i$  = the value x in the  $i^{th}$  trial  $i^{th}$  trial  $i^{th}$  trials

#### Standard Deviation

The sample standard deviation, represented by s, is a measure of dispersion. The dispersion is considered to be the difference between the average and each of the values  $x_i$ . The variance,  $s^2$ , can be calculated by summing the squares of the differences and dividing by the number of differences. The sample standard deviation, s, can be found by taking the square root of the variance.

Standard deviation = s =  $\left[\sum (x_1 - average)^2 / (n-1)\right]^{\frac{1}{2}}$ 

#### Percent Recovery (MS, MSD, LCS and LCSD)

Percent Recovery = (Spike Sample Result – Sample Result) X100 (Spike Added)

#### Confidence Intervals

Confidence intervals are calculated by the LIMS using the average (x), the sample standard deviation (s), and the Student's t distribution (s-dist), which depends on the number of values used to calculate the average and sample standard deviation.

The formula is:

confidence interval =  $x \pm s * s$ -dist

Student's t Distribution

# values *	10	15: **	20 .	25	31	41	61	121	>121⊪
95 %	2.262	2.145	2.093	2.064	2.042	2.021	2.000	1.980	1.960
99%	3.250	2.977	2.861	2.797	2.750	2.704	2.660	2.617	2.576

Unless there is insufficient data, at least 20 values will always be used in calculating the confidence intervals.

#### RPD (Relative Percent Difference)

Analytical precision is expressed as a percentage of the difference between the results of duplicate samples for a given analyst. Relative percent difference (RPD) is calculated as follows:

RPD = 2 x (Sample Result – Duplicate Result) X 100 (Sample Result + Duplicate Result)

#### **Uncertainty Measurements**

Uncertainty, as defined by ISO, is the parameter associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurement. Ultimately uncertainty measurements are used to state how good a test result is and to allow the end user of data to properly interpret their reported data. All procedures allow for some uncertainty. For most analyses the components and estimates of uncertainty are reduced by following well established test methods. To further reduce uncertainty, results are generally not reported below the lowest calibration point (PQL) or above the highest calibration point (UQL).

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Understanding that there are many influence quantities affecting a measurement result, so many in fact that it is impossible to identify all of them, HEAL calculates measurement uncertainty at least annually using LCSs. These estimations of measurement uncertainty are kept on file in the method folders in the QA/QC office.

Measurement Uncertainty contributors are those that may be determined statistically. These shall be generated by estimating the overall uncertainty in the entire analytical process by measuring the dispersion of values obtained from laboratory control samples over time. At least 20 of the most recent LCS data points are gathered. The standard deviation (s) is calculated using these LCSs data points. Since it can be assumed that the possible estimated values of the spikes are approximately normally distributed with approximate standard deviation (s), the unknown value of the spike is believed to lie in 95% confidence interval, corresponding to an uncertainty range of  $\pm 1$ .

Calculate standard deviation (s) and 95% confidence interval according to the following formulae:

$$s = \sqrt{\frac{\sum (x - \overline{x})^2}{(n-1)}}$$

Where: s = standard deviation

x = number in series

 $\bar{x}$  = calculated mean of series n = number of samples taken

95% confidence =  $2 \times s$ 

Example: Assuming that after gathering 20 of the most recent LCS results for Bromide, we have calculated the standard deviations of the values and achieved a result of 0.0326, our measurement uncertainty for Bromide (at 95% confidence =  $2 \times s$ ) is 0.0652.

#### Calibration Calculations

1. Response Factor or Calibration Factor:

$$RF = ((A_x)(C_{is}))/((A_{is})(C_x))$$
  $CF = (A_x)/(C_x)$ 

a. Average RF or CF

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$$RF_{AVE} = \Sigma RF_i / n$$

b. Standard Deviation

$$s = SQRT \{ [\Sigma (RF_i - RF_{AVE})^2] / (n-1) \}$$

c. Relative Standard Deviation

#### Where:

 $A_x$  = Area of the compound

 $C_x$  = Concentration of the compound

A_{is} = Area of the internal standard

C_{is} = Concentration of the internal standard

n = number of pairs of data

RF_i = Response Factor (or other determined value)

RF_{AVE} = Average of all the response factors

 $\Sigma$  = the sum of all the individual values

#### 2. Linear Regression

a. Slope (m)

$$m = (n\Sigma x_i y_i - (n\Sigma x_i)^* (n\Sigma y_i)) / (n\Sigma x_i^2 - (\Sigma x_i)^2)$$

b. Intercept (b)

$$b = y_{AVE} - m^*(x_{AVE})$$

c. Correlation Coefficient (cc)

$$\begin{array}{l} \text{CC (r) = } \{ \ \Sigma((x_i \!\!-\! x_{ave})^*(y_i \!\!-\! y_{ave})) \ \} \ / \ \{ \ SQRT((\Sigma(x_i \!\!-\! x_{ave})^2)^*(\Sigma(y_i \!\!-\! y_{ave})^2)) \ \} \\ \text{Or} \\ \text{CC (r) = } [(\Sigma w \ ^* \Sigma wxy) - (\Sigma wx \ ^* \Sigma wy)] \ / \ (\text{sqrt( ( [(\Sigma w \ ^* \Sigma wx^2) - (\Sigma wx \ ^* \Sigma wx))] ^* [(\Sigma w \ ^* \Sigma wy^2) - (\Sigma wy \ ^* \Sigma wy)])))] \\ \end{array}$$

d. Coefficient of Determination

$$COD(r^2) = CC*CC$$

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#### Where:

 $y = Response (Area) Ratio A_x/A_{is}$ 

 $x = Concentration Ratio C_x/C_{is}$ 

m = slope

b = intercept

n = number of replicate x,y pairs

 $x_i$  = individual values for independent variable

y_I = individual values for dependent variable

 $\Sigma$  = the sum of all the individual values

 $x_{ave}$  = average of the x values

 $y_{ave}$  = average of the y values

w = weighting factor, for equal weighting w=1

# 3. Quadratic Regression

$$y = ax^2 + bx + c$$

#### a. Coefficient of Determination

COD 
$$(r^2) = (\Sigma(y_i - y_{ave})^2 - \{[(n-1)/(n-p)] * [\Sigma(y_i - Y_i)^2]\}) / \Sigma(y_i - y_{ave})^2$$

#### Where:

 $y = Response (Area) Ratio A_x/A_{is}$ 

 $x = Concentration Ratio C_x/C_{is}$ 

 $a = x^2$  coefficient

b = x coefficient

c = intercept

y_i = individual values for each dependent variable

x_i = individual values for each independent variable

 $y_{ave}$  = average of the y values

n = number of pairs of data

p = number of parameters in the polynomial equation (i.e., 3 for third order, 2 for second order)

 $Yi = ((2*a*(C_x/C_{is})^2)-b^2+b+(4*a*c))/(4a)$ 

# b. Coefficients (a,b,c) of a Quadratic Regression

$$a = S_{(x2y)}S_{(xx)}-S_{(xy)}S_{(xx2)} / S_{(xx)}S_{(x2x2)}-[S_{(xx2)}]^2$$

$$b = S_{(xy)}S_{(x2x2)} - S_{(x2y)}S_{(xx2)} / S_{(xx)}S_{(x2x2)} - [S_{(xx2)}]^2$$

$$c = [(\Sigma yw)/n] - b^*[(\Sigma xw)/n] - a^*[\Sigma (x^2w)/n]$$

#### Where:

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n = number of replicate x,y pairs x = x values y = y values y = y values y = y values  $w = S^{-2} / (\Sigma S^{-2}/n)$   $S_{(xx)} = (\Sigma x^2 w) - [(\Sigma x w)^2 / n]$   $S_{(xy)} = (\Sigma x^3 w) - [(\Sigma x w)^* (\Sigma y w) / n]$   $S_{(x22)} = (\Sigma x^3 w) - [(\Sigma x w)^* (\Sigma x^2 w) / n]$   $S_{(x22)} = (\Sigma x^2 y w) - [(\Sigma x^2 w)^* (\Sigma y w) / n]$   $S_{(x222)} = (\Sigma x^4 w) - [(\Sigma x^2 w)^2 / n]$  Or If unweighted calibration, w=1  $S(xx) = (Sx2) - [(Sx)^2 / n]$   $S(xy) = (Sxy) - [(Sx)^* (Sy) / n]$   $S(x2y) = (Sx3) - [(Sx)^* (Sy) / n]$   $S(x2y) = (Sx2y) - [(Sx2)^* (Sy) / n]$   $S(x2x2) = (Sx4) - [(Sx2)^2 / n]$ 

#### 11.0 Data Reduction, Validation, Reporting, and Record Keeping

All data reported must be of the highest possible accuracy and quality. During the processes of data reduction, validation, and report generation, all work is thoroughly checked to insure that error is minimized.

#### Data Reduction

The analyst who generated the data usually performs the data reduction. The calculations include evaluation of surrogate recoveries (where applicable), and other miscellaneous calculations related to the sample quantitation.

If the results are computer generated, then the formulas must be confirmed by hand calculations, at minimum, one per batch.

See the current Data Validation SOP for details regarding data reduction.

#### Validation

A senior analyst, most often the section supervisor, validates the data. All data undergoes peer review. If an error is detected it is brought to the analyst attention to rectify and further checks ensure that all data for that batch is sound. Previous and/or common mistakes are stringently monitored throughout the validation process. Data is reported using appropriate significant figure criteria. In most cases, two significant digits are utilized, but three significant digits can be used in QC calculations. Significant digits are not rounded until after the last step of a sample calculation. All final reports undergo a review by the laboratory manager, or the project manager or their designee, to provide a logical review of all results before they are released to the client.

If data is to be manually transferred from one medium to another, the transcribed data is checked by a peer. This includes data typing, computer data entry, chromatographic data transfer, data table inclusion to a cover letter, or when data results are combined with other data fields.

All hand written data from run logs, analytical standard logbooks, hand entered data logbooks, or on instrument generated chromatograms, are systematically archived should the need for future retrieval arise.

See the current Data Validation SOP for detail regarding data validation.

#### Reports and Records

All records at HEAL are retained and maintained through the procedures outlined in the most recent version of the Records Control SOP.

The reports are compiled by the Laboratory Information Management System (LIMS). Most data is transferred directly from the instruments to the LIMS. After being processed by the analyst and reviewed by a data reviewer, final reports are approved and signed by the senior laboratory management. A comparative analysis of the data is performed at this point. For example, if TKN and NH3 are analyzed on the same sample the NH3 result should never be greater than the TKN result. Lab results and reports are released only to appropriately designated individuals. Release of the data can be by fax, email, electronic deliverables, or mailed hard copy.

When a project is completed, the project file folder is stored with a hard copy of the report, relevant supporting data, and the quality assurance/control worksheets. These folders are kept on file and are arranged by project number. Additionally, all electronic data is backed up daily on the HEAL main server. The backup includes raw data, chromatograms and report documents. Hard copies of chromatograms are stored separately according to the instrument and the analysis date. All records and analytical data reports are retained in a secure location as permanent records for a minimum period of five years (unless specified otherwise in a client contract). Access to archived information shall be documented with an access log. Access to archived electronic reports and data will be protected by a project manager password. In the event that HEAL transfers ownership or terminates business practices, complete records will be maintained or transferred according to the client's instructions.

After issuance, the original report shall remain unchanged. If a correction to the report is necessary, then an additional document shall be issued. This document shall have a title of "Addendum to Test Report or Correction to Original Report", or equivalent. Demonstration of original report integrity comes in two forms. First, the report date is included on each page of the final report. Second, each page is numbered in sequential order, making the addition or omission of any data page(s) readily detectable.

#### 12.0 Corrective Action

Refer to the most recent version of the Data Validation SOP for the procedure utilized in filling out a Corrective Action Report.

The limits that have been defined for data acceptability also form the basis for corrective action initiation. Initiation of corrective action occurs when the data generated from continuing calibration standard, sample surrogate recovery, laboratory control spike, matrix spike or sample duplicates exceed acceptance criteria. If corrective action is necessary, the analyst or the section supervisor will coordinate to take the following steps to determine and correct the measurement system deficiency:

Check all calculations and data measurements systems (Calibrations, reagents, instrument performance checks etc.).

Assure that proper procedures were followed.

Unforeseen problems that arise during sample preparation and/or sample analysis that lead to treating a sample differently from documented procedures shall be documented with a corrective action report. The section supervisor and laboratory manager shall be made aware of the problem at the time of the occurrence. See the appropriate SOP regarding departures from documented procedures.

Continuing calibration standards below acceptance criteria can not be used for reporting analytical data unless method specific criteria states otherwise.

Continuing calibration standards above acceptance criteria can be used to report data so long as the failure is isolated to a single standard and the corresponding samples are non-detect for the failing analyte.

Samples with non-compliant surrogate recoveries should be reanalyzed unless deemed unnecessary by the supervisor for matrix, historical data, or other analysis related anomalies.

Laboratory and Matrix Spike acceptance criteria vary significantly depending on method and matrix. Analysts and supervisors meet and discuss appropriate corrective action measures as spike failures occur.

Sample duplicates with RPD values outside control limits require supervisor evaluation and possible reanalysis.

A second mechanism for initiation of corrective action is that resulting from Quality Assurance performance audits, system audits, inter and intra-laboratory comparison studies. Corrective Actions initiated through this mechanism will be monitored and coordinated by the laboratory QA/QCO.

All corrective action forms are entered in the LIMS and included with the raw data for peer review, signed by the technical director of the section and included in the case narrative to

the client whose samples were affected. All Corrective action forms in the LIMS are reviewed by the QA/QCO.

# 13.0 Quality Assurance Audits, Reports and Complaints

# Internal/External Systems' Audits, Performance Evaluations, and Complaints

Several procedures are used to assess the effectiveness of the quality control system. One of these methods includes internal performance evaluations, which are conducted by the use of control samples, replicate measurements and control charts. Another method is external performance audits, which are conducted by the use of inter-laboratory checks, such as participation in laboratory evaluation programs and performance evaluation samples available from a NELAC accredited Proficiency Standard Vendor.

Proficiency samples will be obtained twice per year from an appropriate vendor for all tests and matrices for which we are accredited and for which there are PTs available. HEAL participates in soil, waste water, drinking water and underground storage tank PT studies. Copies of results are available upon request. HEAL's management and all analyst shall ensure that all PT samples are handled in the same manner as real environmental samples utilizing the same staff, methods, procedures, equipment, facilities and frequency of analysis as used for routine analysis of that analyte. When analyzing a PT, HEAL shall employ the same calibration, laboratory quality control and acceptance criteria, sequence of analytical steps, number of replicates and other procedures as used when analyzing routine samples.

With regards to analyzing PT Samples HEAL shall not send any PT sample, or portion of a PT sample, to another laboratory for any analysis for which we seeks accreditation, or are accredited. HEAL shall not knowingly receive any PT sample or portion of a PT sample from another laboratory for any analysis for which the sending laboratory seeks accreditation, or is accredited. Laboratory management or staff will not communicate with any individual at another laboratory concerning the PT sample. Laboratory management or staff shall no attempt to obtain the assigned value of any PT sample from the PT Provider.

Internal Audits are performed annually by the QA/QCO in accordance with the current Internal Audit SOP. They are performed using the guidelines outlined below:

The system audit consists of a qualitative inspection of the QA system in the laboratory and an assessment of the adequacy of the physical facilities for sampling, calibration, and measurement. This audit includes a careful evaluation and review of laboratory quality control procedures. Including but not limited to:

- 1. Review of staff qualifications, demonstration of capability, and personnel training programs
- 2. Storage and handling of reagents, standards and samples
- 3. Standard preparation logbook and LIMS procedures
- 4. Extraction logbooks
- 5. Raw data logbooks
- 6. Analytical logbooks or batch printouts and instrument maintenance logbooks
- 7. Data review procedures

- 8. Corrective action procedures
- 9. Review of data packages is performed regularly by the lab manager/QA Officer.

The QA/QCO will conduct these audits on an annual basis.

#### **Management Reviews**

HEAL management shall periodically, and at least annually conduct a review of the laboratory's quality system and environmental testing activities to ensure their continuing suitability and effectiveness, and to introduce necessary changes or improvements. The review shall take account of:

- 1. the suitability and implementation of policies and procedures
- 2. reports from managerial and supervisory personnel
- 3. the outcome of recent internal audits
- 4. corrective and preventive actions
- 5. assessments by external bodies
- 6. the results of interlaboratory comparisons or proficiency tests
- 7. changes in volume and type of work
- 8. client feed back
- 9. complaints
- 10. other relevant factors, such as laboratory health and safety, QC activities, resources and staff training.

Findings from management reviews and the actions that arise from them shall be recorded and any corrective actions that arise shall be completed in an appropriate and agreed upon timescale.

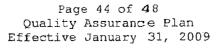
# Complaints

Complaints from clients are documented and given to the laboratory manager. The lab manager shall review the information and contact the client. If doubt is raised concerning the laboratories policies or procedures, then an audit of the section or sections may be performed. All records of complaints and subsequent actions shall be maintained in the client compliant logbook for 5 years unless otherwise stated.

#### Internal and External Reports

The QA/QCO is responsible for preparation and submission of quality assurance reports to the appropriate management personnel as problems and issues arise. These reports include the assessment of measurement systems, data precision and accuracy, and the results of performance and system audits. Additionally, they also include significant QA problems, corrective actions, and recommended resolution measures. Reports of these Quality Assurance Audits describe the particular activities audited, procedures utilized in

the examination and evaluation of laboratory records, and data validation procedures. Finally, there are procedures for evaluating the performance of Quality Control and Quality Assurance activities, and laboratory deficiencies and the implementation of corrective actions with the review requirements.

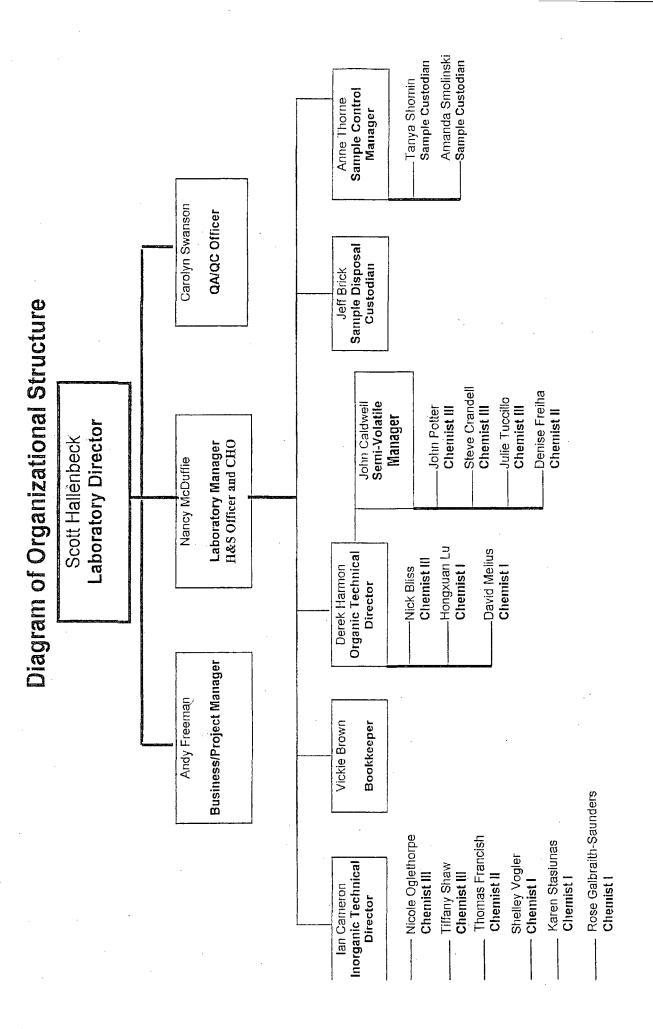


# 14.0 Analytical Protocols Utilized at Hall Environmental Analysis Laboratory, Inc.

- 1. <u>Standard Methods for the Examination of Water and Wastewater:</u> AOHA, AWWA, and WPCG; 20th Edition, 1999.
- 2. <u>Methods for Chemical Analysis of Water and Wastes</u>, USEPA, EPA-600/4-79-020, March 1979 and as amended December, 1982 (EPA-600/4-82-055)
- 3. <u>Test Methods for Evaluating Solid Waste: Physical/Chemical Methods</u>, USEPA SW-846, 3rd Edition, Updates I, II, IIA, IIB, III, December, 1996.
- 4. <u>Methods of Soil Analysis</u>: Parts 1 & 2, 2nd Edition, Agronomy Society of America, Monograph 9
- 5. <u>Diagnosis & Improvement of Saline & Alkali Soils</u>, Agriculture Handbook No. 60, USDA, 1954
- 6. <u>Handbook on Reference Methods for Soil Testing.</u> The Council on Soil Testing & Plant Analysis, 1980 and 1992
- 7. <u>Field and Laboratory Methods Applicable to Overburdens and Mine Soils, USEPA, EPA-600/2-78-054, March 1978</u>
- 8. <u>Laboratory Procedures for Analyses of Oilfield Waste.</u> Department of Natural Resources, Office of Conservation, Injection and Mining Division, Louisiana, August 1988
- 9. <u>Soil Testing Methods Used at Colorado State University for the Evaluation of Fertility.</u>
  Salinity and Trace Element Toxicity, Technical Bulletin LT B88-2 January, 1988
- 10. <u>Manual of Operating Procedures for the Analysis of Selected Soil, Water, Plant Tissue and Wastes Chemical and physical Parameter.</u> Soil, Water, and Plant Analysis Laboratory, Dept. of Soil and Water Science, The University of Arizona, August 1989
- 11. <u>Sampling Procedures and Chemical Methods in Use at the U.S. Salinity Laboratory for Characterizing Salt-Affected Soils and Water.</u> USDA Salinity Laboratory.
- 12. <u>Procedures for Collecting Soil Samples and Methods of Analysis for Soil Survey.</u> USDA Soil Conservation Service, SSIR No. 1.
- 13. <u>Soil Survey Laboratory Methods Manual.</u> Soil Survey Laboratory Staff. Soil Survey Investigations Report No. 42, version 2.0, August 1992.
- 14. <u>Methods for the Determination of Metals in Environmental Samples</u>, USEPA, EPA-600/4-91-010, June 1991
- 15. The Merck Index, Eleventh Edition, Merck & Co., Inc. 1989.

- 16. Handbook of Chemistry and Physics, 62nd Edition, CRC Press, Inc. 1981-1982.
- 17. <u>Analytical Chemistry of PCB's</u>. Erickson, Mitchell D., CRC Press, Inc. 1992.
- 18. <u>Environmental Perspective on the Emerging Oil Shale Industry</u>, EPA Oil & Shale Research Group.
- 19. Polycyclic Aromatic Hydrocarbons in Water Systems, CRC Press, Inc.
- 20. Quality Systems for Analytical Services. Revision 2.2, U.S. Department of Energy, October 2006.

# Appendix A Personnel Chart / Organizational Structure



Fage 48 of 48 Quality Assurance Plan Effective January 31, 2009



# OREGON

# **ENVIRONMENTAL LABORATORY** ACCREDITATION PROGRAM



NELAP Recognized

# Hall Environmental Analysis Laboratory, Inc.

#### NM100001

4901 Hawkins Rd. NE, Suite D Albuquerque, NM 87109

IS GRANTED APPROVAL BY ORELAP UNDER THE 2003 NELAC STANDARDS, TO PERFORM ANALYSES ON ENVIRONMENTAL SAMPLES IN MATRICES AS LISTED BELOW:

	Drinking	Non Potable	Solids and	
Air	Water	Water	Chem. Waste	Tissue
	Chemistry	Chemistry	Chemistry	

AND AS RECORDED IN THE LIST OF APPROVED ANALYTES, METHODS, ANALYTIC TECHNIQUES, AND FIELDS OF TESTING ISSUED CONCURRENTLY WITH THIS CERTIFICATE AND REVISED AS NECESSARY.

ACCREDITED STATUS DEPENDS ON SUCCESSFUL ONGOING PARTICIPATION IN THE PROGRAM AND CONTINUED COMPLIANCE WITH THE STANDARDS.

CUSTOMERS ARE URGED TO VERIFY THE LABORATORY'S CURRENT ACCREDITATION STATUS IN OREGON.

Irene E. Ronning, Ph.D. ORELAP Administrator 3150 NW 229th Ave, Suite 100 Hillsboro, OR 97124

ISSUE DATE:

3/1/2008

EXPIRATION DATE: 2/28/2009

Certificate No:

NM100001-009



# Oregon

# Environmental Laboratory Accreditation Program



Public Health Laboratory 3150 NW 229th Ave, Suite 100 Hillsboro, OR, OR 97124 NELAP Recognized (503) 693-4122 FAX (503) 693-5602

Department of Agriculture, Laboratory Division Department of Environmental Quality, Laboratory Division Department of Human Services, Public Health Laboratory

#### **ORELAP Fields of Accreditation**

ORELAPID: NM100001 EPACode: NM00035

Certificate:

NM100001-009

# Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D Albuquerque, NM, 87109

issue Date: 3/1/2008

Expiration Date: 2/28/2009 As of 03/01/2008 this list supercedes all previous lists for this certificate number.

Customers: Please verify the current accreditation standing with ORELAP.

WATRIX: Drinkii	id Water		Salar Branco Salar Branco Salar Branco Salar Branco Salar Branco Salar Branco Salar Branco Salar Branco Salar B
Reference		Code	Descrip <b>ti</b> on
EPA 200.7 6		10014003	ICP - meta Is
Analyte Code	<u>Analyte</u>		
1000	Aluminum		
1015	Barium		
1020	Beryllium		
1025	Boron		
1030	Cadmium		
1035	Calcium		
1040	Chromium	*	
1055	Copper	•	t
1070	iron		
1075	Lead		
1085	Magnesium		
1090	Manganese		
1100	Molybdenum		
1105	Nickel		
1125	Potassium		,
1150	Silver		
1155	Sodium		
1175	Tin .		
1180	Titanium		
1185	· Vanadium		•
1190	Zinc		
EPA 245.1 3		10036609	Mercury by Cold Vapor Atomic Absorption
Analyte Code	<u>Analyte</u>		·
<b>109</b> 5	Mercury		
EPA 300.0		10053006	ion chroma tography - anions.
Analyte Code	<u>Analyte</u>		•
<b>157</b> 5	Chloride		
1730	Fluoride		
1810	Nitrate as N		
1835	Nitrite		
2000	Sulfate		
EPA 300.0 2.1	_	10053200	inorganic Anions in water by Ion Chromatography
Analyte Code	<u>Analyte</u>		
1870	Orthophosphate	as P	

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PA 5030B 2	10153409 Purg	e and trap for aqueous samples
Analyte Code	<u>Analyte</u>	
125	Extraction/Preparation	
PA 504.1	10083008 EDB	DBCP/TCP micro-extraction, GC/ECD
Analyte Code	<u>Analyte</u>	
4570	1,2-Dibromo-3-chloropropane (DBCP)	
<b>458</b> 5	1,2-Dibromoethane (EDB, Ethylene dibromi	de)
PA 524.2 4.1	10088809 Vota	ille Organic Compounds GC/MS Capillary Column
Analyte Code	<u>Analyte</u>	
5105	1,1,1,2-Tetrachioroethane	
5160	1,1,1-Trichloroethane	
5110	1,1,2,2-Tetrachloroethane	
5165	1,1,2-Trichloroethane	
4630	1,1-Dichloroethane	
4640	1,1-Dichloroethylene	
4670	1,1-Dichloropropene	
5150	1,2,3-Trichlorobenzene	•
5180	1,2,3-Trichloropropane	
5155	1,2,4-Trichlorobenzene	
5210	1,2,4-Trimethylbenzene	
4610	1,2-Dichlorobenzene	
4635	1,2-Dichloroethane	
4655	1,2-Dichioropropane	
5215	1,3,5-Trimethylbenzene	
4615	1.3-Dichlorobenzene	
4660	1,3-Dichloropropane	
4620	1,4-Dichlorobenzene	
4535	2-Chlorotoluene	
4540	4-Chlorotoluene	•
4375	Benzene	
4385	Bromobenzene	
4390	Bromochloromethane	
4395	Bromodichloromethane	
4400	Bromoform	
4950	Bromomethane (Methyl bromide)	
4455	Carbon tetrachioride	
4475	Chlorobenzene	
4485	Chloroethane	
4505	Chloroform	
105	Chloromethane	
4645	cis-1,2-Dichloroethylene	
4680	cis-1,3-Dichloropropene	
4575	Dibromochloromethane	·
4595	Dibromomethane	•
4650	Dichloromethane (DCM, Methylene chloride	}
4765	Ethylbenzene	
4835	Hexachlorobutadiene	
4900	isopropylbenzene	
5000	Methyl tert-butyl ether (MTBE)	
4435	n-Butylbenzene	
509D	n-Propylbanzene	

# **ORELAP** Fields of Accreditation

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EPACode: NM00035

Certificate:

NM100001-009

# Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D Albuquerque, NM, 87109

issue Date: 3/1/2008

2040

Expiration Date: 2/28/2009

As of 03/01/2008 this list supercedes all previous lists for this certificate number. Customers: Please verify the current accreditation standing with ORELAP.

Total Organic Carbon

4440	sec-Butylbenzene	
5100	Styrene	
4445	tert-Butylbenzene	
5115	Tetrachloroethylene (Perchloroethyle	ene)
5140	Toluene	·
4700	trans-1,2-Dicloroethylene	
4685	trans-1,3-Dichloropropylene	
5170	Trichloroethene (Trichloroethylene)	
51:75	Trichlorofluoromethane	
5235	Vinyl chloride	
5260	Xylene (total)	
SM 2540 C 20th ED	20050004	Total Dissolved Solids
Analyte Code	<u>Analyte</u>	•
1 <b>95</b> 5	Residue-filterable (TDS)	
SM 4500-H+ B 20th ED	20104807	pH by Probe
Analyte Code	Analyte	
1900	pH	
SM 5310 B 20th ED	20137400	Total Organic Carbon by Combustion Infra-red Method
Analyte Code	Analyte	

#### **ORELAP Fields of Accreditation**

ORELAPID: NM100001 EPACode: NM00035

Certificate:

NM100001-009

# Hall Environmental Analysis Laboratory, Inc.

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Issue Date: 3/1/2008

Expiration Date: 2/28/2009

As of 03/01/2008 this list supercedes all previous lists for this certificate number. Customers: Please verify the current accreditation standing with ORELAP.

Reference	Code	Description
EPA 300.0	10053006	
Analyte Code	Analyte ·	Toll official assumption and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second seco
1540	Bromide	
1575	Chloride	
1730	Fluoride	
1810	Nitrate as N	
1840	Nitrite as N	
1870	Orthophosphate as P	•
2000	Sulfate	
EPA 3005A 1	10133207	Acid Digestion of waters for Total Recoverable or Dissolved Metals
Analyte Code	<u>Analyte</u>	
125	Extraction/Preparation	
EPA 3510C 3	10138202	Separatory Funnel Liquid-liquid extraction
Analyte Code	<u>Analyte</u>	
125	Extraction/Preparation	
EPA 5030B 2	10153409	Purge and trap for aqueous samples
Analyte Code	<u>Analyte</u>	
125	Extraction/Preparation	
EPA 6010B 2	10155609	ICP - AES
Analyte Code	<u>Analyte</u>	
1000	Aluminum	
1005	Antimony	
<b>10</b> 10 ·	Arsenic	
<b>10</b> 15	Barium	
1020	Beryllium	
1025	Boron	
1030	Cadmium	
1035	Calcium	
1040	Chromium	
1050	Cobalt	
1070		
1075	Iron Lead	
	· -	
1085	Magnesium	
1090	Manganese	
1100	Molybdenum	
1105	Nickel	
1125	Potassium	
1140	Selenium	
1150	Silver	
1155	Sodium	
1165	Thallium	
1175	Tin	
1180	Titanium	
3035	Uranium	
1 <b>1</b> 85	Vanadium	
1190	Zinc	
EPA 7470A 1	10165807	Mercury in Liquid Waste by by Cold Vapor Atomic Absorption
Analyte Code	<u>Analyte</u>	
1095	Mercury	



ORELAPID: NM100001 EPACode: NM00035

Certificate:

NM100001-009

# Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D Albuquerque, NM, 87109

Issue Date: 3/1/2008

Expiration Date: 2/28/2009

As of 03/01/2008 this list supercedes all previous lists for this certificate number.

Customers: Please verify the current accreditation standing with ORELAP.

Analyte Diesel range organics (DRO)	
Diesel range organics (DRO)	
Gasoline range organics (GRO)	
Motor Oil	
10174808	Aromatic and Halogenated Volatiles by GC with PID and/or ECD Purge 8
Analyte	, , , , , , , , , , , , , , , , , , ,
1,2,4-Trimethylbenzene	·
1,3,5-Trimethylbenzene	
Benzene	
Ethylbenzene	
m+p-xylene	
• •	
· · · · · · · · · · · · · · · · · · ·	
•	
	Organochlorine Pesticides by GC/ECD
	Organismini i Committee Sy Conzer
'	
•	
	havano)
•	,
•	valle)
	,
•	vachlere evalor a van EV
·	xachiorocyclone xane)
•	
	Polychlorinated Biphenyls (PCBs) by GC/ECD
	Polychionilated Biblieriyis (PCBS) by GC/ECD
·	•
	•
•	
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The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	
	Volatile Organic Compounds by purge and trap GC/MS
	Volatile Organic Compounds by purge and trap GC/MS
1,1,2-Trichloroethane	
	1,3,5-Trimethylbenzene Benzene





ORELAPID: NM100001 EPACode: NM00035

Certificate:

NM100001-009

# Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D Albuquerque, NM, 87109

Issue Date: 3/1/2008

Expiration Date: 2/28/2009

4640	1,1-Dichloroethylene
4670	1,1-Dichloropropene
5150 .	1,2,3-Trichiorobenzene
5180	1,2,3-Trichloropropane
5155	1,2,4-Trichlorobenzene
5210	1,2,4-Trimethylbenzene
4570	1,2-Dibromo-3-chloropropane (DBCP)
<b>458</b> 5	1,2-Dibromoethane (EDB, Ethylene dibromide)
4610	1,2-Dichłorobenzene
<b>463</b> 5	1,2-Dichloroethane
<b>465</b> 5	1,2-Dichloropropane
5215	1,3,5-Trimethylbenzene
4615	1,3-Dichlorobenzene
4660	1,3-Dichloropropane
4620	1,4-Dichlorobenzene
6380	1-Methylnaphthalene
4665	2,2-Dichloropropane
4410	2-Butanone (Methyl ethyl ketone, MEK)
<b>453</b> 5	2-Chlorotoluene
4860	2-Hexanone
6385	2-Methỳinaphthalene
4540	4-Chlorotoluene
<b>499</b> 5	4-Methyl-2-pentanone (MIBK)
4315	Acetone
4375	Benzene
4385	Bromobenzene
4390	Bromochloromethane
4395	Bromodichloromethane
4400	Bromoform
4950	Bromomethane (Methyl bromide)
4450	Carbon disuffide
4455	Carbon tetrachloride
4475	Chlorobenzene
4485	Chloroethane
<b>450</b> 5	Chloroform
105	Chloromethane
4645	cis-1,2-Dichtoroethylene
4680	cis-1,3-Dichloropropene
4575	Dibromochloromethane
4595	Dibromomethane
4625	Dichlorodifluoromethane
4650	Dichloromethane (DCM, Methylene chloride)
4765	Ethylbanzene
4835	Hexachlorobutadiene
4900	isopropylbenzene
5240	m+p-xylene
5000	Methyl tert-butyl ether (MTBE)
5005	Naphthalene
4435	n-Butylbenzene
5090	n-Propylbenzene
5250	o-Xylene

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Certificate:

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# Hall Environmental Analysis Laboratory, Inc.

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Issue Date: 3/1/2008

Expiration Date: 2/28/2009

4910	p-isopropyitoluene		
4440	sec-Butylbenzene		
5 <b>10</b> 0	Styrene		
4445	tert-Butylbenzene		
5115	Tetrachloroethylene (Perchloroethylene)		
5140	Toluene		
4700	trans-1,2-Dictoroethylene		
4685	trans-1,3-Dichloropropylene		
5170	Trichloroethene (Trichloroethylene)		
5175	Trichlorofluoromethane		
5235	Vinyl chloride		
5260	Xylene (total)		

	5235	Vinyi chioride	
	5260	Xylene (total)	
EPA	8270C 3	10185805	SemiVolitile Organic compounds by GC/MS
	Analyte Code	<u>Anaiyte</u>	
	5155	1,2,4-Trichlorobenzene	
	4610	1,2-Dichlorobenzene	
	4615	1,3-Dichlorobenzene	
	4620	1,4-Dichlorobenzene	·
	6835	2,4,5-Trichiorophenol	
	6840	2,4,6-Trichlorophenol	•
	6000	2,4-Dichlorophenol	
	6130	2,4-Dimethylphenol	•
	6175	2,4-Dinitrophenol	
	6185	2,4-Dinitrotoluene (2,4-DNT)	•
	6190	2,6-Dinltrotoluene (2,6-DNT)	
	5795	2-Chloronaphthalene	
	5800	2-Chlorophenol	
	6385	2-Methylnaphthalene	
	6400	2-Methylphenol (o-Cresol)	
	6460	2-Nitroanlline	·
	6490	2-Nitrophenol	
	6412	3 & 4 Methylphenol	
	5945	3,3'-Dichlorobenzidine	
	6465	3-Nitroaniline	
	6140	4,6-Dinitro-2-methylphenol	
	5660,	4-Bromophenyl phenyl ether	
	5700	4-Chloro-3-methylphenol	
	5745	4-Chloroaniline	·
	5825	4-Chlorophenyl phenylether	
	6470	4-Nitroaniline	
	6500	4-Nitrophenol	
	5500	Acenaphthene	
	5505	Acenaphthylene	
	5545	Aniline	
	5555	Anthracene	
	123	Azobenzene	
	5575	Benzo[a]anthracene	, ~
	5580	Benzo[a]pyrene	
	5585	Benzo[b]fluoranthene	
	5590	Benzo[g,h,i]perylene	
	5600	Benzo[k]fluoranthene	

ORELAPID: NM100001 EPACode: NM00035

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# Hall Environmental Analysis Laboratory, Inc.

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Expiration Date: 2/28/2009

		the burion accreanation standing with ONLEAR.
	482	Benzofluoranthene
	5610	Benzoic acid
	5630	Benzyl alcohol
	5765	bis(2-Chloroethyl)ether
	5770	bis(2-Chloroethyloxymethane)
	5780	bis(2-Chloroisopropyl)ether
	6255	bis(2-Ethylnexyl)phthalate (DEHP)
	5670	Butyl benzyl phthalate
	5680	Carbazole
	5855	Chrysene
	5895	Dibenz[a,h]anthracene
	5905	Dibenzofuran
	6070	Diethyl phthalate
	6135	Dimethyl phthalate
	5925	Di-n-butyl phthalate
	6200	Di-n-octyl phthalate
	6265	Fluoranthene
	6270	Fluorene
	6275	Hexachlorobenzene
	4835	Hexachlorobutadiene
	<b>628</b> 5	Hexachlorocyclopentadiene
	4840	Hexachloroethane
	6315	Indeno[1,2.3-cd]pyrene
	6320	Isophorone
	5005	Naphthalene
	5015	Nitrobenzene
	6 <b>53</b> 5	n-Nitrosodiphenylamine
	6540	n-Nitrosodipropylamine
	6605	Pentachlorophenol
	6615	Phenanthrene
	6625	Phenol
	6665	Pyrene
	<b>509</b> 5	Pyridine
EPA		10187607 Polynuclear Aromatic Hydrocarbons by HPLC/UV-VIS
	Analyte Code	<u>Analyte</u>
	6380	1-Methylnaphthalene
	55 <b>0</b> 0	Acenaphthene
	<b>550</b> 5	Acenaphthylene
	<b>555</b> 5	Anthracene
	5575	Benzo[a]anthracene
	5580	Benzo[a]pyrene
	<b>558</b> 5	Benzo[b]fluoranthene
	5590	Benzo[g,h,i]perylene
	56 <b>0</b> 0	Benzo[k]fluoranthene
	5 <b>85</b> 5	Chrysene
	5895	Dibenz[a,h]anthracene
	62 <b>6</b> 5	Fluoranthene
		Fluorene
	6270	
	6270 6315	
		Indeno[1,2,3-cd]pyrene Naphthalene



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Expiration Date: 2/28/2009

6665	Pyrene				
SM 2540 C 20th ED	20	050004	Total Dissolved Solids		
Analyte Code	<u>Analyte</u>				
1955	Residue-filterable (TDS	S)		•	•
SM 4500-H+ B 20th E	D 20	104807	pH by Probe		
Analyte Code	<u>Analyte</u>				
1900	pН				

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# Hall Environmental Analysis Laboratory, Inc.

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Issue Date: 3/1/2008

Expiration Date: 2/28/2009

Reference	Code	Description
EPA 3050A	10135407	Acid Digestion of Sediments, Sludges, and soils
Analyte Code	<u>Analyte</u>	
125	Extraction/Preparation	
EPA 3540C 3	10140202	Soxhlet Extraction
Analyte Code	<u>Analyte</u>	
125	Extraction/Preparation	
EPA 3545	10140804	Pressurized Fluid Extraction (PFE)
Analyte Code	Analyte	
125	Extraction/Preparation	
EPA 5035	10154004	Closed-System Purge-and-Trap and Extraction for Volatile Organics in S
Analyte Code	<u>Analyte</u>	
125	Extraction/Preparation	
EPA 6010B 2	10155609	ICP - AES
Analyte Code	An <u>alyte</u>	
1000	Aluminum	
1005	Antimony	
1010	Arsenic	
1015	Barium	
1020	Beryllium	
1025	Boron	
1030	Cadmium	
1035	Calcium	
1040	Chromium	
1050	Cobalt	
1055	Copper Iron	
1070		
1075	Lead	
1085	Magnesium	
1090	Manganese	
1100	Molybdenum	
1105	Nickel	
1125	Potassium	
1140	Selenium	
1150	Silver	
1155	Sodium	
1165	Thallium	
1175	Tin	
1180	Titanium	
3035	Uranium	
1185	Vanadium	
1190	Zinc	Standard California Lancative and the California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California California Califo
EPA 7471A 1	10166208	Mercury in Solid Waste by Cold Vapor Atomic Absorption
Analyte Code	Analyte	
1095	Mercury	
EPA 8015B 2	10173601	Non-haloge nated organics using GC/FID
Analyte Code	<u>Analyte</u>	
9369	Diesel range organics (DRO)	
9408	Gasoline range organics (GRO)	
102	Motor Oll	

ORELAPID: NM100001 EPACode: NM00035

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## Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D Albuquerque, NM, 87109

Issue Date: 3/1/2008

Expiration Date: 2/28/2009

PA 8021B 2	10174808	Aromatic and Halogenated Volatiles by GC with PID and/or ECD Purge 8
Analyte Cod	<u>Analyte</u>	
4375	Benzene	
4765	Ethylbenzene	•
5240	m+p-xylene	
5000	Methyl tert-butyl ether (MTBE)	
<b>525</b> 0	o-Xylene	
5140	Toluene	
5260	Xylene (total)	
PA 8081A 1	10178606	Organochtorine Pesticides by GC/ECD
Analyte Cod	<u> Analyte</u>	; 
7355	4,4'-DDD	
7360	4,4'-DDE	
7365	4,4'-DDT	
7025	Aldrin	
7110	aipha-BHC (alpha-Hexachiorocycioh	PYRIDA)
7115	beta-BHC (beta-Hexachlorocyclonex	
7105	delta-BHC	MINY
7470	Dieldrin	
7510	Endosulfan l	
7515	Endosulfan II	
7520	Endosulfan sulfate	
7540	Endrin	
7530	Endrin aldehyde	III and leaves M
<b>71</b> 20	gamma-BHC (Lindane, gamma-Hex	achiorocyclo nexan=)
7685	Heptachlor	
7690	Heptachlor epoxide	
7810	Methoxychlor	
PA 8082	10179007	Polychlori nated Biphenyls (PCBs) by GC/ECD
Analyte Coo		
8880	Aroclor-1016 (PCB-1016)	
8885	Aroclor-1221 (PCB-1221)	
8890	Aroclor-1232 (PCB-1232)	
8895	Arocior-1242 (PCB-1242)	
8900	Arocior-1248 (PCB-1248)	
8905	Aroclor-1254 (PCB-1254)	•
8910	Aroclor-1260 (PCB-1260)	
PA 8260B 2	10184802	Volatile O rganic Compounds by purge and trap GC/MS
Analyte Coc	e <u>Analyte</u>	
5105	1,1,1,2-Tetrachloroethane	
5160	1,1,1-Trichloroethane	
5110	1,1,2,2-Tetrachloroethane	
5165	1,1,2-Trichloroethane	
4530	1,1-Dichloroethane	
4640	1,1-Dichloroethylene	
4670	1,1-Dichloropropene	
5150	1,2,3-Trichlorobenzene	
5180	1,2,3-Trichloropropane	
5155	1,2,4-Trichlorobenzene	
5210	1,2,4-Trimethylbenzene	

ORELAPID: NM100001 EPACode: NM00035

Certificate:

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## Hall Environmental Analysis Laboratory, Inc.

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Issue Date: 3/1/2008

Expiration Date: 2/28/2009

<b>458</b> 5		1,2-Dibromoethane (EDB, Ethylene dibromide)
4610		1,2-Dichlorobenzene
4635	hi	1,2-Dichloroethane
4655		1,2-Dichloropropane
5215		1,3,5-Trimethylbenzene
4615		1,3-Dichlorobenzene
4660		1,3-Dichloropropane
4620		1,4-Dichlorobenzene
6380		1-Methylnaphthalene
4665		2,2-Dichloropropane
4410		2-Butanone (Methyl ethyl ketone, MEK)
4535		2-Chiorotoluene
4860		2-Hexanone
6385		2-Methylnaphthalene
4540		4-Chiorotoluene
4995		4-Methyl-2-pentanone (MIBK)
4315		Acetone
4375		Benzene
4385		Bromobenzene
4390	•	Bromochloromethane
<b>439</b> 5		Bromodichloromethane
4400		Bromoform
4950		Bromomethane (Methyl bromide)
4450		Carbon disulfide
4455		Carbon tetrachloride
4475		Chlorobenzene
4485		Chloroethane
4505		Chloroform
105		Chloromethane
4645		cis-1,2-Dichloroethylene
4680		cis-1,3-Dichloropropene
4575		Dibromochloromethane
4595		Dibromomethane
4625		Dichlorodifluoromethane
465D		Dichloromethane (DCM, Methylene chloride)
4765		Ethylbenzene
4835		Hexachtorobutadiene
4900		Isopropylbenzene
5240		m+p-xylene
5000		Methyl tert-butyl ether (MTBE)
5005		Naphthalene
4435		n-Butylbenzene
5090		n-Propylbenzene
5250		o-Xylene
4910		p-Isopropyltoluene
4440		sec-Butylbenzene
5100		Styrene
4445		tert-Butylbenzene
5115		Tetrachloroethylene (Perchloroethylene)
5140		Toluene
4700		trans-1,2-Dictoroethylene

ORELAPID: NM100001 EPACode: NM00035

Certificate:

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Expiration Date: 2/28/2009

		(			
	4685	trans-1,3-Dichloropropylene			
	5170	Trichloroethene (Trichloroethylene)			
	5175	Trichlorofluoromethane			
	5235	Vinyl chloride			
	5260	Xylene (total)			
EPA	8270C 3	10185805	SemiVolitile Organic compounds by GC/MS		
	Analyte Code	<u>Analyte</u>			
	5155	1,2,4-Trichlorobenzene			
	4610	1,2-Dichlorobenzene	· · · · · · ·		
	4615	. 1,3-Dichlorobenzene			
	4620	1,4-Dichlorobenzene			
	6835	2,4,5-Trichlorophenol			
	6840	2,4,6-Trichlorophenol			
	6000	2,4-Dichlorophenol			
	6130	2,4-Dimethylphenol			
	6175	2,4-Dinitrophenol			
	6185	2,4-Dinitrotoluene (2,4-DNT)	·	٠	•
	6190	2,6-Dinitrotoluene (2,6-DNT)			
	5795	2-Chioronaphthalene			
	5800	2-Chlorophenol			
	6385	2-Methylnaphthalene			
	6400	2-Methylphenol (o-Cresol)	·	•	
	6460	2-Nitroaniline			
	6490	2-Nitrophenol			
	6412	3 & 4 Methylphenol			
	<b>594</b> 5	3,3'-Dichlorobenzidine			
	64 <del>6</del> 5	3-Nitroaniline			
	6140	4,6-Dinitro-2-methylphenol			
	5660	4-Bromophenyl phenyl ether			
	57 <b>0</b> 0	4-Chloro-3-methylphenol			
	5745	4-Chloroaniline			
	5825	4-Chlorophenyl phenylether			
	6470	4-Nitroaniline			
	6500	4-Nitrophenol			
	5500	Acenaphthene			•
	5505	Acenaphthylene			
	5545	Anthroppe	•		
	5555 123	Anthracene Azobenzene			
	5575				
	55 <b>7</b> 5	Benzo(a)anthracene			
	55 <b>8</b> 5	Benzo[a]pyrene Benzo[b]fluoranthene			
	5590	Benzo[g,h,i]perylene			
	5600	Benzo[k]fluoranthene			
	5610	Benzoic acid			
	5630	Benzyl alcohol	•		
	5760	bis(2-Chloroethoxy)methane			
	5765	bis(2-Chloroethyl)ether			
	5780	bis(2-Chloroisopropyl)ether			
•	6255	bis(2-Ethylhexyl)phthalate (DEHP)			
	5670	Butyl benzyl phthalate			
	34.0	- ary a warmy i prosince			

ORELAPID: NM100001 EPACode: NM00035

Certificate:

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## Hall Environmental Analysis Laboratory, Inc.

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Issue Date: 3/1/2008

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	5680	Carbazole
	5855	Chrysene
	5895	Dibenz[a,h]anthracene
	5905	Dibenzofuran
	6070	Diethyl phthalate
	6135	Dimethyl phthalate
	5925	Di-n-butyl phthalate
	6200	Di-n-octyl phthalate
	<b>626</b> 5	Fluoranthene
	6270	Fluorene
	6275	Hexachlorobenzene
	4835	Hexachlorobutadiene
	6285	Hexachlorocyclopentadiene
	4840	Hexachioroethane
	6315	Indeno[1,2,3-cd]pyrene
	6320	Isophorone
	5005	Naphthalene
	5015	Nitrobenzene
	6530	n-Nitrosodimethylamine
	6535	n-Nitrosodiphenylamine
	6540	n-Nitrosodipropylamine
	6605	Pentachiorophenol
	6615	Phenanthrene
	6625	Phenol
	6665	Pyrene
	5095	Pyridine
_		404070

EPA 8310		10187607	Polynuclear Aromatic Hydrocarbons by HPLC/UV-VIS
Amalida Cada	Amainda		

Analyte Code	<u>Analyte</u>
6380	1-Methylnaphthalene
6385	2-Methylnaphthalene
5500	Acenaphthene
5505	Acenaphthylene
<b>555</b> 5	Anthracene
5575	Benzo(a)anthracene
5580	Benzo[a]pyrene
5 <b>58</b> 5	Benzo[b]fluoranthene
5590	Benzo[g,h,i]perylene
5600	Benzo[k]fluoranthene
5855	Chrysene
5895	Dibenz(a,h)anthracene
6 <b>26</b> 5	Fluoranthene
6270	Fluorene
6315	indeno[1,2,3-cd]pyrene
5005	Naphthalene
6615	Phenanthrene
6665	Pyrene



#### State of New Mexico

#### ENVIRONMENT DEPARTMENT

Field Operations Division
Drinking Water Bureau
525 Camino de Los Marquez
Santa Fe, New Mexico 87501
Telephone (505) 476-8620
Fax (505) 476-8658



Cindy Padilla
Deputy Secretary

March 11, 2008

Hall Environmental Analysis Laboratory Inc. 4901 Hawkins Rd. NE, Suite D Albuquerque, NM 87109

Dear Mr. Freeman

The Drinking Water Bureau of the New Mexico Environment Department (NMED-DWB) has received and reviewed your Nelap certification /accreditation information from the state of Oregon, The documentation is acceptable and your New Mexico certification is now valid through February 29, 2009.

This certification is to perform drinking water analysis in compliance with the Federal Safe Drinking Water Act, pursuant 40CFR Part 141, and the New Mexico Environment Department Drinking Water Regulations for the Primary Regulated contaminants, including Contaminants in as listed in your Oregon Scope Accreditation.

You must advise NMED-DWB of any change in your accreditation by the State of Oregon and continue to provide this office with performance evaluation results. You are also required to provide evidence of renewal of accreditation by the state of Oregon to continue certification past February 29, 2009.

Laboratories certified by the New Mexico can be purged from the list if there is no evidence that they are performing drinking water compliance samples analysis for public water supply systems in New Mexico.

IF you have any questions or require additional information, please contact me at 505-476-8635.

Sincerely,

Joe Chavez

### Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD

Sent: Thursday, November 19, 2009 7:45 AM

**To:**'Bob Patterson'; 'Dan Gibson'; 'Schmaltz, Randy'; 'Moore, Darrell'; 'Lackey, Johnny'
Sanchez, Daniel J., EMNRD; VonGonten, Glenn, EMNRD; Griswold, Jim, EMNRD

Subject: UIC Class I Disposal Well Annual Report Schedule for Submittal & Content REMINDER- 2010

Attachments: Class I Disposal Well Annual Report Tracking 2010.xls; 19.15.11 NMAC.doc

#### Gentlemen:

Good morning. You may recall an e-mail message from me this past Summer alerting you to the reporting provision of your current discharge permit (permit) and how the New Mexico Oil Conservation Division (OCD) is stepping up its efforts to track reporting under issued permits.

Please find attached a spreadsheet listing the dates that OCD expects to receive your Annual Reports and/or any reporting requirements from your permit. If you are an operator with limited reporting requirements based on your permit, you are welcome to follow the format and content required from more recent permit renewals issued by the OCD, which are more comprehensive and constitute a report, Any renewed permits will likely require similar content anyway.

You will notice that a Hydrogen Sulfide Contingency Plan (CP) (see attached 19.15.11 NMAC Regulations) has been written into a couple of new Navajo Refining Company permits. This regulation became effective on December 1, 2008 and applies to any facility or well where the hydrogen sulfide concentration is at or greater than 100 ppm. Consequently, if your facilities meet or exceed this concentration, you are required to have an H2S CP for your facility regardless of whether the OCD has required it in your permit. The OCD believes that all UIC Class I Disposal Well Facilities require an H2S CP; therefore, the OCD is requesting your H2S CP(s) by Wednesday, March 31, 2010, unless a different date for submittal is specified in your permit. Also, if you are an operator with multiple wells, you may develop one CP, but you must address each well location with site specific details in that one CP.

Please plan on meeting the Annual Report submittal dates in January of 2010 as failure to submit the report will constitute a violation under the Federal Underground Injection Control (UIC) Program and reporting to the United States Environmental Protection Agency, which could result in the shut-in and/or plug and abandonment of your Class I disposal well. Failure to meet the H2S CP requirement may also result in the shut-in of your well operations; consequently, the OCD is hopeful you will satisfy the regulations pertaining to this deadly gas.

Please contact me if you have questions. Thank you in advance for your cooperation in this matter.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490 Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: <a href="http://www.emnrd.state.nm.us/ocd/index.htm">http://www.emnrd.state.nm.us/ocd/index.htm</a> (Pollution Prevention Guidance is under "Publications")

CC: UIC Class I Well File "Annual Reporting" and "H2S Contingency Plan"

Annual Report Contents	20. B. Hydrogen Sulfide (H2S') Contingency Plan: If concentrations of H-S at the facility may exceed 100 ppm as specified in 19.15.11.12 et seq.
Submitted	30.
Annual Report Due Date	01/31/10
Operator	Navajo Refining Company
Permit ID	UICI-8 WDW-1

42S Contingency Plan per 19,15,11.9 et se NMAC shall be submitted within 3 months of permit issuance.

21 G. Injection Record Volumes and Pressures: The owner/operator shall submit quarterly reports of its disposal, operation and well workovers pravided herein. The minimum, maximum, average flow waste injection volumes (including total volumes) and annular pressures of waste (oil field exempt/non-exempt non-hazardous waste) injected will be recorded monthly and submitted to the OCD Santa Fe Office on a quarterly basis. The casing-tubing annulus shall contain fluid and be equipped with a pressure gauge or an approved leak detection device in order to determine leakage in the casing, tubing, or packer. Due to pressure fluctuations observed at Navajo's other two nearby Class I Injection Wells, WDW-1 shall be equipped with an expansion tank under constant 100 psig pressure connected to the casing-annulus and maintained under constant pressure. The expansion tank shall initially be expansion tank coupled with documented additions! removals of fluids into or out of the expansion tank is required to maintain the equilibrium volume. Any loss or gain of fluids in the expansion tank shall be recorded, and if significant, reported to the CCD within 24 hours of discovery. The owner/operator shall provide the following information on a quarterly basis, weekly expansion tank volume readings shall be provided in a table in the cover letter of each quarterly report. Navajo shall monitor, record and none any fluid volume additions or removals from the expansion tank on a quarterly basis, In addition, any well activity (i.e., plugging, changing injection intervals, etc.) shall be conducted in accordance with all applicable New Mexico Oil Conservation Division regulations. filled half-full (250 gallon expansion tank) with an approved fluid to establish an equilibrium volume and fluid level. Weekly monitoring of fluid levels in the

- 21 H. Analysis of Injected Waste: Provide an analytical data or test results summary of the injection waste water with each annual report. The analytical testing shall be conducted on a quarterly basis with any exceedence reported to the OCD within 24 hours after having knowledge of an exceedence(s). Records shall be maintained at Navajo for the life of the well. The required analytical test methods are:
- a. Aromatic and halogenated volatile hydrocarbon scan by EPA Method 8260C GCMS. Semi-volatile Organics GCMS EPA Method 8270B including I and
- b. General water chemistry (Method 40 CFR 136.3) to include calcium, potassium, magnesium, sodium, bicarbonate, carbonate, chloride, sulfate, total dissolved solids (TDS), pH, and conductivity.
- c. Heavy metals using the ICP scan (FPA Method 60 tO) and Arsenic and Mercury using atomic absorption (FPA Methods 7060 and 7470).
- d. FPA RCRA Characteristics for Ignitability, Corrosivity and Reactivity (40 CFR part 261 Subpart C Sections 261.21 -261.23, July 1, 1992).

## Chavez, Carl J, EMNRD

From:

Chavez, Carl J. EMNRD

Sent:

Thursday, November 19, 2009 7:45 AM

To:

'Bob Patterson'; 'Dan Gibson'; 'Schmaltz, Randy'; 'Moore, Darrell'; 'Lackey, Johnny'

Cc:

Sanchez, Daniel J., EMNRD; VonGonten, Glenn, EMNRD; Griswold, Jim, EMNRD

Subject:

UIC Class I Disposal Well Annual Report Schedule for Submittal & Content REMINDER- 2010

Attachments:

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You will notice that a Hydrogen Sulfide Contingency Plan (CP) (see attached 19.15.11 NMAC Regulations) has been written into a couple of new Navajo Refining Company permits. This regulation became effective on December 1, 2008 and applies to any facility or well where the hydrogen sulfide concentration is at or greater than 100 ppm. Consequently, if your facilities meet or exceed this concentration, you are required to have an H2S CP for your facility regardless of whether the OCD has required it in your permit. The OCD believes that all UIC Class I Disposal Well Facilities require an H2S CP; therefore, the OCD is requesting your H2S CP(s) by Wednesday, March 31, 2010, unless a different date for submittal is specified in your permit. Also, if you are an operator with multiple wells, you may develop one CP, but you must address each well location with site specific details in that one CP.

Please plan on meeting the Annual Report submittal dates in January of 2010 as failure to submit the report will constitute a violation under the Federal Underground Injection Control (UIC) Program and reporting to the United States Environmental Protection Agency, which could result in the shut-in and/or plug and abandonment of your Class I disposal well. Failure to meet the H2S CP requirement may also result in the shut-in of your well operations; consequently, the OCD is hopeful you will satisfy the regulations pertaining to this deadly gas.

Please contact me if you have guestions. Thank you in advance for your cooperation in this matter.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505

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Website: <a href="http://www.emnrd.state.nm.us/ocd/index.htm">http://www.emnrd.state.nm.us/ocd/index.htm</a> (Pollution Prevention Guidance is under "Publications")

CC: UIC Class I Well File "Annual Reporting" and "H2S Contingency Plan"

Annual Report Contents	. Chemical Analysis of Injection Fluids: The following analyses of injection fluids will be conducted on a quarterly hasis:
Submitted	6
Annual Report Due Date	01/31/10
Operator	Western Refining Southwest
Permit ID	6-IJIN

a. Aromatic and halogenated volatile hydrocarbon scan by EPA method 8260C GCMS including MTBE. Semi-Volatile Organics GCMS EPA method 8270B including 1 and 2-methylnaphthalene.

b. General water chemistry to include calcium, potassium, magnesium, sodium, bicarbonate, carbonate, chloride, sulfate total dissolved solids (TDS), pH. and conductivity.

c. Total heavy metals using the ICAP scan (EPA method 6010IICPMS) and Mercury using Cold Vapor (EPA method 7470).

d. EPA RCRA Characteristics for Ignitability, Corrosivity and Reactivity.

Records of all analyses will be maintained at Giant Refining Company for the life of the well..

10. Quarterly Reporting: The following reports will be signed and certified in accordance with WQCC section 5101.G. and submitted quarterly to both the OCD Santa Fe and Aztee Offices:

a. Results of the chemical analysis of the injection fluids (number 9).
 b. Monthly average, maximum and minimum values for injection pressures. flow rate and flow volume; and, annular pressure.
 C. Monthly volumes of injected fluids.

### Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD

Sent: Friday, September 25, 2009 3:05 PM

To: 'Bob Patterson'; 'Imolleur@keyenergy.com'; 'Schmaltz, Randy'; DARRELL MOORE; Lackey,

Johnny

Cc: Sanchez, Daniel J., EMNRD; Jones, William V., EMNRD; VonGonten, Glenn, EMNRD

Subject: New Mexico Oil Conservation Division Class I (non-hazardous) Disposal Well Operator

Notice--QUARTERLY & ANNUAL REPORTING

#### Gentlemen:

Re: UIC Class I Disposal Well Quarterly and Annual Reporting

You are receiving this message because you are currently operating a Underground Injection Control (UIC) Class I (non-hazardous) Disposal Well in New Mexico under an Oil Conservation Division (OCD) Discharge Permit. You may be aware of the most recent events related to OCD Class III Wells in New Mexico and can find out more by visiting the OCD's Brine Well Webpage at <a href="http://www.emnrd.state.nm.us/OCD/brinewells.htm">http://www.emnrd.state.nm.us/OCD/brinewells.htm</a> and OCD Brine Well Work Group Website at <a href="http://ocdimage.emnrd.state.nm.us/imaging/AEOrderFileView.aspx?appNo=pCJC0906359521">http://ocdimage.emnrd.state.nm.us/imaging/AEOrderFileView.aspx?appNo=pCJC0906359521</a>.

The OCD is writing to inform you that it will be monitoring more closely the receipt of your "Quarterly Reports" and "Annual Reports" required under the applicable section(s) of your OCD Discharge Permit. After reexamining our UIC Program subsequent to the UIC Class III Solution Mining Wells that collapsed in July and November of 2008, the OCD identified that it has been deficient in tracking reporting obligations in the past; however, the OCD has recently upgraded its online electronic system to better track operators who are not meeting the reporting requirements as specified in their OCD Discharge Permits. Please plan on submitting reports with required information by the date specified in your discharge permit. Operators undergoing permit renewal will notice changes to the OCD's discharge permit, which will include "Annual Reports" in addition to the Quarterly Reporting requirement(s).

To access your OCD Discharge Permit Online for the date of submittal and required contents of the report(s), please go to OCD Online at <a href="http://ocdimage.emnrd.state.nm.us/imaging/AEOrderCriteria.aspx">http://ocdimage.emnrd.state.nm.us/imaging/AEOrderCriteria.aspx</a> (enter "Order Type" as UICI and your "Order Number"). The OCD has placed a "Quarterly Reporting" and "Annual Reports" thumbnails into each of your online well files and will be scanning all received reports into them upon receipt from now on.

If you have been delinquent in submitting your Quarterly (more recent permits require Annual Reports), a historical review of your production or disposal records will be required in order to provide cumulative injection or disposal information in this year's report.

Please contact me if you have questions or need assistance.

Thank you in advance for your cooperation in this matter.

Copy: Class I (non-hazardous) Disposal Well Files UICI- 5, 9, 8, 8-1 & 8-0 (Quarterly Reporting & Annual Reports)

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505

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