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

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

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:	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.

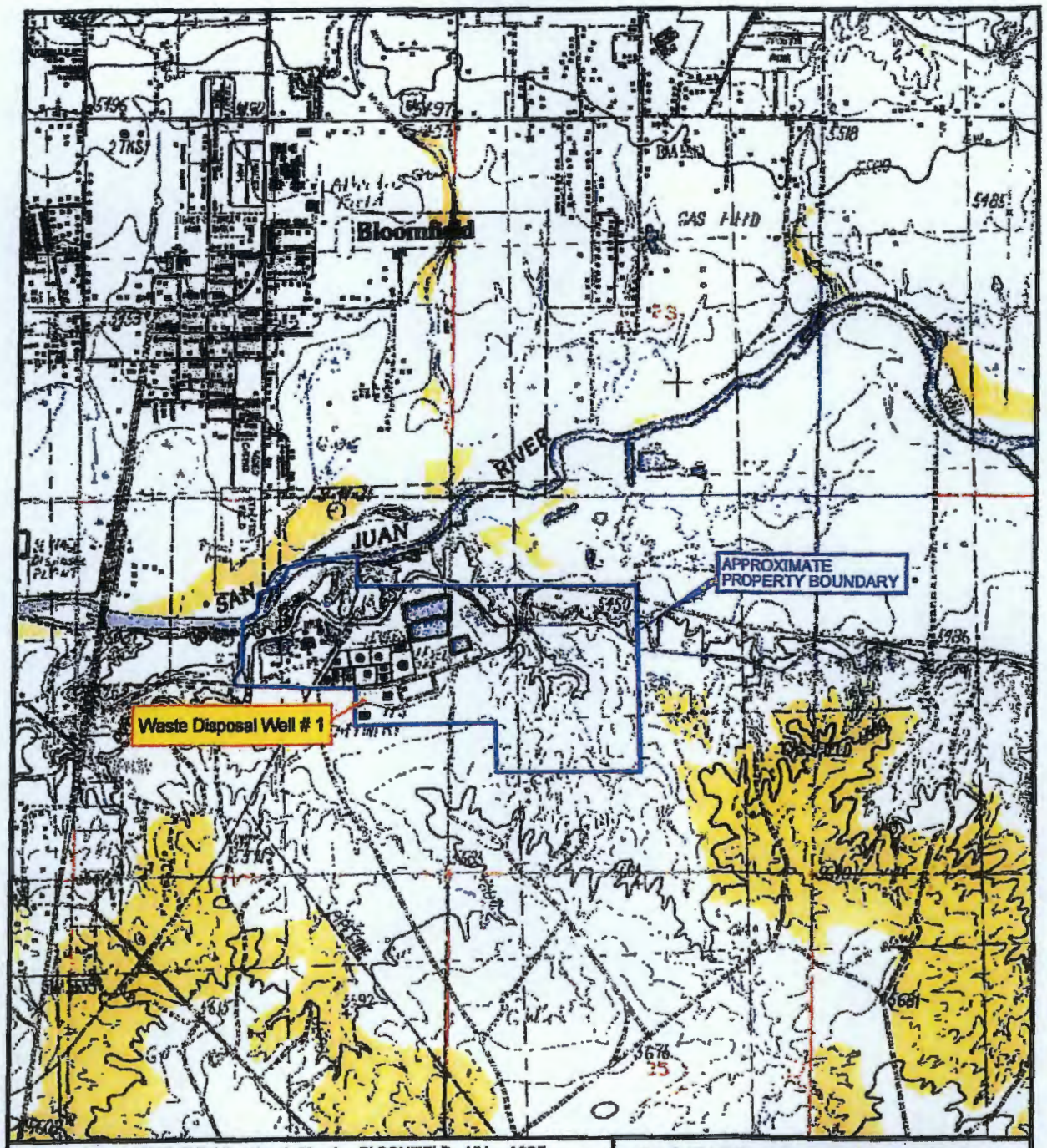
8.0 REFERENCES

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



Map Source: USGS 7.5 Min. Quad Sheet BLOOMFIELD, NM., 1985.

N

0 2000

SCALE IN FEET

NEW MEXICO

QUADRANGLE LOCATION

Western Refining

WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 01/06/10 | FILE: WestRef-A25

FIGURE 1

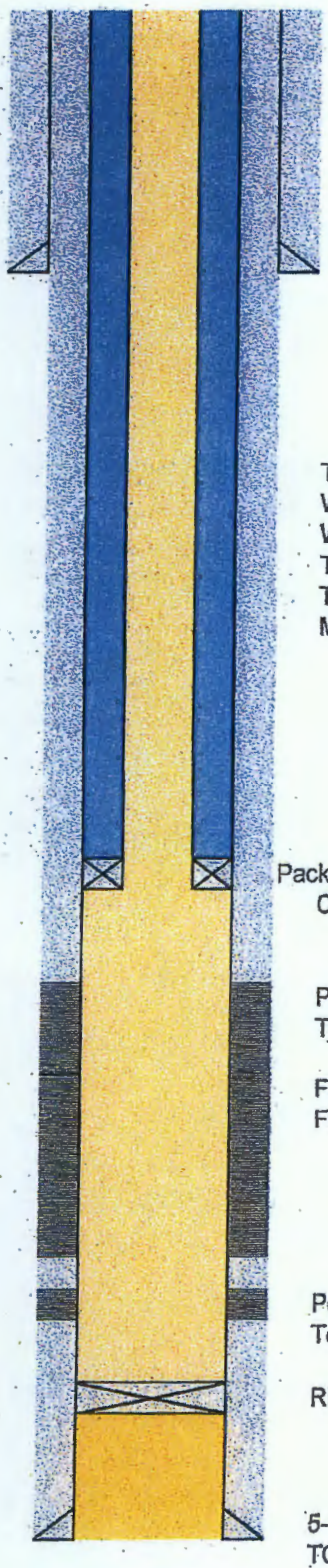
SITE LOCATION MAP

WESTERN REFINING DISPOSAL WELL #1
NW, SW SECTION 26, T29N, R11W
NO.: 30-045-29002

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

FIGURE 1
DISPOSAL WELL #1 WELL SCHEMATIC
Western Refining Inc.
Bloomfield, NM

Date:	4/25/2006	Approved By:	rls	Job No.:	70F5830
Drawn By:	rls	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'

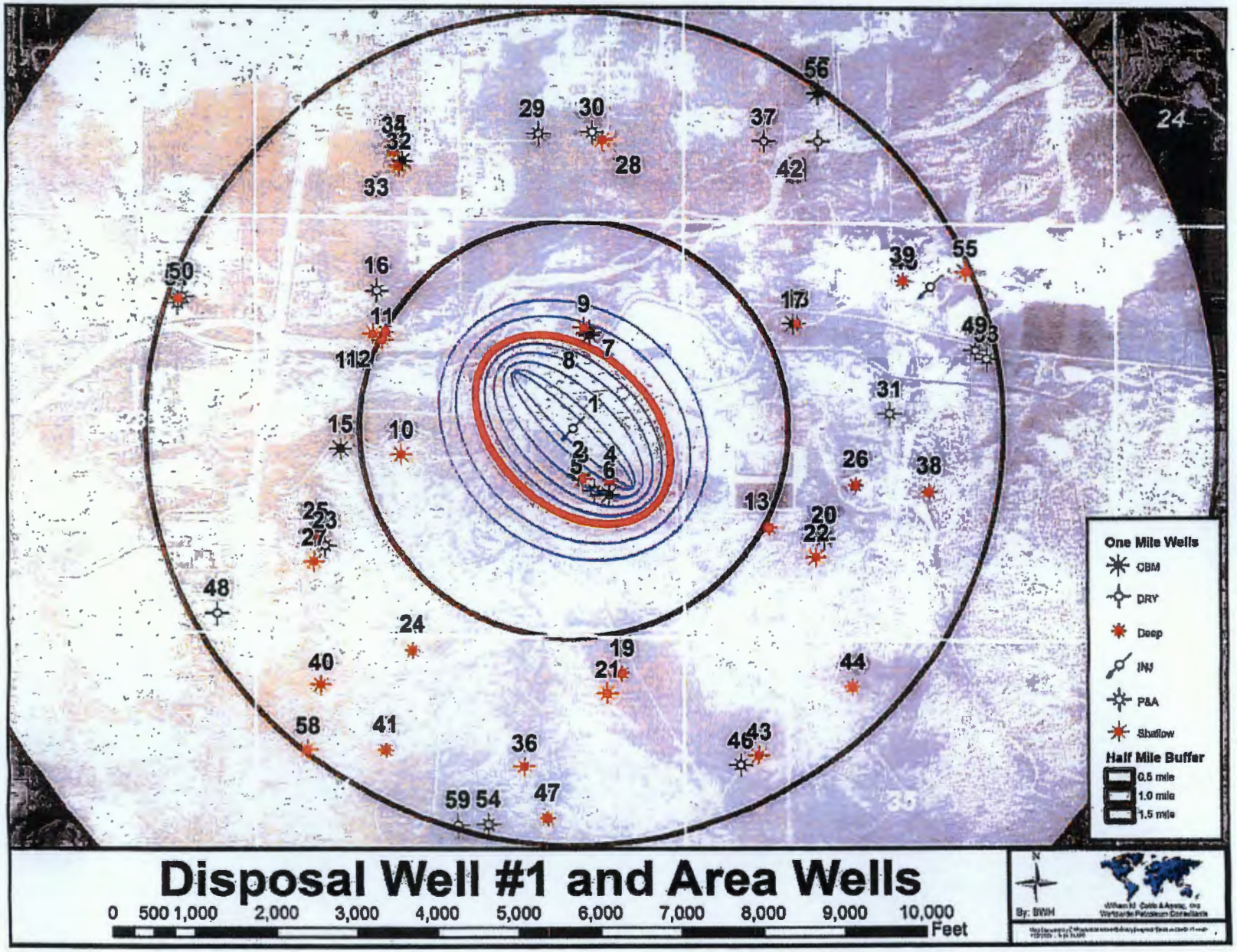
Fill was cleaned out of well on 4/20/06
Fill was orginally tagged at 3325'

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


Disposal Well #1 and Area Wells
0 500 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000
Feet
One Mile Wells
OBM
DRY
Deep
INJ
P&A
Shallow
Half Mile Buffer
0.5 mile
1.0 mile
1.5 mile
By: BWH

TABLES

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

PERIOD 2015	AMOUNT OF WATER FROM RIVER (GALLONS)	AMOUNT TO SOLAR EVAP PONDS (GALLONS)	TOTALIZER AMOUNT INJECTED (GALLONS)	DOWN-TIME (HRS)	INJECTION PRESSURE MAX (PSIA)	INJECTION PRESSURE MIN (PSIA)	INJECTION PRESSURE AVG (PSIA)	ANNULAR PRESSURE MAX (PSIA)	ANNULAR PRESSURE MIN (PSIA)	ANNULAR PRESSURE AVG (PSIA)	ON-LINE FLOW RATES MAX (GPM)	ON-LINE FLOW RATES MIN (GPM)	ON-LINE FLOW RATES AVG (GPM)
JAN	380	1,416,000	-	744	850	823	836	157	128	147	0	0	0
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	0	1082	1025	1063	191	132	166	48	34	39
SEP	-	2,010,196	1,123,804	184	1104	982	1059	199	139	169	41	24	36
OCT	-	-	-	-	-	-	-	-	-	-	-	-	-
NOV	-	-	-	-	-	-	-	-	-	-	-	-	-
DEC	-	-	-	-	-	-	-	-	-	-	-	-	-

The total amount injected in 2015 is: 10,386,505 gallons

NOTE: Well was abaondoned October 28, 2015

CERTIFICATION: Kelly Roberson DATE: 10-29-2015

Table 2

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	P&A Date	ULSTR	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	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	CBM	No
7	0.23	JACQUE	2	30-045-34409	1483	1689	1689		H-27-29N-11W	HOLCOMB O&G	FRUITLAND COAL	CBM	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	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	CBM	No
34	0.79	COOK	1	30-045-07940	6052	6226	6226		N-22-29N-11W	MANANA GAS INC	DAKOTA	Deep	Yes
35	0.79	COOK	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	#	APINO	Perf Top	Perf Bottom	Total Depth	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	CBM	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			Frtlnd		-34-29N-11W	Pre-Ongard	FRUITLAND SAND	DRY	No

Status	Total Wells	Pen Inj. Zone	
		Yes	No
P&A	15	3	12
Dry	4	0	4
INJ	2	2	0
CBM	7	2	5
Shallow	17	3	14
Deep	14	14	0
Total	59	24	35

Table 3

Injection Well
2015 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Volatile 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		< 5.0	< 5.0	< 1.0	na
1,1,2,2-Tetrachloroethane		< 10	< 10	< 2.0	na
1,1,2-Trichloroethane		< 5.0	< 5.0	< 1.0	na
1,1-Dichloroethane		< 5.0	< 5.0	< 1.0	na
1,1-Dichloroethene		< 5.0	< 5.0	< 1.0	na
1,1-Dichloropropene		< 5.0	< 5.0	< 1.0	na
1,2,3-Trichlorobenzene		< 5.0	< 5.0	< 1.0	na
1,2,3-Trichloropropane		< 10	< 10	< 2.0	na
1,2,4-Trichlorobenzene		< 5.0	< 5.0	< 1.0	na
1,2,4-Trimethylbenzene		< 5.0	< 5.0	< 1.0	na
1,2-Dibromo-3-chloropropane		< 10	< 10	< 2.0	na
1,2-Dibromoethane (EDB)		< 5.0	< 5.0	< 1.0	na
1,2-Dichlorobenzene		< 5.0	< 5.0	< 1.0	na
1,2-Dichloroethane (EDC)	500	< 5.0	< 5.0	< 1.0	na
1,2-Dichloropropane		< 5.0	< 5.0	< 1.0	na
1,3,5-Trimethylbenzene		< 5.0	< 5.0	< 1.0	na
1,3-Dichlorobenzene		< 5.0	< 5.0	< 1.0	na
1,3-Dichloropropane		< 5.0	< 5.0	< 1.0	na
1,4-Dichlorobenzene	7500	< 5.0	< 5.0	< 1.0	na
1-Methylnaphthalene		< 20	< 20	< 4.0	na
2,2-Dichloropropane		< 10	< 10	< 2.0	na
2-Butanone		< 50	< 50	11	na
2-Chlorotoluene		< 5.0	< 5.0	< 1.0	na
2-Hexanone		< 50	< 50	< 10	na
2-Methylnaphthalene		< 20	< 20	< 4.0	na
4-Chlorotoluene		< 5.0	< 5.0	< 1.0	na
4-Isopropyltoluene		< 5.0	< 5.0	< 1.0	na
4-Methyl-2-pentanone		< 50	< 50	< 10	na
Acetone		500	76	72	na
Benzene	500	< 5.0	< 5.0	< 1.0	na
Bromobenzene		< 5.0	< 5.0	< 1.0	na
Bromodichloromethane		< 5.0	< 5.0	< 1.0	na
Bromoform		< 5.0	< 5.0	< 1.0	na
Bromomethane		< 15	< 15	< 3.0	na
Carbon disulfide		< 50	< 50	< 10	na
Carbon Tetrachloride	500	< 5.0	< 5.0	< 1.0	na
Chlorobenzene	100000	< 5.0	< 5.0	< 1.0	na
Chloroethane		< 10	< 10	< 2.0	na
Chloroform	6000	< 5.0	< 5.0	< 1.0	na
Chloromethane		< 15	< 15	< 3.0	na
cis-1,2-DCE		< 5.0	< 5.0	< 1.0	na
cis-1,3-Dichloropropene		< 5.0	< 5.0	< 1.0	na
Dibromochloromethane		< 5.0	< 5.0	< 1.0	na
Dibromomethane		< 5.0	< 5.0	< 1.0	na
Dichlorodifluoromethane		< 5.0	< 5.0	< 1.0	na
Ethylbenzene		< 5.0	< 5.0	< 1.0	na
Hexachlorobutadiene	500	< 5.0	< 5.0	< 1.0	na
Isopropylbenzene		< 5.0	< 5.0	< 1.0	na
Methyl tert-butyl ether (MTBE)		< 5.0	< 5.0	< 1.0	na
Methylene Chloride		< 15	< 15	< 3.0	na
Naphthalene		< 10	< 15	< 2.0	na
n-Butylbenzene		< 15	< 5.0	< 1.0	na
n-Propylbenzene		< 5.0	< 10	< 3.0	na

Table 3

Injection Well
2015 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
sec-Butylbenzene		< 5.0	< 5.0	< 1.0	na
Styrene		< 5.0	< 5.0	< 1.0	na
tert-Butylbenzene		< 5.0	< 5.0	< 1.0	na
Tetrachloroethene (PCE)		< 5.0	< 5.0	< 1.0	na
Toluene		< 5.0	< 5.0	1.5	na
trans-1,2-DCE		< 5.0	< 5.0	< 1.0	na
trans-1,3-Dichloropropene		< 5.0	< 5.0	< 1.0	na
Trichloroethene (TCE)		< 5.0	< 5.0	< 1.0	na
Trichlorofluoromethane		< 5.0	< 5.0	< 1.0	na
Vinyl chloride	200	< 5.0	< 5.0	< 1.0	na
Xylenes, Total		< 7.5	< 7.5	< 1.5	na
Semi-Volatile Organic Compounds *(ug/L)*					
1,2,4-Trichlorobenzene		< 10	< 10	< 10	na
1,2-Dichlorobenzene		< 10	< 10	< 10	na
1,3-Dichlorobenzene		< 10	< 10	< 10	na
1,4-Dichlorobenzene	7500	< 10	< 10	< 10	na
1-Methylnaphthalene		< 10	< 10	< 10	na
2,4,5-Trichlorophenol		< 10	< 10	< 10	na
2,4,6-Trichlorophenol	2000	< 10	< 10	< 10	na
2,4-Dichlorophenol		< 20	< 20	< 20	na
2,4-Dimethylphenol		17	< 10	< 10	na
2,4-Dinitrophenol		< 20	< 20	< 20	na
2,4-Dinitrotoluene	130	< 10	< 10	< 10	na
2,6-Dinitrotoluene		< 10	< 10	< 10	na
2-Chloronaphthalene		< 10	< 10	< 10	na
2-Chlorophenol		< 10	< 10	< 10	na
2-Methylnaphthalene		< 10	< 10	< 10	na
2-Methylphenol		55	14	< 10	na
2-Nitroaniline		< 10	< 10	< 10	na
2-Nitrophenol		< 10	< 10	< 10	na
3,3´-Dichlorobenzidine		< 10	< 10	< 10	na
3+4-Methylphenol		79	48	< 10	na
3-Nitroaniline		< 10	< 10	< 10	na
4,6-Dinitro-2-methylphenol		< 20	< 20	< 20	na
4-Bromophenyl phenyl ether		< 10	< 10	< 10	na
4-Chloro-3-methylphenol		< 10	< 10	< 10	na
4-Chloroaniline		< 10	< 10	< 10	na
4-Chlorophenyl phenyl ether		< 10	< 10	< 10	na
4-Nitroaniline		< 10	< 10	< 10	na
4-Nitrophenol		< 10	< 10	< 10	na
Acenaphthene		< 10	< 10	< 10	na
Acenaphthylene		< 10	< 10	< 10	na
Aniline		< 10	< 10	< 10	na
Anthracene		< 10	< 10	< 10	na
Azobenzene		< 10	< 10	< 10	na
Benz(a)anthracene		< 10	< 10	< 10	na
Benzo(a)pyrene		< 10	< 10	< 10	na
Benzo(b)fluoranthene		< 10	< 10	< 10	na
Benzo(g,h,i)perylene		< 10	< 10	< 10	na
Benzo(k)fluoranthene		< 10	< 10	< 10	na
Benzoic acid		< 20	25	< 20	na
Benzyl alcohol		< 10	< 10	< 10	na
Bis(2-chloroethoxy)methane		< 10	< 10	< 10	na
Bis(2-chloroethyl)ether		< 10	< 10	< 10	na
Bis(2-chloroisopropyl)ether		< 10	< 10	< 10	na

Table 3

Injection Well
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		< 10	< 10	< 10	na
Carbazole		< 10	< 10	< 10	na
Chrysene		< 10	< 10	< 10	na
Dibenz(a,h)anthracene		< 10	< 10	< 10	na
Dibenzofuran		< 10	< 10	< 10	na
Diethyl phthalate		< 10	< 10	< 10	na
Dimethyl phthalate		< 10	< 10	< 10	na
Di-n-butyl phthalate		< 10	< 10	< 10	na
Di-n-octyl phthalate		< 10	< 10	< 10	na
Fluoranthene		< 10	< 10	< 10	na
Fluorene		< 10	< 10	< 10	na
Hexachlorobenzene	130	< 10	< 10	< 10	na
Hexachlorobutadiene	500	< 10	< 10	< 10	na
Hexachlorocyclopentadiene		< 10	< 10	< 10	na
Hexachloroethane	3000	< 10	< 10	< 10	na
Indeno(1,2,3-cd)pyrene		< 10	< 10	< 10	na
Isophorone		< 10	< 10	< 10	na
Naphthalene		< 10	< 10	< 10	na
Nitrobenzene	2000	< 10	< 10	< 10	na
N-Nitrosodimethylamine		< 10	< 10	< 10	na
N-Nitrosodi-n-propylamine		< 10	< 10	< 10	na
N-Nitrosodiphenylamine		< 10	< 10	< 10	na
Pentachlorophenol	100000	< 20	< 20	< 20	na
Phenanthrene		< 10	< 10	< 10	na
Phenol		21	< 10	< 10	na
Pyrene		< 10	< 10	< 10	na
Pyridine	5000	< 10	< 10	< 10	na
General Chemistry *(mg/L unless otherwise stated)*					
Specific Conductance *(umhos/cm)*		2900	4900	2000	na
Chloride		950	1400	480	na
Sulfate		48	9.5	65	na
Total Dissolved Solids		2290	2890	1220	na
pH *(pH Units)*		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		560	750	280	na
Total Alkalinity (as CaCO3)		300	358.6	274.6	na
Total Metals *(mg/L)*					
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	< 0.0060	< 0.0060	na
Lead	5	< 0.0050	< 0.0050	< 0.0050	na
Selenium	1	< 0.050	< 0.050	< 0.050	na
Silver	5	< 0.0050	< 0.0050	< 0.0050	na
Mercury	0.2	< 0.00020	< 0.00020	< 0.0010	na
Ignitability, Corrosivity, and Reactivity					
Reactive Cyanide *(mg/L)*		< 0.0200	< 1.00	< 1.00	na
Reactive Sulfide *(mg/L)*		< 0.450	0.87	< 1.0	na
Ignitability *(° F)*	< 140° F	>200	>200	>200	na
Corrosivity (ph Units)	≤ 2 or ≥ 12.5	7.22	7.17	7.36	na

Notes:

na = well shut down

APPENDIX A

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

OIL CONS. DIV DIST. 3
SEP 22 2015

BRADENHEAD TEST REPORT

(submit 1 copy to above address)

Date of Test 9-22-15 Operator San Juan Testing Co. API #30-0 45-29002

Property Name Disposal SWD Well No. 1 Location: Unit I Section 27 Township 29 Range 11

Well Status(Shut-In or Producing) Initial PSI: Tubing 1040 Intermediate N/A Casing 152 Bradenhead 0

OPEN BRADENHEAD AND INTERMEDIATE TO ATMOSPHERE INDIVIDUALLY FOR 15 MINUTES EACH

Testing	PRESSURE Bradenhead BH	Bradenhead Int	Bradenhead Csg	INTERM Int	INTERM Csg
TIME					
5 min	0		152		
10 min	0		155		
15 min	0		155		
20 min					
25 min					
30 min					

FLOW CHARACTERISTICS	BRADENHEAD	INTERMEDIATE
Steady Flow		
Surges		
Down to Nothing	✓	
Nothing		
Gas	✓	
Gas & Water		
Water		

If bradenhead flowed water, check all of the descriptions that apply below:

CLEAR____ FRESH____ SALTY____ SULFUR____ BLACK____

5 MINUTE SHUT-IN PRESSURE BRADENHEAD 0 INTERMEDIATE N/A

REMARKS: Hard puff when opened.

Nothing when opened after 5 min shut in.

By [signature] Witness Monica Kuehling

(Position)

E-mail address

Submit 1 Copy To Appropriate District Office
District I – (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II – (575) 748-1283
811 S. First St., Artesia, NM 88210
District III – (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV – (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised August 1, 2011

	WELL API NO. 30-045-29002-00
	5. Indicate Type of Lease STATE ☐ FEE ☒
	6. State Oil & Gas Lease No. 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 ☐ Gas Well ☒ Other – (Disposal Well)	7. Lease Name or Unit Agreement Name Disposal
	8. Well Number: #001
2. Name of Operator San Juan Refining Co. / Western Refining Southwest, Inc. – Bloomfield Terminal	9. OGRID Number: 037218
3. Address of Operator # 50 Road 4990, Bloomfield, NM, 87413	10. Pool name or Wildcat: Blanco/Mesa Verde
4. Well Location Unit Letter I : 2442 feet from the south line and 1250 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.)*

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: Annual MIT, Bradenhead, ☒		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 requests permission to perform the annual MIT and Bradenhead test on the Class I injection well referenced above. The tests will be performed on Tuesday, September 22th, 2015. Monica Kuehling has agreed to be here to monitor the tests.

Spud Date: Rig Release Date:

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE [signature] TITLE Environmental Coordinator DATE 9/2/15

Type or print name Matthew Krakow E-mail address: matt.krakow@wnr.com PHONE: 505-632-4169

For State Use Only

APPROVED BY: [signature] TITLE Environmental Engineer DATE 9/2/2015
Conditions of Approval (if any):

Submit 1 Copy To Appropriate District Office
District I – (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II – (575) 748-1283
811 S. First St., Artesia, NM 88210
District III – (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV – (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised July 18, 2013

	WELL API NO. 30-045-29002-00
	5. Indicate Type of Lease STATE ☐ FEE ☒
	6. State Oil & Gas Lease No. 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.)	7. Lease Name or Unit Agreement Name Disposal
1. Type of Well: Oil Well ☐ Gas Well ☒ Other – (Disposal Well)	8. Well Number: #001
2. Name of Operator: San Juan Refining Co. / Western Refining Southwest, Inc. - Bloomfield Terminal	9. OGRID Number: 037218
3. Address of Operator #50 Road 4990, Bloomfield, NM, 87413	10. Pool name or Wildcat Blanco/Mesa Verde

4. Well Location
Unit Letter I : 2442 feet from the South line and 1250 feet from the East line
Section 27 Township 29N Range 11 W NMPM San Juan County

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 ☐			
CLOSED-LOOP SYSTEM ☐			
OTHER:	☐	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 RefineryCo. plugged and abandoned this well on October 27 - 29, 2015 per the 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 sxs (66.08 cf) Class B cement from 2750' to 2647 squeeze 44 sxs outside, 6 sxs below, 6 sxs down 53' on top of CR.
Plug #3 with squeeze holes at 2390' and CR at 2350' spot 50 sxs (59 cf) Class B cement from 2390' to 2235' squeeze 32 sxs outside, 5 sxs below leaving 13 sxs on top of CR to cover the Chacra top. Tag TOC at 2180'.
Plug #4 with 20 sxs (23.6 cf) Class B cement from 1748' to 1570' to cover the Pictured Cliffs top.
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', to top off casing from 150' to surface with 16 sxs to cover the surface casing shoe.
Plug #7 with 53 sxs Class B cement top off casings and install P&A marker with coordinates 36° 41' 46" N/ 107° 58' 26" W.

10/27/15 Rode cement equipment to location. Spot in and RU. Wait on rig crew to set CR. Pressure test tubing to 1500 PSI, OK. Pressure test casing to 1000 PSI, OK. Spot plug #1 with calculated TOC at 2785'. Sting out. RD. SDFD.

10/28/15 Travel to location. Spot in and RU cement equipment. RU A-Plus wireline. RIH and tag at 2782'. Perforate 3 HSC squeeze holes at 2750'. Establish rate of 1-1/2 bpm at 850 PSI. TIH and set Weatherford CR at 2700'. Spot plug #2 with calculated TOC at 2647'. Displace with 15.2 mud. POH. Reverse circulate clean. RU A-Plus wireline. Perforate 3 HSC squeeze holes at 2390'. Casing started flowing from squeeze holes. SI well. Check well pressures: casing 180 PSI. Wireline RIH and set 5-1/2" CR at 2350'. Spot plug #3 with calculated TOC at 2235'. Displace with mud. Reverse circulate well clean. RD. SDFD.

10/29/15 Travel to location. Spot in and RU cement equipment. TIH and tag TOC at 2180'. Circulate well clean. Spot plugs #4, #5 and #6. Cut off wellhead. Spot plug #7 top off casings and install P&A marker with coordinates 36° 41' 46" N/ 107° 58' 26" W. RD and MOL. P&A Ops witness by M. Kuehling w/ NMOCD

Spud Date: Rig R[elease Date:]

PNR only

Approved for plugging of wellbore only. Liability under bond is retained pending Receipt of C-103 (Subsequent Report of Well Plugging) which may be found @ OCD web page under forms www.emnrd.state.us/ocd

OIL CONS. DIV DIST. 3
NOV 23 2015

I hereby certify that the information above is true and complet[e]

SIGNATURE [signature] TITLE Agent / Engineer DATE 11/18/2015

Type or print name John Thompson E-mail address: johnewalsheng.net PHONE: 505-320-1748

For State Use Only

APPROVED BY: [signature] TITLE DEPUTY OIL & GAS INSPECTOR DISTRICT #3 DATE 12/1/15

Conditions of Approval (if any):

RV

OIL CONS. DIV DIST. 3
SEP 25 2015

Submit 1 Copy To Appropriate District Office
District I – (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II – (575) 748-1283
811 S. First St., Artesia, NM 88210
District III – (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV – (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised August 1, 2011

	WELL API NO. 30-045-29002-00
	5. Indicate Type of Lease STATE ☐ FEE ☒
	6. State Oil & Gas Lease No. 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.)	7. Lease Name or Unit Agreement Name Disposal
1. Type of Well: Oil Well ☐ Gas Well ☒ Other – (Disposal Well)	8. Well Number: #001
2. Name of Operator San Juan Refining Co. / Western Refining Southwest, Inc. – Bloomfield Refinery	9. OGRID Number: 037218
3. Address of Operator # 50 Road 4990, Bloomfield, NM, 87413	10. Pool name or Wildcat: Blanco/Mesa Verde
4. Well Location Unit Letter I : 2442 feet from the south line and 1250 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.)*

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.

Spud Date: Rig Release Date:

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE [signature] TITLE Environmental Coordinator DATE 9/24/15

Type or print name Matthew Krakow E-mail address: matt.krakow@wnr.com PHONE: 505-632-4169

For State Use Only

APPROVED BY: [signature] TITLE DEPUTY OIL & GAS INSPECTOR DISTRICT #3 DATE SEP 25 2015

Conditions of Approval (if any):

APPENDIX B

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
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 **Matrix:** AQUEOUS

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 2-17-15
Lab ID: 1502723-001 **Matrix:** AQUEOUS

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						Analyst: **DAM**	
2-Chloronaphthalene	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
2-Chlorophenol	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
4-Chlorophenyl phenyl ether	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
Chrysene	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
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
Dibenz(a,h)anthracene	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
Dibenzofuran	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
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	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
3,3'-Dichlorobenzidine	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
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	1	2/23/2015 4:43:18 PM	17825
2,4-Dimethylphenol	17	10		µg/L	1	2/23/2015 4:43:18 PM	17825
4,6-Dinitro-2-methylphenol	ND	20		µg/L	1	2/23/2015 4:43:18 PM	17825
2,4-Dinitrophenol	ND	20		µg/L	1	2/23/2015 4:43:18 PM	17825
2,4-Dinitrotoluene	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
2,6-Dinitrotoluene	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
Fluoranthene	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
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
Hexachloroethane	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
Indeno(1,2,3-cd)pyrene	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
Isophorone	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
1-Methylnaphthalene	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
2-Methylnaphthalene	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
2-Methylphenol	55	10		µg/L	1	2/23/2015 4:43:18 PM	17825
3+4-Methylphenol	79	10		µg/L	1	2/23/2015 4:43:18 PM	17825
N-Nitrosodi-n-propylamine	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
N-Nitrosodimethylamine	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
N-Nitrosodiphenylamine	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
Naphthalene	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
2-Nitroaniline	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
3-Nitroaniline	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
4-Nitroaniline	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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

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 8270C: SEMIVOLATILES						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	17825
Pyrene	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
Pyridine	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
1,2,4-Trichlorobenzene	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
2,4,5-Trichlorophenol	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
2,4,6-Trichlorophenol	ND	10		µg/L	1	2/23/2015 4:43:18 PM	17825
Surr: 2-Fluorophenol	42.5	17.6-104		%REC	1	2/23/2015 4:43:18 PM	17825
Surr: Phenol-d5	52.5	17.7-89.9		%REC	1	2/23/2015 4:43:18 PM	17825
Surr: 2,4,6-Tribromophenol	62.3	16.3-122		%REC	1	2/23/2015 4:43:18 PM	17825
Surr: Nitrobenzene-d5	83.4	45.3-117		%REC	1	2/23/2015 4:43:18 PM	17825
Surr: 2-Fluorobiphenyl	72.8	43-113		%REC	1	2/23/2015 4:43:18 PM	17825
Surr: 4-Terphenyl-d14	43.6	47.6-122	S	%REC	1	2/23/2015 4:43:18 PM	17825
EPA METHOD 8260B: VOLATILES						Analyst: **cadg**	
Benzene	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
Toluene	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
Ethylbenzene	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
Methyl tert-butyl ether (MTBE)	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
1,2,4-Trimethylbenzene	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
1,3,5-Trimethylbenzene	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
1,2-Dichloroethane (EDC)	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
1,2-Dibromoethane (EDB)	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
Naphthalene	ND	10		µg/L	5	2/26/2015 12:27:45 PM	R24544
1-Methylnaphthalene	ND	20		µg/L	5	2/26/2015 12:27:45 PM	R24544
2-Methylnaphthalene	ND	20		µg/L	5	2/26/2015 12:27:45 PM	R24544
Acetone	500	50		µg/L	5	2/26/2015 12:27:45 PM	R24544
Bromobenzene	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
Bromodichloromethane	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
Bromoform	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
Bromomethane	ND	15		µg/L	5	2/26/2015 12:27:45 PM	R24544
2-Butanone	ND	50		µg/L	5	2/26/2015 12:27:45 PM	R24544
Carbon disulfide	ND	50		µg/L	5	2/26/2015 12:27:45 PM	R24544
Carbon Tetrachloride	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
Chlorobenzene	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
Chloroethane	ND	10		µg/L	5	2/26/2015 12:27:45 PM	R24544

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 2-17-15
Lab ID: 1502723-001 **Matrix:** AQUEOUS

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 8260B: VOLATILES						Analyst: **cadg**	
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-Chlorotoluene	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
4-Chlorotoluene	ND	5.0		µg/L	5	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		µg/L	5	2/26/2015 12:27:45 PM	R24544
1,2-Dibromo-3-chloropropane	ND	10		µg/L	5	2/26/2015 12:27:45 PM	R24544
Dibromochloromethane	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
Dibromomethane	ND	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
1,3-Dichlorobenzene	ND	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		µg/L	5	2/26/2015 12:27:45 PM	R24544
1,1-Dichloroethene	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
1,2-Dichloropropane	ND	5.0		µg/L	5	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
2,2-Dichloropropane	ND	10		µg/L	5	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		µg/L	5	2/26/2015 12:27:45 PM	R24544
4-Methyl-2-pentanone	ND	50		µg/L	5	2/26/2015 12:27:45 PM	R24544
Methylene Chloride	ND	15		µg/L	5	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		µg/L	5	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		µg/L	5	2/26/2015 12:27:45 PM	R24544
trans-1,3-Dichloropropene	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
1,2,3-Trichlorobenzene	ND	5.0		µg/L	5	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	5	2/26/2015 12:27:45 PM	R24544

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

Qualifiers:

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

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						Analyst: **cadg**	
Trichloroethene (TCE)	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
Trichlorofluoromethane	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
1,2,3-Trichloropropane	ND	10		µg/L	5	2/26/2015 12:27:45 PM	R24544
Vinyl chloride	ND	5.0		µg/L	5	2/26/2015 12:27:45 PM	R24544
Xylenes, Total	ND	7.5		µg/L	5	2/26/2015 12:27:45 PM	R24544
Surr: 1,2-Dichloroethane-d4	101	70-130		%REC	5	2/26/2015 12:27:45 PM	R24544
Surr: 4-Bromofluorobenzene	103	70-130		%REC	5	2/26/2015 12:27:45 PM	R24544
Surr: Dibromofluoromethane	101	70-130		%REC	5	2/26/2015 12:27:45 PM	R24544
Surr: Toluene-d8	98.7	70-130		%REC	5	2/26/2015 12:27:45 PM	R24544
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **JRR**	
Conductivity	2900	0.010		µmhos/cm	1	2/18/2015 12:49:27 PM	R24379
SM4500-H+B: PH						Analyst: **JRR**	
pH	7.19	1.68	H	pH units	1	2/18/2015 12:49:27 PM	R24379
SM2320B: ALKALINITY						Analyst: **JRR**	
Bicarbonate (As CaCO3)	300	20		mg/L CaCO3	1	2/18/2015 12:49:27 PM	R24379
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	2/18/2015 12:49:27 PM	R24379
Total Alkalinity (as CaCO3)	300	20		mg/L CaCO3	1	2/18/2015 12:49:27 PM	R24379
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

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 #: 150219026
Project Name: 1502723

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	SW846 CH7	
Flashpoint	>200	°F		2/25/2015	KFG	EPA 1010	
pH	7.13	ph Units		2/20/2015	KJS	SM 4500pH-B	
Sulfide	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

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

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 #: 150219026
Project Name: 1502723

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Sulfide	0.200	mg/L	0.2	100.0	70-130	3/3/2015	3/3/2015
Reactive sulfide	0.200	mg/L	0.2	100.0	70-130	3/3/2015	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	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
150219026-001	Reactive sulfide	ND	0.727	mg/L	0.91	79.9	70-130	3/3/2015	3/3/2015
150219026-001	Cyanide (reactive)	ND	0.953	mg/L	1	95.3	80-120	2/24/2015	2/24/2015

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide (reactive)	0.955	mg/L	1	95.5	0.2	0-25	2/24/2015	2/24/2015

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide (reactive)	ND	mg/L	1	2/24/2015	2/24/2015
Reactive sulfide	ND	mg/L	1	3/3/2015	3/3/2015
Sulfide	ND	mg/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 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502723**

16-Mar-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 2-17-15

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R24392**	RunNo: **24392**
Prep Date:	Analysis Date: **2/18/2015**	SeqNo: **718760** 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: **LCSW**	Batch ID: **R24392**	RunNo: **24392**
Prep Date:	Analysis Date: **2/18/2015**	SeqNo: **718761** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.8	0.50	5.000	0	96.3	90	110			
Sulfate	9.9	0.50	10.00	0	98.6	90	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 Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R24544**	RunNo: **24544**
Prep Date:	Analysis Date: **2/26/2015**	SeqNo: **722682** 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 Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R24544**	RunNo: **24544**
Prep Date:	Analysis Date: **2/26/2015**	SeqNo: **722682** 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-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			
Surr: Toluene-d8	9.8		10.00		97.8	70	130			

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R24544**	RunNo: **24544**
Prep Date:	Analysis Date: **2/26/2015**	SeqNo: **722684** Units: **µg/L**

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502723**

16-Mar-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 2-17-15

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R24544**	RunNo: **24544**
Prep Date:	Analysis Date: **2/26/2015**	SeqNo: **722684** 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	75.6	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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **17825**	RunNo: **24458**
Prep Date: **2/20/2015**	Analysis Date: **2/23/2015**	SeqNo: **720293** 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 Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **17825**	RunNo: **24458**
Prep Date: **2/20/2015**	Analysis Date: **2/23/2015**	SeqNo: **720293** 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	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			
Surr: Nitrobenzene-d5	81		100.0		81.4	45.3	117			
Surr: 2-Fluorobiphenyl	82		100.0		82.2	43	113			
Surr: 4-Terphenyl-d14	60		100.0		60.2	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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502723**

16-Mar-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 2-17-15

Sample ID **lcs-17825**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **17825**	RunNo: **24458**
Prep Date: **2/20/2015**	Analysis Date: **2/23/2015**	SeqNo: **720294** 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 **lcsd-17825**	SampType: **LCSD**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSS02**	Batch ID: **17825**	RunNo: **24458**
Prep Date: **2/20/2015**	Analysis Date: **2/23/2015**	SeqNo: **720295** Units: **µg/L**

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
- 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502723**

16-Mar-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 2-17-15

Sample ID	**lcsd-17825**	SampType: **LCSD**		TestCode: **EPA Method 8270C: Semivolatiles**					
Client ID:	**LCSS02**	Batch ID: **17825**		RunNo: **24458**					
Prep Date:	**2/20/2015**	Analysis Date: **2/23/2015**		SeqNo: **720295**	Units: **µg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	72		100.0		72.5	47.6	122	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 Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502723**

16-Mar-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 2-17-15

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

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

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
Conductivity	2900	0.010						0.349	20	

Qualifiers:

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

QC SUMMARY REPORT

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**	Batch ID: **17887**	RunNo: **24523**
Prep Date: **2/25/2015**	Analysis Date: **2/26/2015**	SeqNo: **722178** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID **LCS-17887**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **17887**	RunNo: **24523**
Prep Date: **2/25/2015**	Analysis Date: **2/26/2015**	SeqNo: **722179** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0051	0.00020	0.005000	0	102	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 Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **17834**	RunNo: **24435**
Prep Date: **2/20/2015**	Analysis Date: **2/21/2015**	SeqNo: **719770** 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**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **17834**	RunNo: **24435**
Prep Date: **2/20/2015**	Analysis Date: **2/21/2015**	SeqNo: **719771** 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.
- 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502723**

16-Mar-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 2-17-15

Sample ID	**1502723-001c dup**	SampType:	**DUP**	TestCode:	**SM4500-H+B: pH**					
Client ID:	**Injection Well**	Batch ID:	**R24379**	RunNo:	**24379**					
Prep Date:		Analysis Date:	**2/18/2015**	SeqNo:	**718422**	Units:	**pH units**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.22	1.68								H

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

QC SUMMARY REPORT

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**
Client ID: **PBW**	Batch ID: **R24379**	RunNo: **24379**
Prep Date:	Analysis Date: **2/18/2015**	SeqNo: **718434** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**
Client ID: **LCSW**	Batch ID: **R24379**	RunNo: **24379**
Prep Date:	Analysis Date: **2/18/2015**	SeqNo: **718435** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	99.7	90	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 Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1502723**

16-Mar-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 2-17-15

Sample ID **MB-17793**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **17793**	RunNo: **24408**
Prep Date: **2/18/2015**	Analysis Date: **2/19/2015**	SeqNo: **718999** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-17793**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **17793**	RunNo: **24408**
Prep Date: **2/18/2015**	Analysis Date: **2/19/2015**	SeqNo: **719000** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1020	20.0	1000	0	102	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 Not In Range
- RL Reporting Detection Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 Number: 1502723 RcptNo: 1

Received by/date: [illegible] 02/18/15

Logged By: Ashley Gallegos 2/18/2015 8:00:00 AM AG

Completed By: Ashley Gallegos 2/18/2015 8:45:45 AM AG

Reviewed By: CS 02/18/15

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		

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 ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: 1 2 3 (<2 or >12 unless noted)
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted? No
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: _____ 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	1.7	Good	Yes			

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4135

email or Fax#:

QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Injection Well 2-17-15

Project #:

Project Manager:

Sampler: Bob
On Ice: ☒ Yes ☐ No
Sample Temperature: 1.7

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1502723
2-17-15	11:20	H2O	Injection Well	3-VOA	HCl	-001
				1-Liter	amber	
				1-500ml		
				1-500ml		
				1-250ml	H2SO4	
				1-500ml	HNO3	
				1-500ml	NaOH	
				1-50ml	Zn-Acetate	

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	~~TPH (Method 418.1)~~ TDS	~~EDB (Method 504.1)~~ Backup	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F,Cl,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Eq, pH, SO4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
			X						X						
										X					
											X				
			X	X									X		
			X	X											
						X									
												X			
														X	

Date:	Time:	Relinquished by:	Received by:	Date	Time
2-17-15	1612	Robert Krakow	Christie Walters	2/17/15	1612
2/17/15	1750	Christie Walters		02/18/15	0800

Remarks: Per BK - analyze for RCI
AT 02/18/15

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.

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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
4901 Hawkins NE
Albuquerque, NM 87109

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well
Lab ID: 1504086-001 **Matrix:** AQUEOUS

Client Sample ID: Injection Well
Collection Date: 4/1/2015 10:15:00 AM
Received Date: 4/2/2015 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **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	ND	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:

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

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: SEMIVOLATILES						Analyst: **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						Analyst: **DJF**	
Benzene	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
Toluene	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
Ethylbenzene	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
Methyl tert-butyl ether (MTBE)	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
1,2,4-Trimethylbenzene	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
1,3,5-Trimethylbenzene	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
1,2-Dichloroethane (EDC)	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
1,2-Dibromoethane (EDB)	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
Naphthalene	ND	10		µg/L	5	4/2/2015 8:23:27 PM	R25251
1-Methylnaphthalene	ND	20		µg/L	5	4/2/2015 8:23:27 PM	R25251
2-Methylnaphthalene	ND	20		µg/L	5	4/2/2015 8:23:27 PM	R25251
Acetone	76	50		µg/L	5	4/2/2015 8:23:27 PM	R25251
Bromobenzene	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
Bromodichloromethane	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
Bromoform	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
Bromomethane	ND	15		µg/L	5	4/2/2015 8:23:27 PM	R25251
2-Butanone	ND	50		µg/L	5	4/2/2015 8:23:27 PM	R25251
Carbon disulfide	ND	50		µg/L	5	4/2/2015 8:23:27 PM	R25251
Carbon Tetrachloride	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
Chlorobenzene	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
Chloroethane	ND	10		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:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well
Lab ID: 1504086-001 **Matrix:** AQUEOUS

Client Sample ID: Injection Well
Collection Date: 4/1/2015 10:15:00 AM
Received Date: 4/2/2015 7:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **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:

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

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 8260B: VOLATILES						Analyst: **DJF**	
Trichloroethene (TCE)	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
Trichlorofluoromethane	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
1,2,3-Trichloropropane	ND	10		µg/L	5	4/2/2015 8:23:27 PM	R25251
Vinyl chloride	ND	5.0		µg/L	5	4/2/2015 8:23:27 PM	R25251
Xylenes, Total	ND	7.5		µg/L	5	4/2/2015 8:23:27 PM	R25251
Surr: 1,2-Dichloroethane-d4	91.2	70-130		%REC	5	4/2/2015 8:23:27 PM	R25251
Surr: 4-Bromofluorobenzene	87.3	70-130		%REC	5	4/2/2015 8:23:27 PM	R25251
Surr: Dibromofluoromethane	101	70-130		%REC	5	4/2/2015 8:23:27 PM	R25251
Surr: Toluene-d8	91.7	70-130		%REC	5	4/2/2015 8:23:27 PM	R25251
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **JRR**	
Conductivity	4900	0.010		µmhos/cm	1	4/3/2015 3:32:30 PM	R25315
SM4500-H+B: PH						Analyst: **JRR**	
pH	6.94	1.68	H	pH units	1	4/3/2015 3:32:30 PM	R25315
SM2320B: ALKALINITY						Analyst: **JRR**	
Bicarbonate (As CaCO3)	358.6	20.00		mg/L CaCO3	1	4/3/2015 3:32:30 PM	R25315
Carbonate (As CaCO3)	ND	2.000		mg/L CaCO3	1	4/3/2015 3:32:30 PM	R25315
Total Alkalinity (as CaCO3)	358.6	20.00		mg/L CaCO3	1	4/3/2015 3:32:30 PM	R25315
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	2890	200	*	mg/L	1	4/3/2015 3:48:00 PM	18487

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

Qualifiers:

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

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

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
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 150403019
Project Name: 1504086

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Cyanide (reactive)	0.555	mg/L	0.5	111.0	80-120	4/8/2015	4/8/2015
Reactive sulfide	0.2	mg/L	0.2	100.0	70-130	4/6/2015	4/6/2015

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
150403019-001A	Reactive sulfide	0.872	1.60	mg/L	0.73	99.7	70-130	4/6/2015	4/6/2015
150403019-001	Cyanide (reactive)	ND	0.464	mg/L	0.5	92.8	80-120	4/8/2015	4/8/2015

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide (reactive)	0.447	mg/L	0.5	89.4	3.7	0-25	4/8/2015	4/8/2015

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide (reactive)	ND	mg/L	1	4/8/2015	4/8/2015
Reactive sulfide	ND	mg/L	0.5	4/6/2015	4/6/2015

AR	Acceptable Range
ND	Not Detected
PQL	Practical Quantitation Limit
RPD	Relative Percentage Difference

Comments:

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504086**

28-Apr-15

Client: Western Refining Southwest, Inc.

Project: Injection Well

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
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
Chloride	ND	0.50								
Sulfate	ND	0.50								

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504086**

28-Apr-15

Client: Western Refining Southwest, Inc.

Project: Injection Well

Sample ID **5ml rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R25251**	RunNo: **25251**
Prep Date:	Analysis Date: **4/2/2015**	SeqNo: **746628** 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 Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504086**

28-Apr-15

Client: Western Refining Southwest, Inc.

Project: Injection Well

Sample ID **5ml rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R25251**	RunNo: **25251**
Prep Date:	Analysis Date: **4/2/2015**	SeqNo: **746628** 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-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	9.0		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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504086**

28-Apr-15

Client: Western Refining Southwest, Inc.

Project: Injection Well

Sample ID **mb-18572**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **18572**	RunNo: **25381**
Prep Date: **4/8/2015**	Analysis Date: **4/8/2015**	SeqNo: **751155** 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 Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504086**

28-Apr-15

Client: Western Refining Southwest, Inc.

Project: Injection Well

Sample ID **mb-18572**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **18572**	RunNo: **25381**
Prep Date: **4/8/2015**	Analysis Date: **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								
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	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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504086**

28-Apr-15

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**						
Prep Date: **4/13/2015**	Analysis Date: **4/13/2015**			SeqNo: **754166**		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 Not In Range
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1504086**

28-Apr-15

Client: Western Refining Southwest, Inc.

Project: Injection Well

Sample ID **MB-18515**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **18515**	RunNo: **25295**
Prep Date: **4/3/2015**	Analysis Date: **4/4/2015**	SeqNo: **747966** 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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

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**							
Prep Date:	Analysis Date: **4/3/2015**	SeqNo: **748965**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20.00								

Sample ID **mb-2**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R25315**	RunNo: **25315**							
Prep Date:	Analysis Date: **4/3/2015**	SeqNo: **748989**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20.00								

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

QC SUMMARY REPORT

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	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **1504086-001BMS**	SampType: **MS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
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	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	13000	200	10000	2890	101	80	120			

Sample ID **1504086-001BMSD**	SampType: **MSD**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **Injection Well**	Batch ID: **18487**	RunNo: **25292**
Prep Date: **4/2/2015**	Analysis Date: **4/3/2015**	SeqNo: **747864** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	13100	200	10000	2890	102	80	120	0.841	5	

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 Number: 1504086 RcptNo: 1

Received by/date: AT 04/02/15

Logged By: Lindsay Mangin 4/2/2015 7:00:00 AM

Completed By: Lindsay Mangin 4/2/2015 9:21:57 AM

Reviewed By: 04/02/15

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		

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 ☐ (2 of 3 and 3 of 3 have bubbles. -CS 04/02/15)
10. VOA vials have zero headspace? (CS 04/02/15 Sample -001A)	Yes ☑	No ☑	No VOA Vials ☐
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: 1, 2 (<2 or >12 unless noted)
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted? No
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: CS

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: _____

Client Instructions: _____

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.0	Good	Yes			

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4135

email or Fax#:

QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name:
Injection Well 4-1-15

Project #:
PO #1261263

Project Manager:

Sampler: Bob
On Ice: ☒ Yes ☐ No
Sample Temperature: 1.0

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1504086
4-1-15	10:15	H_2O	Injection Well	3-VOA	HCl	-001
				1-liter	amber	-001
				1-500ml		-001
				1-500ml		-001
				1-120ml	H_2SO_4	-001
				1-500ml	HNO_3	-001
				1-500ml	NaOH	-001
				1-500ml	2N Acetate	-001

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TDS	BACKUP	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Ec, pH, SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
									X						
										X					
											X				
				X									X		
					X										
						X									
												X			
														X	

Date:	Time:	Relinquished by:	Received by:	Date	Time
4-1-15	1624	Robert Krakow	Mistie Waelen	4/1/15	1624
4/1/15	1825	Mistie Waelen		4/1/15	1704

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.

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

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 OrderNo.: 1507094

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
4901 Hawkins NE
Albuquerque, NM 87109

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	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						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**	
pH	7.45	1.68	H	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: SEMIVOLATILES						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.

Qualifiers:

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

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES						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

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 7-1-15
Lab ID: 1507094-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES						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.

Qualifiers:

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

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **BCN**	
1-Methylnaphthalene	ND	4.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
2-Methylnaphthalene	ND	4.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
Acetone	72	10		µg/L	1	7/9/2015 8:19:52 PM	R27397
Bromobenzene	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
Bromodichloromethane	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
Bromoform	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
Bromomethane	ND	3.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
2-Butanone	11	10		µg/L	1	7/9/2015 8:19:52 PM	R27397
Carbon disulfide	ND	10		µg/L	1	7/9/2015 8:19:52 PM	R27397
Carbon Tetrachloride	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
Chlorobenzene	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
Chloroethane	ND	2.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
Chloroform	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
Chloromethane	ND	3.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
2-Chlorotoluene	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
4-Chlorotoluene	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
cis-1,2-DCE	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
Dibromochloromethane	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
Dibromomethane	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
1,2-Dichlorobenzene	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
1,3-Dichlorobenzene	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
1,4-Dichlorobenzene	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
Dichlorodifluoromethane	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
1,1-Dichloroethane	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
1,1-Dichloroethene	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
1,2-Dichloropropane	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
1,3-Dichloropropane	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
2,2-Dichloropropane	ND	2.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
1,1-Dichloropropene	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
Hexachlorobutadiene	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
2-Hexanone	ND	10		µg/L	1	7/9/2015 8:19:52 PM	R27397
Isopropylbenzene	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
4-Isopropyltoluene	ND	1.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
4-Methyl-2-pentanone	ND	10		µg/L	1	7/9/2015 8:19:52 PM	R27397
Methylene Chloride	ND	3.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
n-Butylbenzene	ND	3.0		µg/L	1	7/9/2015 8:19:52 PM	R27397
n-Propylbenzene	ND	1.0		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.

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 7-1-15
Lab ID: 1507094-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **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.

Qualifiers:

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

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 #: 150707035
Project Name: 1507094

Analytical Results Report

Sample Number 150707035-001 **Sampling Date** 7/1/2015 **Date/Time Received** 7/7/2015 11:00 AM
Client Sample ID 1507094-001E / INJECTION WELL **Sampling Time** 9:00 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	1	7/15/2015	CRW	SW846 CH7	
Flashpoint	>200	°F		7/15/2015	KFG	EPA 1010	
pH	7.36	ph Units		7/8/2015	KMC	SM 4500pH-B	
Reactive sulfide	ND	mg/L	1	7/15/2015	HSW	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

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):E87893; ID:ID00013; MT CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00159; WA:C585; MT Cert0095; FL(NELAP):E871099

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 #: 150707035
Project Name: 1507094

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Reactive sulfide	0.816	mg/L	0.907	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

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
150707035-001A	Reactive sulfide	ND	0.816	mg/L	0.907	90.0	70-130	7/15/2015	7/15/2015
150707035-001	Cyanide (reactive)	ND	0.462	mg/L	0.5	92.4	80-120	7/15/2015	7/15/2015

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide (reactive)	0.454	mg/L	0.5	90.8	1.7	0-25	7/15/2015	7/15/2015

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide (reactive)	ND	mg/L	1	7/15/2015	7/15/2015
Reactive sulfide	ND	mg/L	1	7/15/2015	7/15/2015

AR Acceptable Range
ND 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 Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1507094**

06-Aug-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 7-1-15

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R27295**	RunNo: **27295**
Prep Date:	Analysis Date: **7/2/2015**	SeqNo: **817819** 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: **LCSW**	Batch ID: **R27295**	RunNo: **27295**
Prep Date:	Analysis Date: **7/2/2015**	SeqNo: **817820** 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			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1507094**

06-Aug-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 7-1-15

Sample ID **100ng LCS**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R27397**	RunNo: **27397**
Prep Date:	Analysis Date: **7/9/2015**	SeqNo: **822125** 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			

Sample ID **rb1**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R27397**	RunNo: **27397**
Prep Date:	Analysis Date: **7/9/2015**	SeqNo: **822418** 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								

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1507094**

06-Aug-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 7-1-15

Sample ID **rb1**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R27397**	RunNo: **27397**
Prep Date:	Analysis Date: **7/9/2015**	SeqNo: **822418** Units: **µg/L**

Analyte	Result	PQL	SPK 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-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								

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1507094**

06-Aug-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 7-1-15

Sample ID **rb1**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R27397**	RunNo: **27397**
Prep Date:	Analysis Date: **7/9/2015**	SeqNo: **822418** 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:

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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **20095**	RunNo: **27414**
Prep Date: **7/6/2015**	Analysis Date: **7/10/2015**	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								

Qualifiers:

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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **20095**	RunNo: **27414**
Prep Date: **7/6/2015**	Analysis Date: **7/10/2015**	SeqNo: **822558** 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	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:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1507094**

06-Aug-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 7-1-15

Sample ID **lcs-20095**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **20095**	RunNo: **27414**
Prep Date: **7/6/2015**	Analysis Date: **7/10/2015**	SeqNo: **822559** 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 **lcsd-20095**	SampType: **LCSD**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSS02**	Batch ID: **20095**	RunNo: **27414**
Prep Date: **7/6/2015**	Analysis Date: **7/10/2015**	SeqNo: **822560** 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.
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P Sample pH Not In Range
- R RPD outside accepted recovery limits
- RL Reporting Detection Limit
- S % Recovery outside of range due to dilution or matrix

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1507094**

06-Aug-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 7-1-15

Sample ID **lcsd-20095**	SampType: **LCSD**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSS02**	Batch ID: **20095**	RunNo: **27414**
Prep Date: **7/6/2015**	Analysis Date: **7/10/2015**	SeqNo: **822560** 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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **20218**	RunNo: **27531**
Prep Date: **7/13/2015**	Analysis Date: **7/15/2015**	SeqNo: **826536** Units: **%REC**

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 **lcs-20218**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **20218**	RunNo: **27531**
Prep Date: **7/13/2015**	Analysis Date: **7/15/2015**	SeqNo: **826537** Units: **%REC**

Analyte	Result	PQL	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 **lcsd-20218**	SampType: **LCSD**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSS02**	Batch ID: **20218**	RunNo: **27531**
Prep Date: **7/13/2015**	Analysis Date: **7/15/2015**	SeqNo: **826538** Units: **%REC**

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

QC SUMMARY REPORT

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**				
Prep Date:		Analysis Date:	**7/6/2015**	SeqNo:	**819171**	Units:	**µmhos/cm**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	2000	0.010						0.0491	20	

Qualifiers:

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

QC SUMMARY REPORT

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**
Client ID: **PBW**	Batch ID: **20158**	RunNo: **27365**
Prep Date: **7/8/2015**	Analysis Date: **7/8/2015**	SeqNo: **820590** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID **LCS-20158**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **20158**	RunNo: **27365**
Prep Date: **7/8/2015**	Analysis Date: **7/8/2015**	SeqNo: **820591** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0051	0.00020	0.005000	0	102	80	120			

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**	SeqNo: **820635** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0059	0.0010	0.005000	0	118	75	125			

Sample ID **1507094-001DMSD**	SampType: **MSD**	TestCode: **EPA Method 7470: Mercury**
Client ID: **Injection Well**	Batch ID: **20158**	RunNo: **27365**
Prep Date: **7/8/2015**	Analysis Date: **7/8/2015**	SeqNo: **820638** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0058	0.0010	0.005000	0	116	75	125	1.62	20	

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1507094**

06-Aug-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 7-1-15

Sample ID **MB-20102**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **20102**	RunNo: **27378**
Prep Date: **7/6/2015**	Analysis Date: **7/9/2015**	SeqNo: **821352** 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								
Calcium	ND	1.0								
Lead	ND	0.0050								
Magnesium	ND	1.0								
Potassium	ND	1.0								
Sodium	ND	1.0								

Sample ID **LCS-20102**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **20102**	RunNo: **27378**
Prep Date: **7/6/2015**	Analysis Date: **7/9/2015**	SeqNo: **821353** 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**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **20102**	RunNo: **27491**
Prep Date: **7/6/2015**	Analysis Date: **7/14/2015**	SeqNo: **824974** 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**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **20102**	RunNo: **27491**
Prep Date: **7/6/2015**	Analysis Date: **7/14/2015**	SeqNo: **824975** 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**	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

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1507094**

06-Aug-15

Client: Western Refining Southwest, Inc.

Project: 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**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.50	0.0020	0.5000	0	101	80	120			
Selenium	0.50	0.050	0.5000	0	99.7	80	120			
Silver	0.10	0.0050	0.1000	0	105	80	120			

Qualifiers:

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

QC SUMMARY REPORT

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: **SM4500-H+B: pH**						
Client ID: **Injection Well**	Batch ID: **R27329**			RunNo: **27329**						
Prep Date:	Analysis Date: **7/6/2015**			SeqNo: **819204**		Units: **pH units**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.46	1.68								H

Qualifiers:

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

QC SUMMARY REPORT

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:	Analysis Date: **7/6/2015**	SeqNo: **819128**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20.00								

Sample ID **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R27329**	RunNo: **27329**							
Prep Date:	Analysis Date: **7/6/2015**	SeqNo: **819129**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	78.36	20.00	80.00	0	98.0	90	110			

Sample ID **mb-2**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R27329**	RunNo: **27329**							
Prep Date:	Analysis Date: **7/6/2015**	SeqNo: **819152**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20.00								

Sample ID **lcs-2**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R27329**	RunNo: **27329**							
Prep Date:	Analysis Date: **7/6/2015**	SeqNo: **819153**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	79.44	20.00	80.00	0	99.3	90	110			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1507094**

06-Aug-15

Client: Western Refining Southwest, Inc.

Project: Injection Well 7-1-15

Sample ID **MB-20129**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **20129**	RunNo: **27360**
Prep Date: **7/7/2015**	Analysis Date: **7/8/2015**	SeqNo: **820297** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-20129**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **20129**	RunNo: **27360**
Prep Date: **7/7/2015**	Analysis Date: **7/8/2015**	SeqNo: **820298** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	0	101	80	120			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 Number: 1507094 RcptNo: 1

Received by/date: AT 07/02/15

Logged By: Anne Thorne 7/2/2015 7:00:00 AM

Completed By: Anne Thorne 7/2/2015

Reviewed By: CS 07/02/15

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		

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 ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
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 ☐	

# of preserved bottles checked for pH: 2 2 (<2 or >12 unless noted)

Adjusted? —

Checked by:

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:

Client Instructions:

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.0	Good	Yes			

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4135

email or Fax#:

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other _____

☐ EDD (Type) _____

Turn-Around Time:
☒ Standard ☐ Rush _____

Project Name:
Injection Well 7-1-15

Project #:
P.O.# 126109 39

Project Manager:

Sampler: Bob
On Ice: ☒ Yes ☐ No
Sample Temperature: 1.6

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1501014
7-1-15	9:00	H_2O	injection well	5-VOA	HCl	-001
				1-liter	amber	-001
				1-500ml		-001
				1-500ml		-001
				1-125ml	H_2SO_4	-001
				1-500ml	HNO_3	-001
				1-500ml	NaOH	-001
				1-500ml	Zn Acetate	-001

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	~~TPH (Method 418.1)~~ TDS	~~EDB (Method 504.1)~~ Back up	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals Ca, Mg, Na, K	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability	Reactivity, Corrosivity	Ec, pH SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
									X						
										X					
											X				
			X										X		
				X											
						X									
												X			
														X	

Date:	Time:	Relinquished by:	Received by:	Date	Time
7-1-15	1215	Robert Bratton	Christy Walker	7/1/15	1215
7/1/15	1810	Christy Walker		07/02/15	0700

Remarks:

APPENDIX C

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

8/12/14
Date

Approved By:

Carolyn Swanson
Quality Assurance/Quality Control Officer

8/13/2014
Date

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Approved By:

8/13/14
Ian Cameron Date
Assistant Laboratory Manager

8-13-14
John Caldwell Date
Assistant Laboratory Manager
Semi-Volatiles Technical Director

8-13-14
Rene Aguilera Date
Volatiles Technical Director

8/13/14
Tiffany Shaw Date
Metals Technical Director

8/13/14
Stacey McCoy Date
Wet Chemistry Technical Director

8/13/14
Stephanie Shaffers Date
Microbiology Technical Director

Table of Contents

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 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 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, CDOCPs, 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. 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(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.

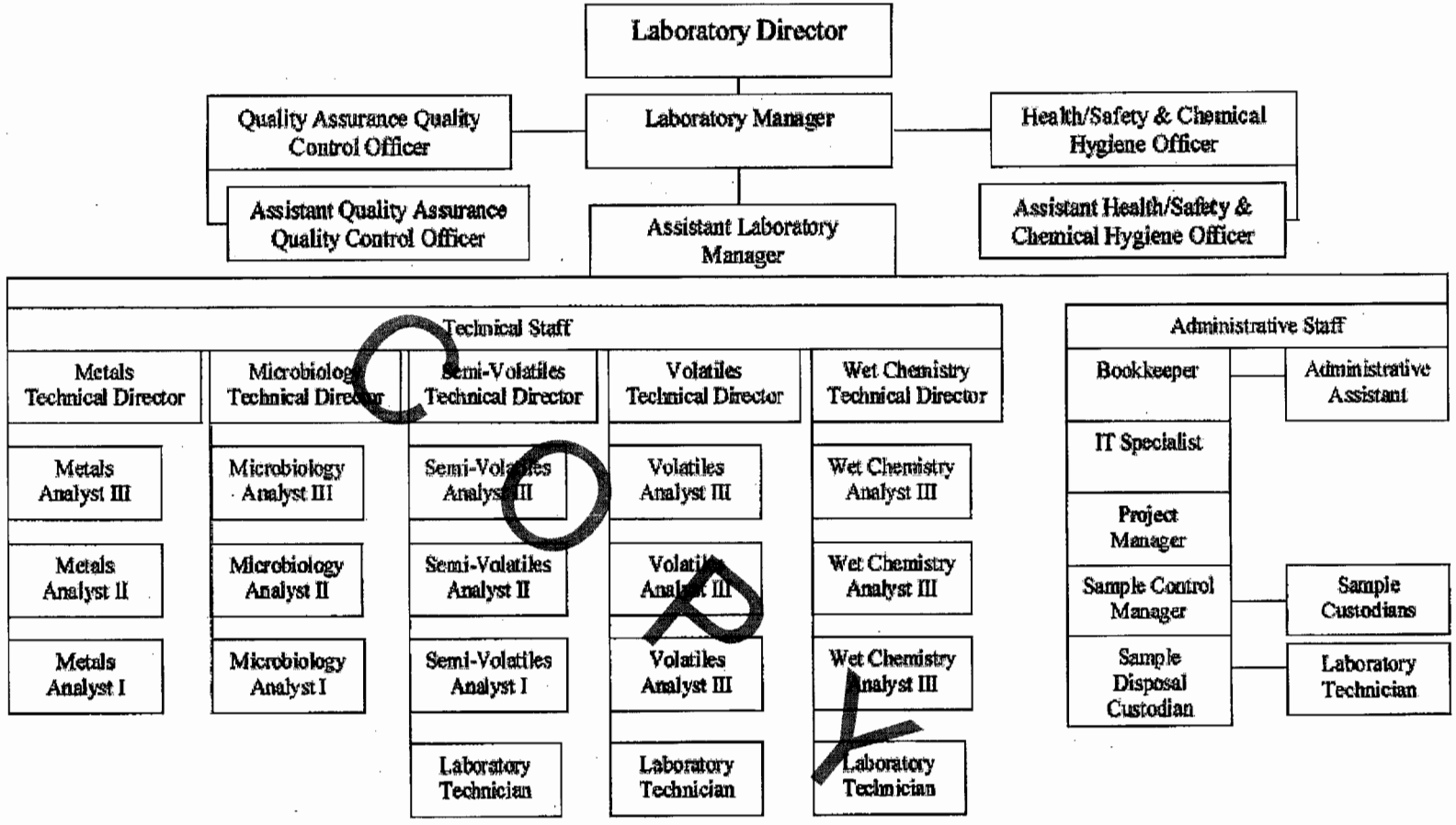
Each new employee shall be provided with data integrity training as a formal part of their new employee orientation. Each new employee will sign an ethics and data integrity agreement to ensure that they understand that data quality is our main objective. Every HEAL employee recognizes that although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



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 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"
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"
1664A	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"

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"
8015D	NPW	"Nonhalogenated Volatile Organics by Gas Chromatography"
	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"
SM4500-NH3 C	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 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 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 1MΩ 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 </= 20%.

> 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 re-extraction 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/QC 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.

$$RPD = 2 \times \frac{(\text{Sample Result} - \text{Duplicate Result})}{(\text{Sample Result} + \text{Duplicate Result})} \times 100$$

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:

$$\%Recovery = \{(concentration^* \text{ recovered})/(concentration^* \text{ added})\} \times 100$$

*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

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.

$$\text{Average} = (\Sigma x_l) / n$$

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.

$$\text{Standard deviation} = s = [\Sigma (x_i - \text{average})^2 / (n - 1)]^{1/2}$$

Percent Recovery (LCS and LCSD)

$$\text{Percent Recovery} = \frac{(\text{Spike Sample Result})}{(\text{Spike Added})} \times 100$$

Percent Recovery (MS, MSD)

$$\text{Percent Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{(\text{Spike Added})} \times 100$$

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.

$$T = \frac{x_{max} - x_{mean}}{sd} \quad \text{(for the largest value)}$$

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

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:

$$RPD = \frac{2 \times (\text{Sample Result} - \text{Duplicate Result})}{(\text{Sample Result} + \text{Duplicate Result})} \times 100$$

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:

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

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 x s) is 0.0652.

Total Nitrogen

Total nitrogen is calculated as follows:

Total Nitrogen = TKN + NO_2 + NO_3

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(°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:

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

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

$$RSD = s / RF_{AVE}$$

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
Σ = the sum of all the individual values

2. Linear Regression

$$y = mx + b$$

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)

$$CC\ (r) = \{ \Sigma((x_i - x_{ave})*(y_i - y_{ave})) \} / \{ SQRT((\Sigma(x_i - x_{ave})^2)*(\Sigma(y_i - y_{ave})^2)) \}$$

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
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

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

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:
n = number of replicate x,y pairs
x = x values
y = y values
$w = S^{-2} / (\Sigma S^{-2}/n)$
$S_{(xx)} = (\Sigma x^2w) - [(\Sigma xw)^2 / n]$
$S_{(xy)} = (\Sigma xyw) - [(\Sigma xw)*(\Sigma yw) / n]$
$S_{(xx2)} = (\Sigma x^3w) - [(\Sigma xw)*(\Sigma x^2w) / n]$
$S_{(x2y)} = (\Sigma x^2yw) - [(\Sigma x^2w)*(\Sigma yw) / n]$
$S_{(x2x2)} = (\Sigma x^4w) - [(\Sigma x^2w)^2 / n]$
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]

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

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 A_{is} and C_{is} 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 = $\frac{\text{(On-Column Conc)(Dilution)(Final Volume)}}{\text{(Initial Amount)(Injection Volume)}}$

Concentration for Purged Samples = $\frac{\text{(On-Column Conc)(Purged Amount)(Dilution)}}{\text{(Purged Amount)}}$

Dry Weight Concentration

Dry Weight Concentration = $\frac{\text{Final Concentration Wet Weight *100}}{\text{\% Solids}}$

Percent Difference

\% Difference= $\frac{\text{Absolute(Continuing Calibration RRF - Average RRF)}}{\text{Average RRF}}$ * 100

Percent Drift

\% Drift= $\frac{\text{Absolute(Calculated Concentration - Theoretical Concentration)}}{\text{Theoretical Concentration}}$ * 100

Dilution Factor

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

Relative Retention Time

RRT =RT of Compound / RT of ISTD

Breakdown Percent

$$\text{Breakdown} = \frac{\text{Area of DDD + Area of DDE}}{\text{Average (DDT, DDE and DDD)}}$$

-or-

$$\frac{\text{Area of Endrin Ketone + Area of Endrin Aldehyde}}{\text{Average (Endrin, Endrin Ketone, Endrin Aldehyde)}}$$

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 un-necessary 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
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.

14.0 References (Analytical Protocols Utilized at HEAL)

1. Analytical Chemistry of PCB's. Erickson, Mitchell D., CRC Press, Inc. 1992.

2. Diagnosis & Improvement of Saline & Alkali Soils, Agriculture Handbook No. 60, USDA, 1954

3. Environmental Perspective on the Emerging Oil Shale Industry, EPA Oil & Shale Research Group.

4. Field and Laboratory Methods Applicable to Overburdens and Mine Soils, USEPA, EPA-600/2-78-054, March 1978

5. Handbook of Chemistry and Physics, 62nd Edition, CRC Press, Inc. 1981-1982.

6. Handbook on Reference Methods for Soil Testing, The Council on Soil Testing & Plant Analysis, 1980 and 1992

7. Laboratory Procedures for Analyses of Oilfield Waste. Department of Natural Resources, Office of Conservation, Injection and Mining Division, Louisiana, August 1988

8. Langelier index calculation. http://www.corrosion-doctors.org/NaturalWaters/Langelier.htm.

9. Manual for the Certification of Laboratories Analyzing Drinking Water, Criteria and procedures Quality Assurance Fifth Edition, U.S. Environmental Protection Agency, January 2005.

10. Manual of Operating Procedures for the Analysis of Selected Soil, Water, Plant Tissue and Wastes Chemical and physical Parameter. Soil, Water, and Plant Analysis Laboratory, Dept. of Soil and Water Science, The University of Arizona, August 1989

11. The Merck Index, Eleventh Edition, Merck & Co., Inc. 1989.

12. Methods for Chemical Analysis of Water and Wastes, USEPA, EPA-600/4-79-020, March 1979 and as amended December, 1982 (EPA-600/4-82-055)

13. Methods for the Determination of Metals in Environmental Samples, USEPA, EPA-600/4-91-010, June 1991

14. Methods of Soil Analysis: Parts 1 & 2, 2nd Edition, Agronomy Society of America, Monograph 9

15. Polycyclic Aromatic Hydrocarbons in Water Systems, CRC Press, Inc.

16. Procedures for Collecting Soil Samples and Methods of Analysis for Soil Survey. USDA Soil Conservation Service, SSIR No. 1

17. Quality Systems for Analytical Services, Revision 2.2, U.S. Department of Energy, October 2006.

18. Sampling Procedures and Chemical Methods in Use at the U.S. Salinity Laboratory for Characterizing Salt-Affected Soils and Water. USDA Salinity Laboratory.

19. Soil Survey Laboratory Methods Manual. 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

21. Standard Methods for the Examination of Water and Wastewater: AOHA, AWWA, and WPCG; 20th Edition, 1999.

22. Technical Notes on Drinking Water Methods, U.S. Environmental Protection Agency, October 1994.

23. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, USEPA SW-846, 3rd Edition, Updates I, II, IIA, IIB, III, December, 1996.

Western Refining

WNR LISTED NYSE

RECEIVED OCD

2015 JAN 20 P 2:27

January 16, 2015

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

UPS Tracking #: 1Z 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
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.

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 2014

Western Refining

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

Submitted January 16, 2015

Western Refining

WNR LISTED NYSE

January 16, 2015

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

UPS Tracking #: 1Z 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
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.

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

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

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.

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 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.

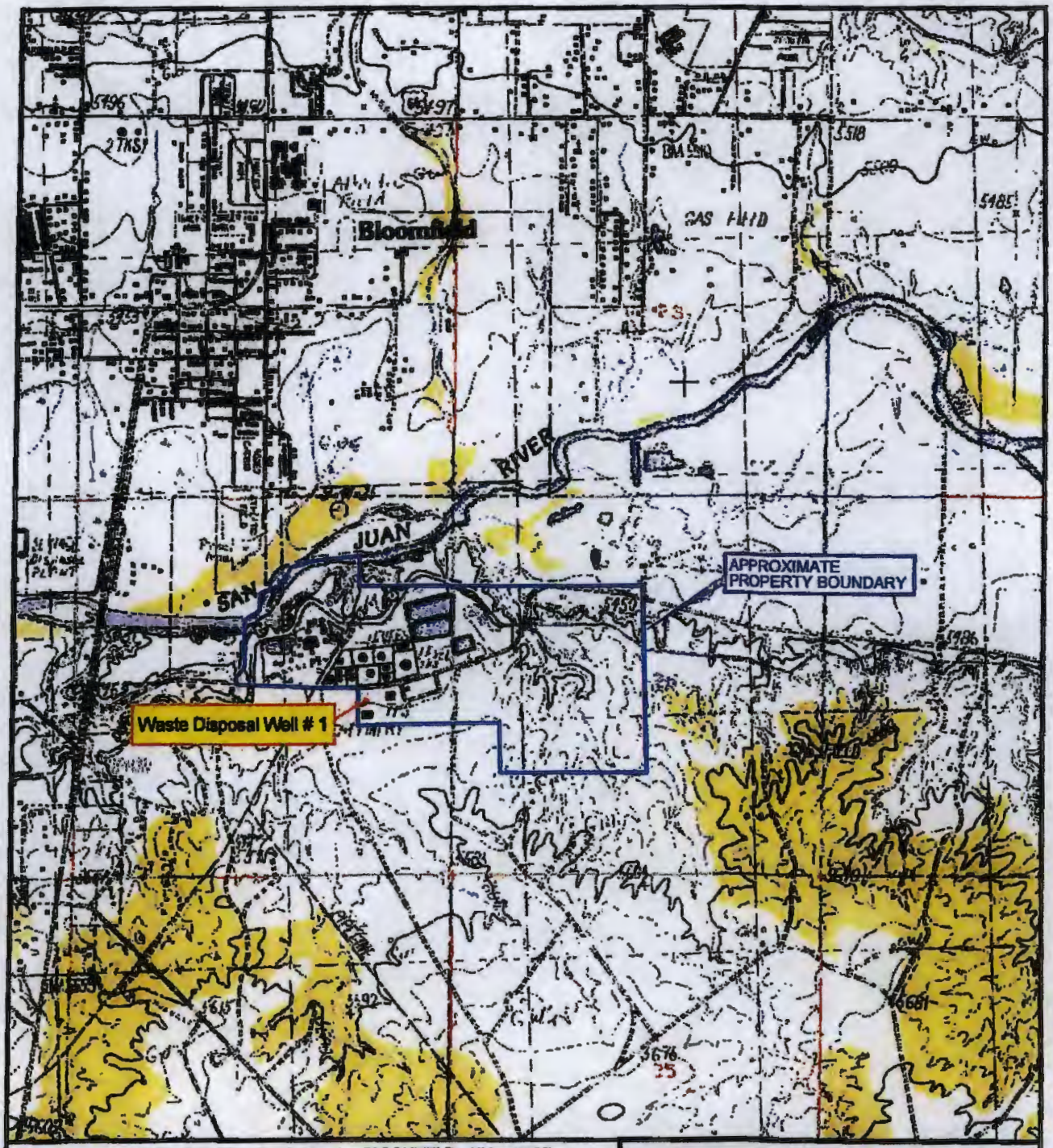
8.0 REFERENCES

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



Map Source: USGS 7.5 Min. Quad Sheet BLOOMFIELD, NM., 1985.

N

0 2000

SCALE IN FEET

NEW MEXICO

QUADRANGLE LOCATION

WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 01/06/10 | FILE: WestRef-A25

FIGURE 1

SITE LOCATION MAP

WESTERN REFINING DISPOSAL WELL #1

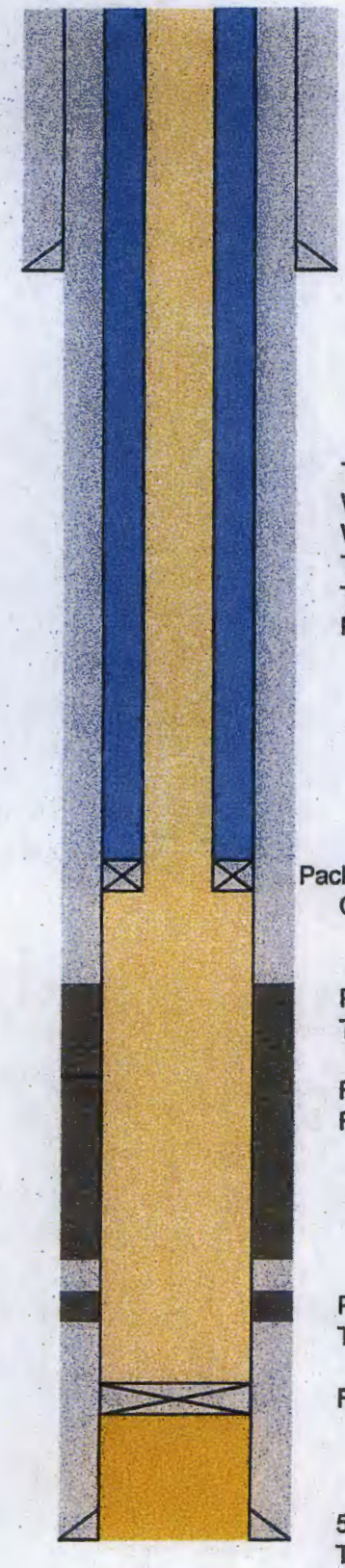
NW, SW SECTION 26, T29N, R11W

NO.: 30-045-29002

SUBSURFACE — HOUSTON, TX; SOUTH BEND, IN; BATON ROUGE, LA

FIGURE 1
DISPOSAL WELL #1 WELL SCHEMATIC
Western Refining Inc.
Bloomfield, NM

Date:	4/26/2006	Approved By:	rls	Job No.:	70F5830
Drawn By:	rls	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'

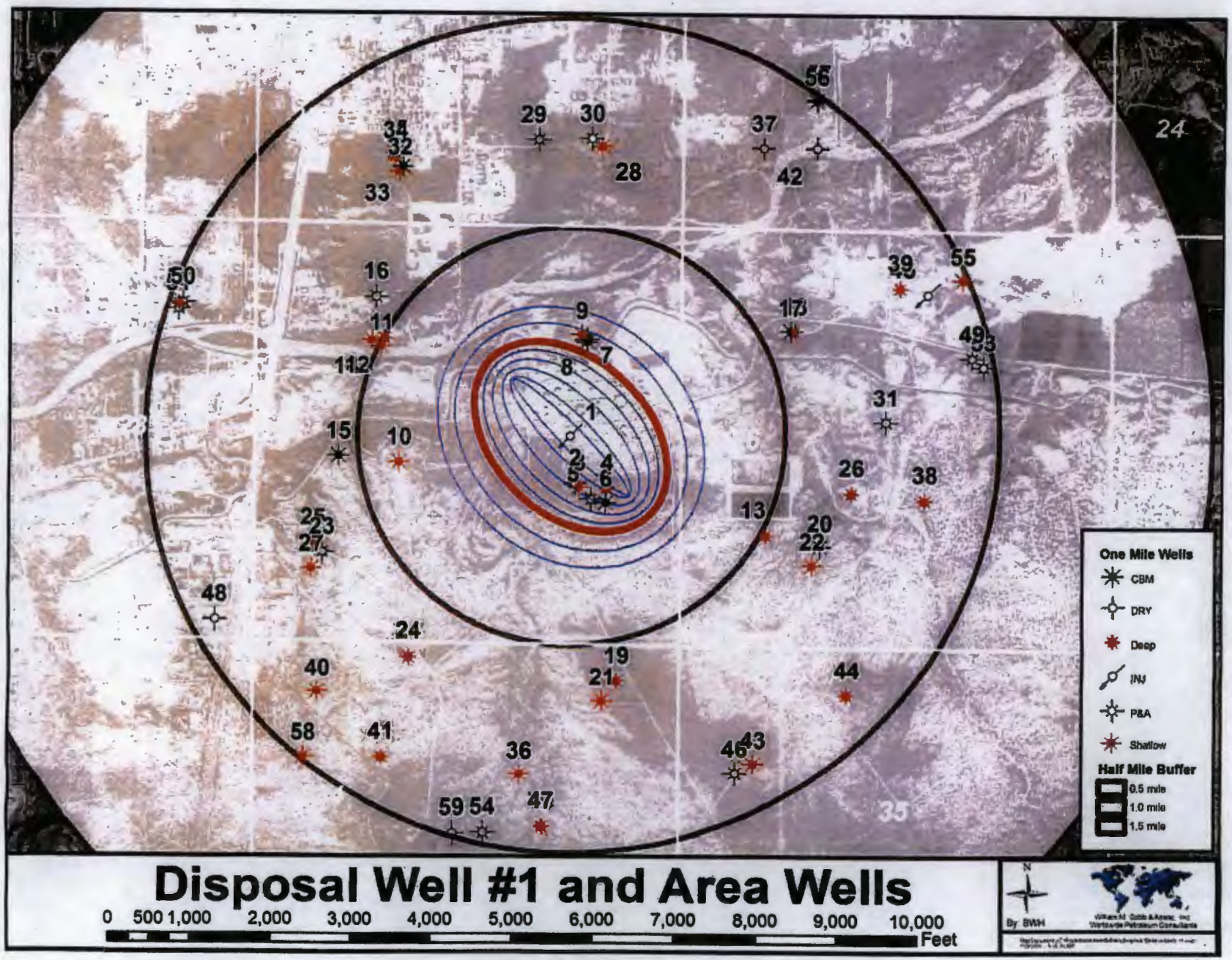
Fill was cleaned out of well on 4/20/06
Fill was orginally tagged at 3325'

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


Disposal Well #1 and Area Wells
0 500 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000
Feet
One Mile Wells
CBM
DRY
Deep
INJ
P&A
Shallow
Half Mile Buffer
0.5 mile
1.0 mile
1.5 mile
By: BWH
24
35

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

PERIOD 2014	AMOUNT OF WATER FROM RIVER (GALLONS)	AMOUNT TO SOLAR EVAP PONDS (GALLONS)	TOTALIZER AMOUNT INJECTED (GALLONS)	DOWN-TIME (HRS)	INJECTION PRESSURE			ANNULAR PRESSURE			ON-LINE FLOW RATES		
					MAX (PSIA)	MIN (PSIA)	AVG (PSIA)	MAX (PSIA)	MIN (PSIA)	AVG (PSIA)	MAX (GPM)	MIN (GPM)	AVG (GPM)
JAN	403	513,408	481,592	579	998	0	210	259	67	199	59	0	11
FEB	1,708	486,247	314,753	486	924	0	287	296	143	214	47	0	6.8
MAR	0	1,190,830	170	744	815	793	803	271	166	197	0	0	0
APR	0	1,477,000	0	720	793	778	786	182	128	148	0	0	0
MAY	0	1,439,000	0	744	778	766	772	178	115	152	0	0	0
JUN	0	1,863,000	0	720	766	756	761	164	148	155	0	0	0
JUL	0	794,870	1,503,130	435.5	1113	0	814	207	148	167	91	0	32.2
AUG	0	0	1,990,938	130	1081	809	947	203	132	164	80	0	43
SEP	0	2,855,553	1,308,447	26	981	854	928	214	109	168	37	0	30.4
OCT	0	0	2,146,832	70.5	1124	843	1035	181	130	164	65	0	48
NOV	0	0	2,102,489	0	1113	908	1057	208	139	161	58	15	47
DEC	2,058	1,296,879	242,121	355	1028	850	879	271	147	218	42	0	5.3

The total amount injected in 2014 is: **10,090,472** gallons

CERTIFICATION: Kelly Rollow DATE: 1/9/2015

Table 2

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	P&A Date	ULSTR	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	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	CBM	No
7	0.23	JACQUE	2	30-045-34409	1483	1689	1689		H-27-29N-11W	HOLCOMB O&G	FRUITLAND COAL	CBM	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	Status	Pen. Ini. 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	COOK	1	30-045-07940	6052	6226	6226		N-22-29N-11W	MANANA GAS INC	DAKOTA	Deep	Yes
35	0.79	COOK	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	#	APINO	Perf Top	Perf Bottom	Total Depth	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	CBM	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			Frtlnd		-34-29N-11W	Pre-Ongard	FRUITLAND SAND	DRY	No

Status	Total Wells	Pen Inj. Zone	
		Yes	No
P&A	15	3	12
Dry	4	0	4
INJ	2	2	0
CBM	7	2	5
Shallow	17	3	14
Deep	14	14	0
Total	59	24	35

Table 3

Injection Well
2014 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Volatile Organic Compounds *(ug/L)*		1/23/2014		7/28/2014	10/1/2014
1,1,1,2-Tetrachloroethane		< 10	na	< 2.0	< 5.0
1,1,1-Trichloroethane		< 10	na	< 2.0	< 5.0
1,1,2,2-Tetrachloroethane		< 20	na	< 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		< 10	na	< 2.0	< 5.0
1,1-Dichloropropene		< 10	na	< 2.0	< 5.0
1,2,3-Trichlorobenzene		< 10	na	< 2.0	< 5.0
1,2,3-Trichloropropane		< 20	na	< 4.0	< 10
1,2,4-Trichlorobenzene		< 10	na	< 2.0	< 5.0
1,2,4-Trimethylbenzene		< 10	na	< 2.0	< 5.0
1,2-Dibromo-3-chloropropane		< 20	na	< 4.0	< 10
1,2-Dibromoethane (EDB)		< 10	na	< 2.0	< 5.0
1,2-Dichlorobenzene		< 10	na	< 2.0	< 5.0
1,2-Dichloroethane (EDC)	500	< 10	na	< 2.0	< 5.0
1,2-Dichloropropane		< 10	na	< 2.0	< 5.0
1,3,5-Trimethylbenzene		< 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	< 4.0	< 10
2-Butanone		200	na	< 20	< 50
2-Chlorotoluene		< 10	na	< 2.0	< 5.0
2-Hexanone		< 100	na	< 20	< 50
2-Methylnaphthalene		< 40	na	< 8.0	< 20
4-Chlorotoluene		< 10	na	< 2.0	< 5.0
4-Isopropyltoluene		< 10	na	< 2.0	< 5.0
4-Methyl-2-pentanone		< 100	na	< 20	< 50
Acetone		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	na	< 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
Chlorobenzene	100000	< 10	na	< 2.0	< 5.0
Chloroethane		< 20	na	< 4.0	< 10
Chloroform	6000	< 10	na	< 2.0	< 5.0
Chloromethane		< 30	na	< 6.0	< 15
cis-1,2-DCE		< 10	na	< 2.0	< 5.0
cis-1,3-Dichloropropene		< 10	na	< 2.0	< 5.0
Dibromochloromethane		< 10	na	< 2.0	< 5.0
Dibromomethane		< 10	na	< 2.0	< 5.0
Dichlorodifluoromethane		< 10	na	< 2.0	< 5.0
Ethylbenzene		< 10	na	< 2.0	< 5.0
Hexachlorobutadiene	500	< 10	na	< 2.0	< 5.0
Isopropylbenzene		< 10	na	< 2.0	< 5.0
Methyl tert-butyl ether (MTBE)		< 10	na	< 2.0	< 5.0
Methylene Chloride		< 30	na	< 6.0	< 15
Naphthalene		< 30	na	< 4.0	< 10
n-Butylbenzene		< 10	na	< 6.0	< 15
n-Propylbenzene		< 20	na	< 2.0	< 5.0
sec-Butylbenzene		< 10	na	< 2.0	< 5.0
Styrene		< 10	na	< 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

Table 3

Injection Well
2014 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Semi-Volatile Organic Compounds *(ug/L)*					
1,2,4-Trichlorobenzene		< 50	na	< 100	< 10
1,2-Dichlorobenzene		< 50	na	< 100	< 10
1,3-Dichlorobenzene		< 50	na	< 100	< 10
1,4-Dichlorobenzene	7500	< 50	na	< 100	< 10
1-Methylnaphthalene		< 50	na	< 100	< 10
2,4,5-Trichlorophenol		< 50	na	< 100	< 10
2,4,6-Trichlorophenol	2000	< 50	na	< 100	< 10
2,4-Dichlorophenol		< 100	na	< 200	< 20
2,4-Dimethylphenol		< 50	na	< 100	< 10
2,4-Dimitrophenol		< 100	na	< 200	< 20
2,4-Dinitrotoluene	130	< 50	na	< 100	< 10
2,6-Dinitrotoluene		< 50	na	< 100	< 10
2-Chloronaphthalene		< 50	na	< 100	< 10
2-Chlorophenol		< 50	na	< 100	< 10
2-Methylnaphthalene		< 50	na	< 100	< 10
2-Methylphenol		< 50	na	< 200	< 20
2-Nitroaniline		< 50	na	< 100	< 10
2-Nitrophenol		< 50	na	< 100	< 10
3,3´-Dichlorobenzidine		< 50	na	210	< 10
3+4-Methylphenol		< 50	na	< 100	< 10
3-Nitroaniline		< 50	na	< 100	< 10
4,6-Dinitro-2-methylphenol		< 100	na	< 200	< 20
4-Bromophenyl phenyl ether		< 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		< 50	na	< 100	< 10
4-Nitrophenol		< 50	na	< 100	< 10
Acenaphthene		< 50	na	< 100	< 10
Acenaphthylene		< 50	na	< 100	< 10
Aniline		< 50	na	< 100	< 10
Anthracene		< 50	na	< 100	< 10
Azobenzene		< 50	na	< 100	< 10
Benz(a)anthracene		< 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	na	< 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	na	< 100	< 10
Chrysene		< 50	na	< 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	na	< 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	na	< 100	< 10
Hexachloroethane	3000	< 50	na	< 100	< 10
Indeno(1,2,3-cd)pyrene		< 50	na	< 100	< 10
Isophorone		< 50	na	< 100	< 10
Naphthalene		< 50	na	< 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		< 50	na	< 100	< 10
Pyridine	5000	< 50	na	< 100	< 10

Table 3

Injection Well
2014 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
General Chemistry *(mg/L unless otherwise stated)*					
Specific Conductance *(umhos/cm)*		7100	na	1900	1100
Chloride		2400	na	510	220
Sulfate		35	na	41	26
Total Dissolved Solids		5240	na	1380	742
pH *(pH Units)*		6.25	na	7.10	7.08
Bicarbonate (As CaCO3)		380	na	220	150
Carbonate (As CaCO3)		<2.0	na	<2.0	<2.0
Calcium		490	na	480	110
Magnesium		75	na	99	23
Potassium		37	na	36	8.2
Sodium		1000	na	1100	220
Total Alkalinity (as CaCO3)		380	na	220	150
Total 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
Ignitability, Corrosivity, and Reactivity					
Reactive Cyanide *(mg/L)*		<1.0	na	<1.0	<1.0
Reactive Sulfide *(mg/kg)*		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 Office
District I – (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II – (575) 748-1283
811 S. First St., Artesia, NM 88210
District III – (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV – (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised July 18, 2013

WELL API NO.
30-045-29002-00

5. Indicate Type of Lease
STATE ☐ FEE ☐

6. State Oil & Gas Lease No.

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.)

7. Lease Name or Unit Agreement Name

1. Type of Well: Oil Well ☐ Gas Well ☒ Other

8. Well Number #001

2. Name of Operator
Western Refining Southwest, Inc. – Bloomfield Terminal

9. OGRID Number 037218

3. Address of Operator
50 County Road 4990, Bloomfield, NM 87401

10. Pool name or Wildcat

4. Well Location
Unit Letter I : 2442 feet from the South line and 1250 feet from the East line
Section 27 Township 29 Range 11 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	☐						
CLOSED-LOOP SYSTEM	☐						
OTHER: Replace wellhead valves	☒			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 is requesting permission to replace in-kind the valve tree assembly located at the injection wellhead. In order to do this work, Western will have to place a temporary bridge plug down in the well to seal-off the well properly prior to removing the valve tree assembly. Phoenix Services has been contracted by Western to perform the down hole wire line work. WSI has been contracted to perform the valve tree replacement. A summary of the proposed scope of activities for this project is as follows:

- Phoenix Services will run tubing gauges down hole to verify the exact size of the tubing.
- The appropriate sized bridge plug will selected and place at approximately 3,221 ft below surface.
- Once the well is securely blocked-in, WSI will commence replacement of the valve tree.
- Once the valves are replaced, Phoenix Services will retrieve the bridge plug.
- The well will then return to normal operations.

Pending OCD approval, Western would like to schedule the work to be performed during the week of June 30th, 2014. If you have any questions regarding this project, please feel free to contact me at your convenience.

Spud Date: Rig Release Date:

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Kelly Robinson TITLE Environmental Supervisor DATE 7/2/14

Type or print name Kelly Robinson E-mail address: Kelly.robinson@wnr.com PHONE: 505-632-4166

For State Use Only

APPROVED BY: TITLE DATE

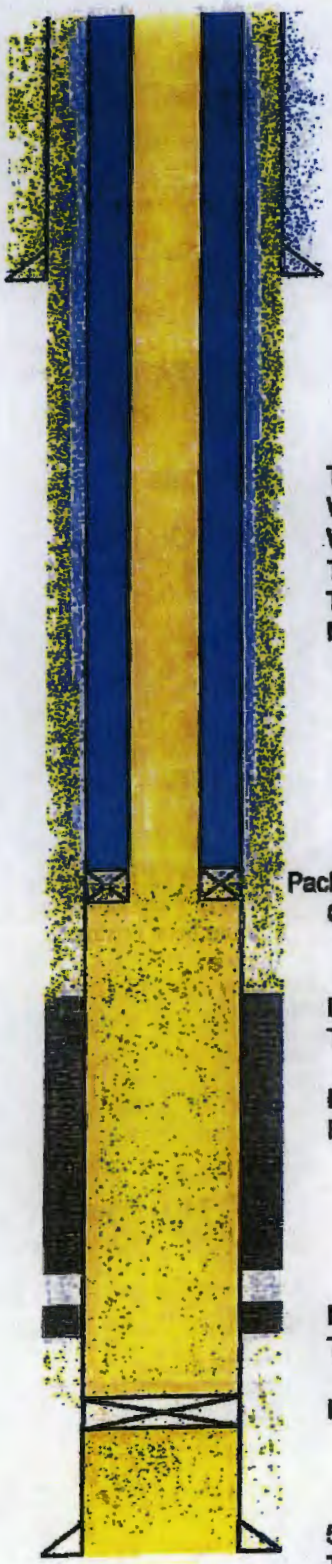
Conditions of Approval (if any):

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

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

FIGURE 1
DISPOSAL WELL #1 WELL SCHEMATIC
Western Refining Inc.
Bloomfield, NM

Date:	4/28/2006	Approved By:	rls	Job No.:	70F5830
Drawn By:	rls	Checked By:		Scale:	NTS



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' - 3406' 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: CarlJ.Chavez@State.NM.US
Web: 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: 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 questions, please let me know.

Thank you, Sir!

Kelly R. Robinson I Environmental Supervisor

Western Refining I 111 County Road 4990 I Bloomfield, NM87413
(o) 505-632-4166 I (c) 505-801-5616 I (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: CarlJ.Chavez@State.NM.US
Web: 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: 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 (carlJ.Chavez@state.nm.us)'
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
District I – (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II – (575) 748-1283
811 S. First St., Artesia, NM 88210
District III – (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV – (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised August 1, 2011

WELL API NO.
30-045-29002-00

5. Indicate Type of Lease
STATE ☐ FEE ☒

6. State Oil & Gas Lease No.
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.)

7. Lease Name or Unit Agreement Name
Disposal

1. Type of Well: Oil Well ☐ Gas Well ☒ Other – (Disposal Well)

8. Well Number: #001

2. Name of Operator San Juan Refining Co. / Western Refining Southwest, Inc. – Bloomfield Refinery

9. OGRID Number: 037218

3. Address of Operator
50 Road 4990, Bloomfield, NM, 87413

10. Pool name or Wildcat:
Blanco/Mesa Verde

4. Well Location
Unit Letter I : 2442 feet from the south line and 1250 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.)*

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: Annual MIT, Bradenhead,	☒			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 requests permission to perform the annual MIT and Bradenhead test on the Class I injection well referenced above. The tests will be performed on Thursday, September 18th, 2014. Monica Kuehling has agreed to be here to monitor the tests.

Spud Date: | Rig Release Date:

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Matthew Krakow TITLE Environmental Coordinator DATE 9-3-14

Type or print name Matthew Krakow E-mail address: matt.krakow@wnr.com PHONE: 505-632-4169

For State Use Only

APPROVED BY: TITLE DATE

Conditions of Approval (if any):

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 of Test 9.18.14 Operator San Juan API #30-0 _____

Property Name SWD Well No. 1 Location: Unit I Section 27 Township 29 Range 11

Well Status(Shut-In or Producing) Initial PSI: Tubing 890 Intermediate N/A Casing 200 Bradenhead 2

OPEN BRADENHEAD AND INTERMEDIATE TO ATMOSPHERE INDIVIDUALLY FOR 15 MINUTES EACH

PRESSURE

Testing	Bradenhead BH	Bradenhead Int	Bradenhead Csg	INTERM Int	INTERM Csg
TIME 5 min	0		198		
10 min	0		198		
15 min	0		198		
20 min					
25 min					
30 min					

FLOW CHARACTERISTICS

	BRADENHEAD	INTERMEDIATE
Steady Flow		
Surges		
Down to Nothing	✓	
Nothing		
Gas	✓	
Gas & Water		
Water		

If bradenhead flowed water, check all of the descriptions that apply below:

CLEAR_____ FRESH_____ SALTY_____ SULFUR_____ BLACK_____

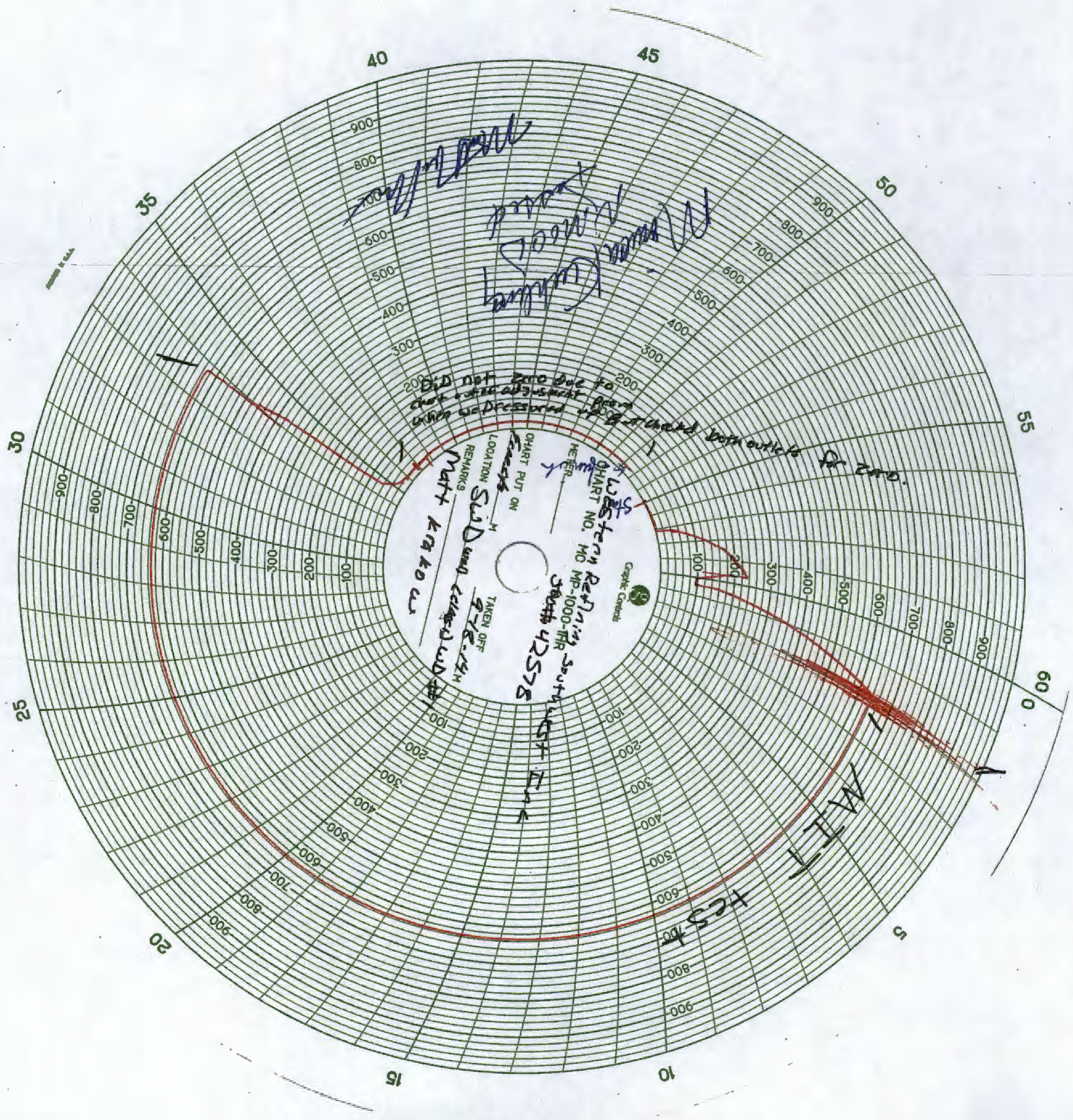
5 MINUTE SHUT-IN PRESSURE BRADENHEAD 0 INTERMEDIATE N/A

REMARKS: BH-down to nothing in 4 seconds - opened slow

By _____ Witness _____

(Position)

E-mail address _____


Graphic Controls
CHART NO. MC MP-1000-1HR
METER
CHART PUT ON
TAKEN OFF
LOCATION
REMARKS

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

MECHANICAL INTEGRITY TEST REPORT

(TA OR UIC)

Date of Test 9-18-14 Operator ______ API # 30-0______

Property Name SWD Well # 1 Location: Unit I Sec 27 Twn 29 Rge 11

Land Type:

State______
Federal______
Private______
Indian______

Well Type:

Water Injection______
Salt Water Disposal ✓
Gas Injection______
Producing Oil/Gas______
Pressure obervation______

Temporarily Abandoned Well (Y/N): N TA Expires:______

Casing Pres. 0
Bradenhead Pres. 0
Tubing Pres. 480
Int. Casing Pres. N/A

Tbg. SI Pres. ______
Tbg. Inj. Pres. ______

Max. Inj. Pres. ______

Pressured annulus up to 638 psi. for 30 mins. Test passed/failed

REMARKS:

Packer Set at 3221

Top Perf 3208-3276

Chart Stuck at 20 lbs - Bled down on open end chart/well - well bled to 0

By [signature] Witness [signature]
(Operator Representative) (NMOCD)

______
(Position)

Revised 02-11-02

APPENDIX B

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 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

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

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	Qual	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	11432
Cadmium	ND	0.0020		mg/L	1	1/29/2014 11:20:46 AM	11432
Calcium	490	5.0		mg/L	5	1/29/2014 11:22:17 AM	11432
Chromium	ND	0.0060		mg/L	1	1/29/2014 11:20:46 AM	11432
Lead	ND	0.0050		mg/L	1	1/29/2014 11:20:46 AM	11432
Magnesium	75	1.0		mg/L	1	1/29/2014 11:20:46 AM	11432
Potassium	37	1.0		mg/L	1	1/29/2014 11:20:46 AM	11432
Selenium	ND	0.050		mg/L	1	1/29/2014 11:20:46 AM	11432
Silver	ND	0.0050		mg/L	1	1/29/2014 11:20:46 AM	11432
Sodium	1000	20		mg/L	20	1/29/2014 11:50:27 AM	11432
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **DAM**	
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	1	1/30/2014 7:14:30 PM	11420
Azobenzene	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
Benz(a)anthracene	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
Benzo(a)pyrene	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
Benzo(b)fluoranthene	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
Benzo(g,h,i)perylene	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
Benzo(k)fluoranthene	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
Benzoic acid	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	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		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	50		µg/L	1	1/30/2014 7:14:30 PM	11420
Butyl benzyl phthalate	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
Carbazole	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
4-Chloro-3-methylphenol	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
4-Chloroaniline	ND	50		µg/L	1	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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 1-23-2014
Lab ID: 1401A07-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES						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	1	1/30/2014 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
Hexachlorobutadiene	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	1	1/30/2014 7:14:30 PM	11420
Indeno(1,2,3-cd)pyrene	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
Isophorone	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
1-Methylnaphthalene	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
2-Methylnaphthalene	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
2-Methylphenol	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
3+4-Methylphenol	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
N-Nitrosodi-n-propylamine	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
N-Nitrosodimethylamine	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
N-Nitrosodiphenylamine	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
Naphthalene	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
2-Nitroaniline	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
3-Nitroaniline	ND	50		µg/L	1	1/30/2014 7:14:30 PM	11420
4-Nitroaniline	ND	50		µg/L	1	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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

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 8270C: SEMIVOLATILES						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						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/L	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

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

Qualifiers:

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

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	R16441
Chloromethane	ND	30		µg/L	10	1/31/2014 3:25:28 PM	R16441
2-Chlorotoluene	ND	10		µg/L	10	1/31/2014 3:25:28 PM	R16441
4-Chlorotoluene	ND	10		µg/L	10	1/31/2014 3:25:28 PM	R16441
cis-1,2-DCE	ND	10		µg/L	10	1/31/2014 3:25:28 PM	R16441
cis-1,3-Dichloropropene	ND	10		µg/L	10	1/31/2014 3:25:28 PM	R16441
1,2-Dibromo-3-chloropropane	ND	20		µg/L	10	1/31/2014 3:25:28 PM	R16441
Dibromochloromethane	ND	10		µg/L	10	1/31/2014 3:25:28 PM	R16441
Dibromomethane	ND	10		µg/L	10	1/31/2014 3:25:28 PM	R16441
1,2-Dichlorobenzene	ND	10		µg/L	10	1/31/2014 3:25:28 PM	R16441
1,3-Dichlorobenzene	ND	10		µg/L	10	1/31/2014 3:25:28 PM	R16441
1,4-Dichlorobenzene	ND	10		µg/L	10	1/31/2014 3:25:28 PM	R16441
Dichlorodifluoromethane	ND	10		µg/L	10	1/31/2014 3:25:28 PM	R16441
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	R16441
1,2-Dichloropropane	ND	10		µg/L	10	1/31/2014 3:25:28 PM	R16441
1,3-Dichloropropane	ND	10		µg/L	10	1/31/2014 3:25:28 PM	R16441
2,2-Dichloropropane	ND	20		µg/L	10	1/31/2014 3:25:28 PM	R16441
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
Isopropylbenzene	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		µg/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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

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		µg/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 CONDUCTANCE						Analyst: **SRM**	
Conductivity	7100	0.010		µmhos/cm	1	1/24/2014 5:53:17 PM	R16304
SM4500-H+B: PH						Analyst: **SRM**	
pH	6.25	1.68	H	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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

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 #:**	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	
pH	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
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**
Client ID: **PBW**	Batch ID: **R16313**	RunNo: **16313**
Prep Date:	Analysis Date: **1/24/2014**	SeqNo: **470380** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R16313**	RunNo: **16313**
Prep Date:	Analysis Date: **1/24/2014**	SeqNo: **470381** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.6	0.50	10.00	0	96.0	90	110			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R16337**	RunNo: **16337**
Prep Date:	Analysis Date: **1/27/2014**	SeqNo: **471000** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R16337**	RunNo: **16337**
Prep Date:	Analysis Date: **1/27/2014**	SeqNo: **471001** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.6	0.50	5.000	0	92.6	90	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

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R16441**	RunNo: **16441**
Prep Date:	Analysis Date: **1/31/2014**	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								
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

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R16441**	RunNo: **16441**
Prep Date:	Analysis Date: **1/31/2014**	SeqNo: **474209** 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-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 lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R16441**	RunNo: **16441**
Prep Date:	Analysis Date: **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
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

WO#: **1401A07**

Hall Environmental Analysis Laboratory, Inc.

13-Feb-14

Client: Western Refining Southwest, Inc.
Project: Injection Well 1-23-2014

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R16441**	RunNo: **16441**
Prep Date:	Analysis Date: **1/31/2014**	SeqNo: **474213** 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	70	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		10.00		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

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-11420**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **11420**	RunNo: **16402**
Prep Date: **1/27/2014**	Analysis Date: **1/30/2014**	SeqNo: **473422** 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

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-11420**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **11420**	RunNo: **16402**
Prep Date: **1/27/2014**	Analysis Date: **1/30/2014**	SeqNo: **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			

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

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 **lcs-11420**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**								
Client ID: **LCSW**	Batch ID: **11420**	RunNo: **16402**								
Prep Date: **1/27/2014**	Analysis Date: **1/30/2014**	SeqNo: **473423**	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			
4-Nitrophenol	16	10	200.0	0	8.02	10.5	67.9			S
Pentachlorophenol	31	20	200.0	0	15.5	22.4	81.1			S
Phenol	67	10	200.0	0	33.4	21.4	72.9			
Pyrene	66	10	100.0	0	65.9	46.9	109			
1,2,4-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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**								
Client ID: **PBW**	Batch ID: **11513**	RunNo: **16496**								
Prep Date: **1/31/2014**	Analysis Date: **2/3/2014**	SeqNo: **475097**	Units: **%REC**							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	110		200.0		54.9	22.7	98			
Surr: Phenol-d5	93		200.0		46.5	23.4	74.9			
Surr: 2,4,6-Tribromophenol	130		200.0		65.6	23.3	111			
Surr: Nitrobenzene-d5	77		100.0		77.3	36.8	111			
Surr: 2-Fluorobiphenyl	71		100.0		70.6	38.3	110			
Surr: 4-Terphenyl-d14	72		100.0		71.6	52.1	116			

Sample ID **lcs-11513**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**								
Client ID: **LCSW**	Batch ID: **11513**	RunNo: **16496**								
Prep Date: **1/31/2014**	Analysis Date: **2/3/2014**	SeqNo: **475098**	Units: **%REC**							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	100		200.0		49.8	22.7	98			
Surr: Phenol-d5	85		200.0		42.3	23.4	74.9			
Surr: 2,4,6-Tribromophenol	150		200.0		77.3	23.3	111			
Surr: Nitrobenzene-d5	82		100.0		81.7	36.8	111			
Surr: 2-Fluorobiphenyl	79		100.0		78.7	38.3	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

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 **lcs-11513**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **11513**	RunNo: **16496**
Prep Date: **1/31/2014**	Analysis Date: **2/3/2014**	SeqNo: **475098** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	61		100.0		61.4	52.1	116			

Sample ID **lcsd-11513**	SampType: **LCSD**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSS02**	Batch ID: **11513**	RunNo: **16496**
Prep Date: **1/31/2014**	Analysis Date: **2/3/2014**	SeqNo: **475099** Units: **%REC**

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.
- 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

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-11463**	SampType: **MBLK**	TestCode: **EPA Method 7470: Mercury**
Client ID: **PBW**	Batch ID: **11463**	RunNo: **16401**
Prep Date: **1/29/2014**	Analysis Date: **1/30/2014**	SeqNo: **473049** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID **LCS-11463**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **11463**	RunNo: **16401**
Prep Date: **1/29/2014**	Analysis Date: **1/30/2014**	SeqNo: **473050** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0047	0.00020	0.005000	0	94.3	80	120			

Sample ID **1401A07-001CMS**	SampType: **MS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **Injection Well**	Batch ID: **11463**	RunNo: **16401**
Prep Date: **1/29/2014**	Analysis Date: **1/30/2014**	SeqNo: **473069** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0046	0.0010	0.005000	0	91.0	75	125			

Sample ID **1401A07-001CMSD**	SampType: **MSD**	TestCode: **EPA Method 7470: Mercury**
Client ID: **Injection Well**	Batch ID: **11463**	RunNo: **16401**
Prep Date: **1/29/2014**	Analysis Date: **1/30/2014**	SeqNo: **473070** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0045	0.0010	0.005000	0	90.1	75	125	1.02	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

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-11432**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **11432**	RunNo: **16372**
Prep Date: **1/28/2014**	Analysis Date: **1/29/2014**	SeqNo: **472096** 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**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **11432**	RunNo: **16372**
Prep Date: **1/28/2014**	Analysis Date: **1/29/2014**	SeqNo: **472097** 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

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-1**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R16304**	RunNo: **16304**							
Prep Date:	Analysis Date: **1/24/2014**	SeqNo: **470197**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R16304**	RunNo: **16304**							
Prep Date:	Analysis Date: **1/24/2014**	SeqNo: **470198**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	82	20	80.00	0	103	90	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

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-11406**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **11406**	RunNo: **16349**
Prep Date: **1/27/2014**	Analysis Date: **1/28/2014**	SeqNo: **471302** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-11406**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **11406**	RunNo: **16349**
Prep Date: **1/27/2014**	Analysis Date: **1/28/2014**	SeqNo: **471303** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 Number: 1401A07 RcptNo: 1

Received by/date: LM 01/24/14

Logged By: Michelle Garcia 1/24/2014 10:15:00 AM Michelle Garcia

Completed By: Michelle Garcia 1/24/2014 12:54:49 PM Michelle Garcia

Reviewed By: AT 01/27/14

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		

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 ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
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 ☐	

# of preserved bottles checked for pH: 2 (<2 or >12 unless noted)

Adjusted? No

Checked by:

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:

Client Instructions:

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.2	Good	Yes			

Chain-of-Custody Record

Client: **Western Refining**

Mailing Address: **50 CR 4990**

Bloomfield, NM 87413

Phone #: **505-632-4135**

email or Fax#:

QA/QC Package:

X Standard ☐ Level 4 (Full Validation)

☐ Other

X EDD (Type)

Turn-Around Time:

X Standard ☐ Rush

Project Name: **Injection Well**

1-23-2014

Project #:

Project Manager:

Sampler: Bob

On Ice: X Yes ☐ No

Sample Temperature: 1.7

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1401A07	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1) TDS	EDB (Method 504.1) Back-up	PAH (8310 or 8270SIMS)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F,Cl,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability	Reactivity, Corrosivity	Ec, pH, SO4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
1-23-14	8:35	H_2O	Injection Well	5-VOA	HCl	-001										X						
		H_2O	Injection Well	1 - liter	Amber	-001											X					
		H_2O	Injection Well	1-500 ml	Amber	-001				X								X				
		H_2O	Injection Well	1-500 ml	Amber	-001														X		
		H_2O	Injection Well	1-250 ml	H_2SO_4	-001					X											
		H_2O	Injection Well	1-500 ml	HNO_3	-001							X									
		H_2O	Injection Well	1-500 ml	Na OH	-001													X			
		H_2O	Injection Well	1-500 ml	Zn Acutate	-001															X	

Date:	Time:	Relinquished by:	Received by:	Date	Time
1-23-14	1510	Robert Krakow	Christine Walker	1/23/14	1510
1/23/14	1710	Christine Walker		01/24/14	1015

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.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

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 OrderNo.: 1407D12

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

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES						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-Chlorophenyl 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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES						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-Trichlorophenol	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	R20298
Toluene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
Ethylbenzene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
Methyl tert-butyl ether (MTBE)	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
1,2,4-Trimethylbenzene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
1,3,5-Trimethylbenzene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
1,2-Dichloroethane (EDC)	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
1,2-Dibromoethane (EDB)	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
Naphthalene	ND	4.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
1-Methylnaphthalene	ND	8.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
2-Methylnaphthalene	ND	8.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
Acetone	85	20		µg/L	2	7/31/2014 1:41:17 PM	R20298
Bromobenzene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
Bromodichloromethane	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
Bromoform	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
Bromomethane	ND	6.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
2-Butanone	ND	20		µg/L	2	7/31/2014 1:41:17 PM	R20298
Carbon disulfide	ND	20		µg/L	2	7/31/2014 1:41:17 PM	R20298
Carbon Tetrachloride	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
Chlorobenzene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
Chloroethane	ND	4.0		µg/L	2	7/31/2014 1:41:17 PM	R20298

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

Qualifiers:

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

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Chloroform	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
Chloromethane	ND	6.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
2-Chlorotoluene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
4-Chlorotoluene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
cis-1,2-DCE	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
cis-1,3-Dichloropropene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
1,2-Dibromo-3-chloropropane	ND	4.0		µg/L	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		µg/L	2	7/31/2014 1:41:17 PM	R20298
1,3-Dichlorobenzene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
1,4-Dichlorobenzene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
Dichlorodifluoromethane	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
1,1-Dichloroethane	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
1,1-Dichloroethene	ND	2.0		µg/L	2	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		µg/L	2	7/31/2014 1:41:17 PM	R20298
Hexachlorobutadiene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
2-Hexanone	ND	20		µg/L	2	7/31/2014 1:41:17 PM	R20298
Isopropylbenzene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
4-Isopropyltoluene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
4-Methyl-2-pentanone	ND	20		µg/L	2	7/31/2014 1:41:17 PM	R20298
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
n-Propylbenzene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
sec-Butylbenzene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
Styrene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
tert-Butylbenzene	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
1,1,1,2-Tetrachloroethane	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
1,1,2,2-Tetrachloroethane	ND	4.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
Tetrachloroethene (PCE)	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
trans-1,2-DCE	ND	2.0		µg/L	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
1,2,3-Trichlorobenzene	ND	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	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298
1,1,2-Trichloroethane	ND	2.0		µg/L	2	7/31/2014 1:41:17 PM	R20298

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

Qualifiers:

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

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	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		µg/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 CONDUCTANCE						Analyst: **JRR**	
Conductivity	1900	0.010		µmhos/cm	1	7/29/2014 12:08:01 PM	R20245
SM4500-H+B: PH						Analyst: **JRR**	
pH	7.10	1.68	H	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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

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

Sample Number	140730036-001	**Sampling Date**	7/28/2014	**Date/Time Received**	7/30/2014 12:25 PM
Client Sample ID	1407D12-001E / INJECTION WELL			**Sampling Time**	9:30 AM
Matrix	Water				
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/L	1	8/12/2014	CRW	SW846 CH7	
Flashpoint	>200	°F		8/5/2014	KFG	EPA 1010	
pH	7.44	ph Units		8/5/2014	AJT	SM 4500pH-B	
Reactive sulfide	ND	mg/L	1	8/1/2014	AJT	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

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:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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 #: 140730036
Project Name: 1407D12

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Reactive sulfide	0.16	mg/L	0.2	80.0	70-130	8/1/2014	8/1/2014
Cyanide (reactive)	0.505	mg/L	0.5	101.0	80-120	8/12/2014	8/12/2014

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Reactive sulfide	0.18	mg/L	0.2	90.0	11.8	0-25	8/1/2014	8/1/2014

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
140730036-001	Reactive sulfide	ND	0.22	mg/L	0.2	110.0	70-130	8/1/2014	8/1/2014
140730036-001	Cyanide (reactive)	ND	0.919	mg/L	1	91.9	80-120	8/12/2014	8/12/2014

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide (reactive)	0.906	mg/L	1	90.6	1.4	0-25	8/12/2014	8/12/2014

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide (reactive)	ND	mg/L	1	8/12/2014	8/12/2014
Reactive sulfide	ND	mg/L	1	8/1/2014	8/1/2014

AR	Acceptable Range
ND	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 Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

QC SUMMARY REPORT

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**
Client ID: **PBW**	Batch ID: **R20236**	RunNo: **20236**
Prep Date:	Analysis Date: **7/29/2014**	SeqNo: **588153** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	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: **20236**
Prep Date:	Analysis Date: **7/29/2014**	SeqNo: **588154** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.7	0.50	10.00	0	97.4	90	110			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R20236**	RunNo: **20236**
Prep Date:	Analysis Date: **7/29/2014**	SeqNo: **588211** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	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: **20236**
Prep Date:	Analysis Date: **7/29/2014**	SeqNo: **588212** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	9.6	0.50	10.00	0	95.6	90	110			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R20363**	RunNo: **20363**
Prep Date:	Analysis Date: **8/4/2014**	SeqNo: **592146** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	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: **20363**
Prep Date:	Analysis Date: **8/4/2014**	SeqNo: **592147** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	94.2	90	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

QC SUMMARY REPORT

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**
Client ID: **PBW**	Batch ID: **R20363**	RunNo: **20363**
Prep Date:	Analysis Date: **8/5/2014**	SeqNo: **592208** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	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: **20363**
Prep Date:	Analysis Date: **8/5/2014**	SeqNo: **592209** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	93.8	90	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

QC SUMMARY REPORT

WO#: **1407D12**

Hall Environmental Analysis Laboratory, Inc.

15-Aug-14

Client: Western Refining Southwest, Inc.
Project: Injection Well 7-28-14 3rd QTR

Sample ID **5mL rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R20230**	RunNo: **20230**
Prep Date:	Analysis Date: **7/29/2014**	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 lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R20230**	RunNo: **20230**
Prep Date:	Analysis Date: **7/29/2014**	SeqNo: **587930** Units: **%REC**

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R20298**	RunNo: **20298**
Prep Date:	Analysis Date: **7/31/2014**	SeqNo: **589943** 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
- 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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R20298**	RunNo: **20298**
Prep Date:	Analysis Date: **7/31/2014**	SeqNo: **589943** 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-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								

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

QC SUMMARY REPORT

WO#: **1407D12**

Hall Environmental Analysis Laboratory, Inc.

15-Aug-14

Client: Western Refining Southwest, Inc.
Project: Injection Well 7-28-14 3rd QTR

Sample ID **5ml rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R20298**	RunNo: **20298**
Prep Date:	Analysis Date: **7/31/2014**	SeqNo: **589943** 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 lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R20298**	RunNo: **20298**
Prep Date:	Analysis Date: **7/31/2014**	SeqNo: **589945** 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
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **14520**	RunNo: **20300**
Prep Date: **7/31/2014**	Analysis Date: **7/31/2014**	SeqNo: **590031** 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

QC SUMMARY REPORT

WO#: **1407D12**

Hall Environmental Analysis Laboratory, Inc.

15-Aug-14

Client: Western Refining Southwest, Inc.
Project: Injection Well 7-28-14 3rd QTR

Sample ID **mb-14520**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **14520**	RunNo: **20300**
Prep Date: **7/31/2014**	Analysis Date: **7/31/2014**	SeqNo: **590031** 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-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	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

QC SUMMARY REPORT

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 **lcs-14520**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **14520**	RunNo: **20300**
Prep Date: **7/31/2014**	Analysis Date: **7/31/2014**	SeqNo: **590032** 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	106			
Surr: 4-Terphenyl-d14	91		100.0		90.9	44	113			

Sample ID **lcsd-14520**	SampType: **LCSD**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSS02**	Batch ID: **14520**	RunNo: **20300**
Prep Date: **7/31/2014**	Analysis Date: **7/31/2014**	SeqNo: **590033** 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
- 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

QC SUMMARY REPORT

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	**lcsd-14520**	SampType: **LCSD**		TestCode: **EPA Method 8270C: Semivolatiles**					
Client ID:	**LCSS02**	Batch ID: **14520**		RunNo: **20300**					
Prep Date:	**7/31/2014**	Analysis Date: **7/31/2014**		SeqNo: **590033**	Units: **µg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	90		100.0		90.0	44	113	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

QC SUMMARY REPORT

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		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity		1800	0.010						4.30	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

QC SUMMARY REPORT

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**
Client ID: **PBW**	Batch ID: **14571**	RunNo: **20345**
Prep Date: **8/4/2014**	Analysis Date: **8/4/2014**	SeqNo: **591482** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID **LCS-14571**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **14571**	RunNo: **20345**
Prep Date: **8/4/2014**	Analysis Date: **8/4/2014**	SeqNo: **591483** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0049	0.00020	0.005000	0	98.9	80	120			

Qualifiers:

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

QC SUMMARY REPORT

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-14549**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **14549**	RunNo: **20323**
Prep Date: **8/1/2014**	Analysis Date: **8/2/2014**	SeqNo: **590696** 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**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **14549**	RunNo: **20323**
Prep Date: **8/1/2014**	Analysis Date: **8/2/2014**	SeqNo: **590697** 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**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **14549**	RunNo: **20323**
Prep Date: **8/1/2014**	Analysis Date: **8/2/2014**	SeqNo: **590698** 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

QC SUMMARY REPORT

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**		RunNo: **20245**					
Prep Date:		Analysis Date: **7/29/2014**		SeqNo: **588388**	Units: **pH units**				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.11	1.68								H

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

QC SUMMARY REPORT

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**	RunNo: **20245**							
Prep Date:	Analysis Date: **7/29/2014**	SeqNo: **588355**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R20245**	RunNo: **20245**							
Prep Date:	Analysis Date: **7/29/2014**	SeqNo: **588356**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	100	90	110			

Sample ID **mb-2**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R20245**	RunNo: **20245**							
Prep Date:	Analysis Date: **7/29/2014**	SeqNo: **588376**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-2**	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**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	100	90	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

QC SUMMARY REPORT

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-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**	SeqNo: **588640** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-14475**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **14475**	RunNo: **20257**
Prep Date: **7/29/2014**	Analysis Date: **7/30/2014**	SeqNo: **588641** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1020	20.0	1000	0	102	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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 Number: 1407D12 RcptNo: 1

Received by/date: AT 07/29/14

Logged By: Anne Thorne 7/29/2014 7:55:00 AM Anne Thorne

Completed By: Anne Thorne 7/29/2014 Anne Thorne

Reviewed By: MG 07/29/14

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		

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 ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
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 ☐	

# of preserved bottles checked for pH: 2 2 2 (<2 or >12 unless noted)

Adjusted? no

Checked by: CS

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: ____

Client Instructions: ____

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.0	Good	Yes			

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4135

email or Fax#:

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Injection Well 3rd QTR 7-28-14

Project #:

Project Manager:

Sampler: Bob

On Ice: ☒ Yes ☐ No

Sample Temperature: /C

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1407012	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TDS	Backup	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F,Cl,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Ec, pH, SO4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
7-28-14	9:30	H2O	Injection Well	3-VOA	HCl	-001										X						
				1-liter	amber	-002											X					
				1-500ml	—	-003												X				
				1-500ml	—	-004				X										X		
				1-250ml	H2SO4	-005					X											
				1-500ml	HNO3	-006							X									
				1-500ml	NaOH	-007													X			
				1-500ml	ZN ACETATE	-008															X	

Date:	Time:	Relinquished by:	Received by:	Date	Time
7-28-14	1452	Robert Krakow	Christy Walla	7/28/14	1452
7/28/14	1724	Christine Walla		07/29/14	0755

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.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

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 OrderNo.: 1410102

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

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.

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 4th QTR 10-1-14
Lab ID: 1410102-001 **Matrix:** AQUEOUS

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	Qual	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	15825
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	15825
Chromium	ND	0.0060		mg/L	1	10/10/2014 9:26:53 AM	15825
Lead	ND	0.0050		mg/L	1	10/10/2014 9:26:53 AM	15825
Magnesium	23	1.0		mg/L	1	10/10/2014 9:26:53 AM	15825
Potassium	8.2	1.0		mg/L	1	10/10/2014 9:26:53 AM	15825
Selenium	ND	0.050		mg/L	1	10/10/2014 9:26:53 AM	15825
Silver	ND	0.0050		mg/L	1	10/10/2014 9:26:53 AM	15825
Sodium	220	5.0		mg/L	5	10/10/2014 9:28:28 AM	15825
EPA METHOD 8270C: SEMIVOLATILES						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

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

Qualifiers:

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

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **DAM**	
2-Chloronaphthalene	ND	10		µg/L	1	10/9/2014 9:16:21 PM	15747
2-Chlorophenol	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		µg/L	1	10/9/2014 9:16:21 PM	15747
Isophorone	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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 4th QTR 10-1-14
Lab ID: 1410102-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **DAM**	
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	R21653
Toluene	ND	5.0		µg/L	5	10/3/2014 10:52:10 PM	R21653
Ethylbenzene	ND	5.0		µg/L	5	10/3/2014 10:52:10 PM	R21653
Methyl tert-butyl ether (MTBE)	ND	5.0		µg/L	5	10/3/2014 10:52:10 PM	R21653
1,2,4-Trimethylbenzene	ND	5.0		µg/L	5	10/3/2014 10:52:10 PM	R21653
1,3,5-Trimethylbenzene	ND	5.0		µg/L	5	10/3/2014 10:52:10 PM	R21653
1,2-Dichloroethane (EDC)	ND	5.0		µg/L	5	10/3/2014 10:52:10 PM	R21653
1,2-Dibromoethane (EDB)	ND	5.0		µg/L	5	10/3/2014 10:52:10 PM	R21653
Naphthalene	ND	10		µg/L	5	10/3/2014 10:52:10 PM	R21653
1-Methylnaphthalene	ND	20		µg/L	5	10/3/2014 10:52:10 PM	R21653
2-Methylnaphthalene	ND	20		µg/L	5	10/3/2014 10:52:10 PM	R21653
Acetone	120	50		µg/L	5	10/3/2014 10:52:10 PM	R21653
Bromobenzene	ND	5.0		µg/L	5	10/3/2014 10:52:10 PM	R21653
Bromodichloromethane	ND	5.0		µg/L	5	10/3/2014 10:52:10 PM	R21653
Bromoform	ND	5.0		µg/L	5	10/3/2014 10:52:10 PM	R21653
Bromomethane	ND	15		µg/L	5	10/3/2014 10:52:10 PM	R21653
2-Butanone	ND	50		µg/L	5	10/3/2014 10:52:10 PM	R21653
Carbon disulfide	ND	50		µg/L	5	10/3/2014 10:52:10 PM	R21653
Carbon Tetrachloride	ND	5.0		µg/L	5	10/3/2014 10:52:10 PM	R21653
Chlorobenzene	ND	5.0		µg/L	5	10/3/2014 10:52:10 PM	R21653
Chloroethane	ND	10		µg/L	5	10/3/2014 10:52:10 PM	R21653

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

Qualifiers:

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

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	Qual	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-Chlorotoluene	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		µg/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

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 4th QTR 10-1-14
Lab ID: 1410102-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **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
Vinyl 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**	
pH	7.08	1.68	H	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 SOLIDS						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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

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 #:**	141003043
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1410102
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	141003043-001	**Sampling Date**	10/1/2014	**Date/Time Received**	10/3/2014 1:30 PM
Client Sample ID	1410102-001E / INJECTION WELL			**Sampling Time**	10:00 AM
Matrix	Water	**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	
pH	6.82	ph Units		10/6/2014	KJS	SM 4500pH-B	
Reactive sulfide	3.01	mg/L	1	10/15/2014	HSW	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; MT:CERT0026; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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 #:**	141003043
Address:	4901 HAWKINS NE SUITE D	**Project Name:**	1410102
	ALBUQUERQUE, NM 87109		
Attn:	ANDY FREEMAN		

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	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	0.5	103.8	80-120	10/15/2014	10/15/2014

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
141003043-001	Reactive sulfide	3.01	3.77	mg/L	0.767	99.1	70-130	10/15/2014	10/15/2014
141003043-001	Cyanide (reactive)	ND	2.41	mg/L	2.5	96.4	80-120	10/15/2014	10/15/2014

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide (reactive)	2.41	mg/L	2.5	96.4	0.0	0-25	10/15/2014	10/15/2014

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide (reactive)	ND	mg/L	1	10/15/2014	10/15/2014
Reactive sulfide	ND	mg/L	1	10/15/2014	10/15/2014

AR	Acceptable Range
ND	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:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

QC SUMMARY REPORT

WO#: **1410102**

Hall Environmental Analysis Laboratory, Inc.

23-Oct-14

Client: Western Refining Southwest, Inc.
Project: Injection Well 4th QTR 10-1-14

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R21640**	RunNo: **21640**
Prep Date:	Analysis Date: **10/2/2014**	SeqNo: **634799** 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: **LCSW**	Batch ID: **R21640**	RunNo: **21640**
Prep Date:	Analysis Date: **10/2/2014**	SeqNo: **634800** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	94.0	90	110			
Sulfate	9.7	0.50	10.00	0	96.8	90	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

QC SUMMARY REPORT

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: **R21653**	RunNo: **21653**	
Prep Date:	Analysis Date: **10/3/2014**	SeqNo: **636225**	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

QC SUMMARY REPORT

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: **R21653**	RunNo: **21653**
Prep Date:	Analysis Date: **10/3/2014**	SeqNo: **636225** 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-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	8.0		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 lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R21653**	RunNo: **21653**
Prep Date:	Analysis Date: **10/3/2014**	SeqNo: **636227** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	19	1.0	20.00	0	96.4	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
- P Sample pH greater than 2.
- RL Reporting Detection Limit

QC SUMMARY REPORT

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 **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R21653**	RunNo: **21653**
Prep Date:	Analysis Date: **10/3/2014**	SeqNo: **636227** Units: **µg/L**

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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **15747**	RunNo: **21803**
Prep Date: **10/7/2014**	Analysis Date: **10/9/2014**	SeqNo: **640784** 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	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	20								
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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **15747**	RunNo: **21803**
Prep Date: **10/7/2014**	Analysis Date: **10/9/2014**	SeqNo: **640784** 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-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	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		74.3	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

QC SUMMARY REPORT

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 **lcs-15747**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **15747**	RunNo: **21803**
Prep Date: **10/7/2014**	Analysis Date: **10/9/2014**	SeqNo: **640785** 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			
Surr: 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 **lcsd-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**	SeqNo: **640786** 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		73.3	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

QC SUMMARY REPORT

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	**lcsd-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**			SeqNo: **640786**		Units: **µg/L**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14		81		100.0		80.9	44	113	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

QC SUMMARY REPORT

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-15770**	SampType: **MBLK**	TestCode: **EPA Method 7470: Mercury**
Client ID: **PBW**	Batch ID: **15770**	RunNo: **21753**
Prep Date: **10/7/2014**	Analysis Date: **10/8/2014**	SeqNo: **639033** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID **LCS-15770**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **15770**	RunNo: **21753**
Prep Date: **10/7/2014**	Analysis Date: **10/8/2014**	SeqNo: **639034** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0051	0.00020	0.005000	0	103	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

QC SUMMARY REPORT

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-15825**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **15825**	RunNo: **21801**
Prep Date: **10/9/2014**	Analysis Date: **10/10/2014**	SeqNo: **640639** 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 Metals**
Client ID: **LCSW**	Batch ID: **15825**	RunNo: **21801**
Prep Date: **10/9/2014**	Analysis Date: **10/10/2014**	SeqNo: **640640** 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			B
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 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

QC SUMMARY REPORT

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: **PBW**	Batch ID: **R21715**	RunNo: **21715**							
Prep Date:	Analysis Date: **10/6/2014**	SeqNo: **637458**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R21715**	RunNo: **21715**							
Prep Date:	Analysis Date: **10/6/2014**	SeqNo: **637459**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	83	20	80.00	0	103	90	110			

Sample ID **mb-2**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R21715**	RunNo: **21715**							
Prep Date:	Analysis Date: **10/6/2014**	SeqNo: **637474**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-2**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R21715**	RunNo: **21715**							
Prep Date:	Analysis Date: **10/6/2014**	SeqNo: **637475**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	81	20	80.00	0	102	90	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

QC SUMMARY REPORT

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**	SeqNo: **638741** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-15759**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **15759**	RunNo: **21752**
Prep Date: **10/7/2014**	Analysis Date: **10/8/2014**	SeqNo: **638742** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 Number: 1410102 RcptNo: 1

Received by/date: LM 10/02/14

Logged By: Anne Thorne 10/2/2014 6:50:00 AM Anne Thorne

Completed By: Anne Thorne 10/2/2014 Anne Thorne

Reviewed By: 10/02/14

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		

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 ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
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 ☐	

# of preserved bottles checked for pH: 2,12 (<2 or >12 unless noted)

Adjusted? NO

Checked by:

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:

Client Instructions:

17. Additional remarks:

18. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.3	Good	Yes			

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield NM 87413

Phone #: 505-632-4135

email or Fax#:

QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: 10-1-14
Injection Well 4th QTR

Project #:

Project Manager:

Sampler: Bob
On Ice: ☐ Yes ☐ No
Sample Temperature: NA

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1411
10-1-14	10:00	H_2O	Inj. well	3-VOA	HCl	-001
				1-Liter	amber	-001
				1-500ml		-001
				1-500ml		-001
				1-125 ml	H_2SO_4	-001
				1-500 ml	HNO_3	-001
				1-500ml	NaOH	-001
				1-500ml	Zn-Acetate	-001

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TDS	[redacted] Back up	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals Ca, Mg, Na, K	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Ec, pH, SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
									X						
										X					
											X				
				X									X		
					X										
						X									
												X			
														X	

Date:	Time:	Relinquished by:	Received by:	Date	Time
10-1-14	1421	Robert Krakow	Christa Walters	10/1/14	1421
10/1/14	1815	Christa Walters		10/02/14	0650

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.

APPENDIX C

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

Hall Environmental Analysis Laboratory

QUALITY ASSURANCE PLAN

Effective Date: August 13th, 2014

Revision 9.9

www.hallenvironmental.com

Control Number: 00000157

Approved By:

8/12/14

Andy Freeman
Laboratory Manager

Date

Approved By:

8/13/2014

Carolyn Swanson
Quality Assurance/Quality Control Officer

Date

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Approved By:

8/13/14

Ian Cameron Date
Assistant Laboratory Manager

8-13-14

John Caldwell Date
Assistant Laboratory Manager
Semi-Volatiles Technical Director

8-13-14

Rene Aguilera Date
Volatiles Technical Director

8/13/14

Tiffany Shaw Date
Metals Technical Director

8/13/14

Stacey McCoy Date
Wet Chemistry Technical Director

8/13/14

Stephanie Shaffers Date
Microbiology Technical Director

Table of Contents

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 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 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. 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(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.

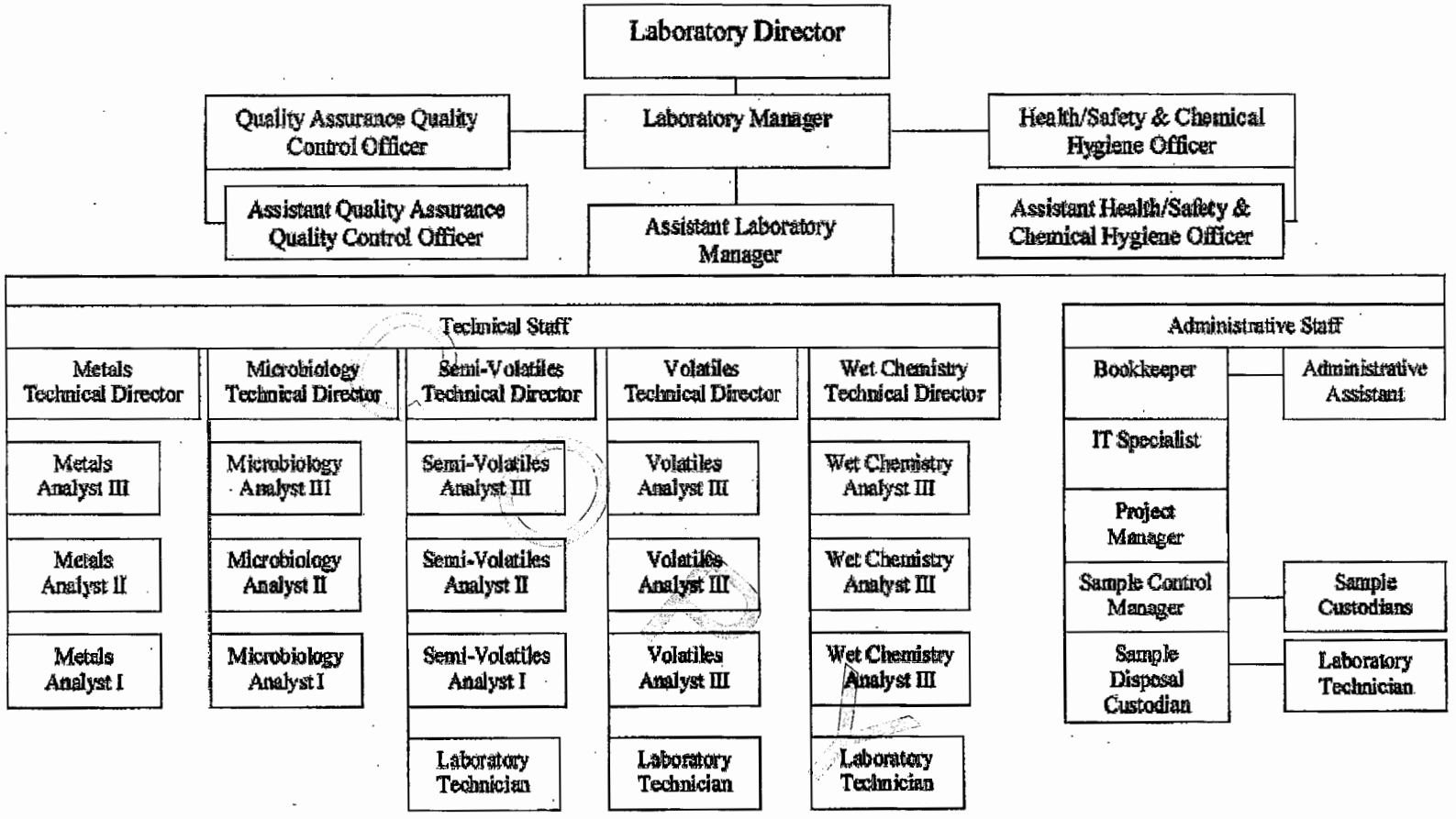
Each new employee shall be provided with data integrity training as a formal part of their new employee orientation. Each new employee will sign an ethics and data integrity agreement to ensure that they understand that data quality is our main objective. Every HEAL employee recognizes that although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



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 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"
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"
1664A	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"

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"
8015D	NPW	"Nonhalogenated Volatile Organics by Gas Chromatography"
	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"
SM4500-NH3 C	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 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 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 1MΩ 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 </= 20%.

> 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 re-extraction 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.

$$RPD = \frac{2 \times (\text{Sample Result} - \text{Duplicate Result})}{(\text{Sample Result} + \text{Duplicate Result})} \times 100$$

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:

$$\%Recovery = \{(concentration^* \text{ recovered})/(concentration^* \text{ added})\} \times 100$$

*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

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.

$$\text{Average} = (\Sigma x_i) / n$$

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^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.

$$\text{Standard deviation} = s = [\Sigma (x_i - \text{average})^2 / (n-1)]^{1/2}$$

Percent Recovery (LCS and LCSD)

$$\text{Percent Recovery} = \frac{\text{(Spike Sample Result)}}{\text{(Spike Added)}} \times 100$$

Percent Recovery (MS, MSD)

$$\text{Percent Recovery} = \frac{\text{(Spike Sample Result} - \text{Sample Result)}}{\text{(Spike Added)}} \times 100$$

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.

$$T = \frac{x_{max} - x_{mean}}{sd} \quad \text{(for the largest value)}$$

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

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:

$$RPD = 2 \times \frac{(\text{Sample Result} - \text{Duplicate Result})}{(\text{Sample Result} + \text{Duplicate Result})} \times 100$$

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:

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

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 x s) is 0.0652.

Total Nitrogen

Total nitrogen is calculated as follows:

Total Nitrogen = TKN + NO_2 + NO_3

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(°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

$RSD = s / RF_{AVE}$

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
Σ = the sum of all the individual values

2. Linear Regression

$y=mx+b$

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)

$$CC\ (r) = \{ \Sigma((x_i - x_{ave})*(y_i - y_{ave})) \} / \{ SQRT((\Sigma(x_i - x_{ave})^2)*(\Sigma(y_i - y_{ave})^2)) \}$$

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
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

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

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:
n = number of replicate x,y pairs
x = x values
y = y values
$w = S^{-2} / (\Sigma S^{-2}/n)$
$S_{(xx)} = (\Sigma x^2w) - [(\Sigma xw)^2 / n]$
$S_{(xy)} = (\Sigma xyw) - [(\Sigma xw)*(\Sigma yw) / n]$
$S_{(xx2)} = (\Sigma x^3w) - [(\Sigma xw)*(\Sigma x^2w) / n]$
$S_{(x2y)} = (\Sigma x^2yw) - [(\Sigma x^2w)*(\Sigma yw) / n]$
$S_{(x2x2)} = (\Sigma x^4w) - [(\Sigma x^2w)^2 / n]$
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]

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

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 A_{is} and C_{is} 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)

$$\text{Concentration for Extracted Samples} = \frac{(\text{On-Column Conc})(\text{Dilution})(\text{Final Volume})}{(\text{Initial Amount})(\text{Injection Volume})}$$

$$\text{Concentration for Purged Samples} = \frac{(\text{On-Column Conc})(\text{Purged Amount})(\text{Dilution})}{(\text{Purged Amount})}$$

Dry Weight Concentration

$$\text{Dry Weight Concentration} = \frac{\text{Final Concentration Wet Weight} * 100}{\%\ \text{Solids}}$$

Percent Difference

$$\%\ \text{Difference} = \frac{\text{Absolute(Continuing Calibration RRF - Average RRF)}}{\text{Average RRF}} * 100$$

Percent Drift

$$\%\ \text{Drift} = \frac{\text{Absolute(Calculated Concentration - Theoretical Concentration)}}{\text{Theoretical Concentration}} * 100$$

Dilution Factor

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

Relative Retention Time

RRT =RT of Compound / RT of ISTD

Breakdown Percent

$$\text{Breakdown} = \frac{\text{Area of DDD + Area of DDE}}{\text{Average (DDT, DDE and DDD)}}$$

-or-

$$\frac{\text{Area of Endrin Ketone + Area of Endrin Aldehyde}}{\text{Average (Endrin, Endrin Ketone, Endrin Aldehyde)}}$$

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 un-necessary 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
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.

14.0 References (Analytical Protocols Utilized at HEAL)

1. Analytical Chemistry of PCB's. Erickson, Mitchell D., CRC Press, Inc. 1992.

2. Diagnosis & Improvement of Saline & Alkali Soils, Agriculture Handbook No. 60, USDA, 1954

3. Environmental Perspective on the Emerging Oil Shale Industry, EPA Oil & Shale Research Group.

4. Field and Laboratory Methods Applicable to Overburdens and Mine Soils, USEPA, EPA-600/2-78-054, March 1978

5. Handbook of Chemistry and Physics, 62nd Edition, CRC Press, Inc. 1981-1982.

6. Handbook on Reference Methods for Soil Testing, The Council on Soil Testing & Plant Analysis, 1980 and 1992

7. Laboratory Procedures for Analyses of Oilfield Waste. Department of Natural Resources, Office of Conservation, Injection and Mining Division, Louisiana, August 1988

8. Langelier index calculation. http://www.corrosion-doctors.org/NaturalWaters/Langelier.htm.

9. Manual for the Certification of Laboratories Analyzing Drinking Water, Criteria and procedures Quality Assurance Fifth Edition, U.S. Environmental Protection Agency, January 2005.

10. Manual of Operating Procedures for the Analysis of Selected Soil, Water, Plant Tissue and Wastes Chemical and physical Parameter. Soil, Water, and Plant Analysis Laboratory, Dept. of Soil and Water Science, The University of Arizona, August 1989

11. The Merck Index, Eleventh Edition, Merck & Co., Inc. 1989.

12. Methods for Chemical Analysis of Water and Wastes, USEPA, EPA-600/4-79-020, March 1979 and as amended December, 1982 (EPA-600/4-82-055)

13. Methods for the Determination of Metals in Environmental Samples, USEPA, EPA-600/4-91-010, June 1991

14. Methods of Soil Analysis: Parts 1 & 2, 2nd Edition, Agronomy Society of America, Monograph 9

15. Polycyclic Aromatic Hydrocarbons in Water Systems, CRC Press, Inc.

16. Procedures for Collecting Soil Samples and Methods of Analysis for Soil Survey. USDA Soil Conservation Service, SSIR No. 1

17. Quality Systems for Analytical Services, Revision 2.2, U.S. Department of Energy, October 2006.

18. Sampling Procedures and Chemical Methods in Use at the U.S. Salinity Laboratory for Characterizing Salt-Affected Soils and Water. USDA Salinity Laboratory.

19. Soil Survey Laboratory Methods Manual. 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

21. Standard Methods for the Examination of Water and Wastewater: AOHA, AWWA, and WPCG; 20th Edition, 1999.

22. Technical Notes on Drinking Water Methods, U.S. Environmental Protection Agency, October 1994.

23. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, USEPA SW-846, 3rd Edition, Updates I, II, IIA, IIB, III, December, 1996.

Proof of Delivery

Close Window

Dear Customer,

This notice serves as proof of delivery for the shipment listed below.

Tracking Number:	1Z8818390155273271
Service:	UPS NEXT DAY AIR
Delivered On:	01/31/2013 9:37 A.M.
Delivered To:	SANTA FE, NM, US
Signed By:	MILLER
Left At:	Front Desk

Thank you for giving us this opportunity to serve you.

Sincerely,

UPS

Tracking results provided by UPS: 02/05/2014 9:33 A.M. ET

Print This Page Close Window

2 LBS PAK 1 OF 1

FROM:
KELLY ROBINSON
(505) 947-9463
WESTERN REFINING SOUTHWEST INC
#50 CR 4990
BLOOMFIELD NM 87413

SHIP TO:
1220 SOUTH ST. FRANCIS DRIVE
(505) 476-3490
NMED - OIL CONSERVATION DIVISION
CARL CHAVEZ
SANTA FE NM 87505

NM 875 0-03

UPS NEXT DAY AIR **1**
TRACKING #: 1Z 881 839 01 5527 3271

BILLING: P/P

WS 15.0.16 HP LaserJet 4 36.0A 01/2013

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

MR. BRANDON POWELL
OIL CONSERVATION DIVISION
ENERGY, MINERALS & NATURAL
RESOUCES DEPARTMENT
1000 RIO BRAZOS ROAD
AZTEC, NM 87410

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) Brandon Powell C. Date of Delivery 1/31

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☒ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7010 3090 0001 3450 2982

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

ice RECEIPT
(No Insurance Coverage Provided)
Visit our website at www.usps.com
OFFICIAL USE

Return Receipt Fee (Endorsement Required)	2.55
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 10.70

Postmark Here
JAN 31 2013
87413

7010 3090 0001

Sent To: Brandon Powell OCD
Street, Apt. No.; or PO Box No.: 1000 Rio Brazos Rd
City, State, ZIP+4: Aztec, NM 87410

PS Form 3800, August 2006 See Reverse for Instructions

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

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

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 up-stream 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,

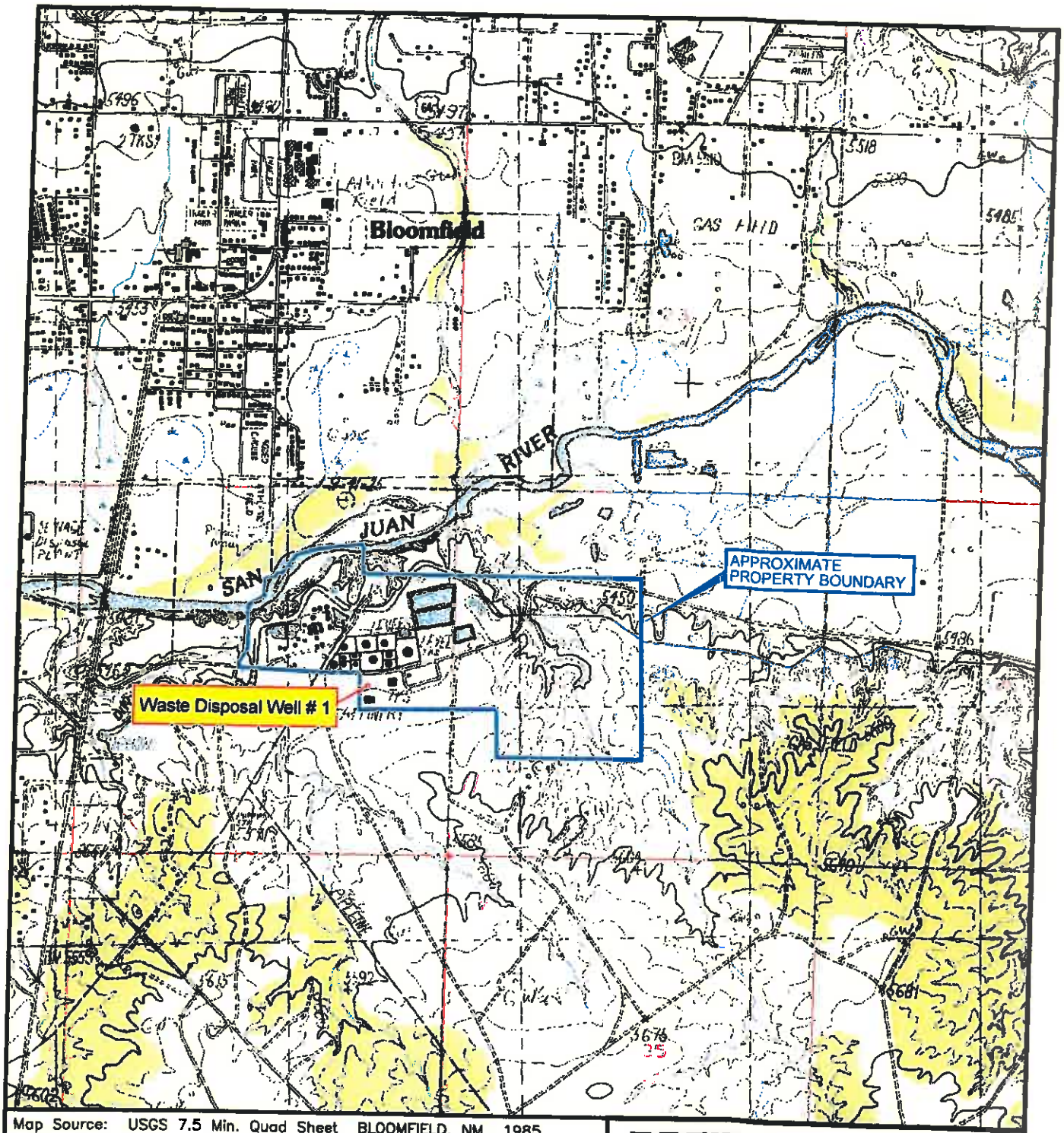
mechanical integrity testing, and Bradenhead testing in 2013. Western will continue to utilize the maximum operating injection pressure at the wellhead as permitted by Discharge Permit GW-130.

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.



Map Source: USGS 7.5 Min. Quad Sheet BLOOMFIELD, NM., 1985.

N

0 2000

SCALE IN FEET

NEW MEXICO

QUADRANGLE LOCATION

Western Refining

WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 01/06/10 | FILE: WestRef-A25

FIGURE 1

SITE LOCATION MAP

BLOOMFIELD REFINERY

WESTERN REFINING DISPOSAL WELL #1

NW, SW SECTION 26, T29N, R11W

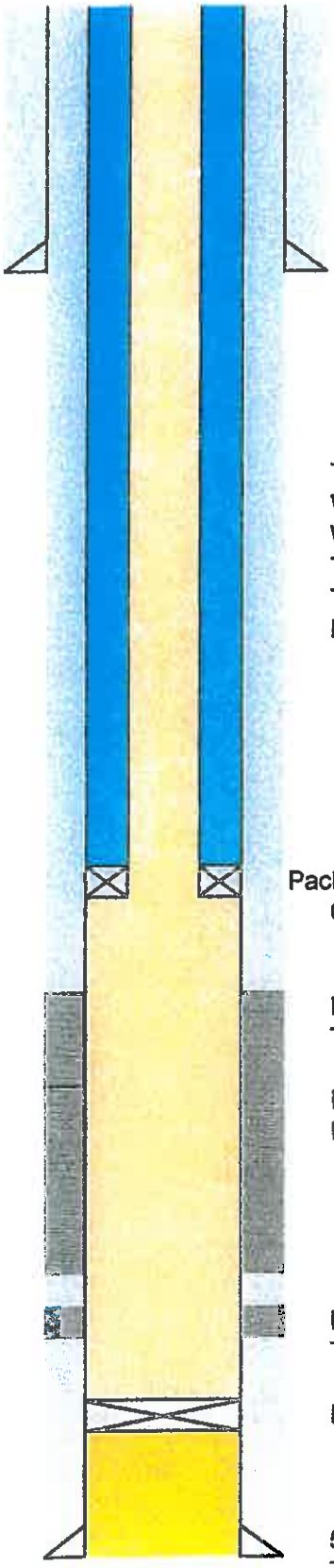
NO.: 30-045-29002

SUBSURFACE — HOUSTON, TX; SOUTH BEND, IN; BATON ROUGE, LA

Figure 2

DISPOSAL WELL #1 WELL SCHEMATIC
Western Refining Inc.
Bloomfield, NM

Date:	4/26/2006	Approved By:	rls	Job No.:	70F5830
Drawn By:	rls	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

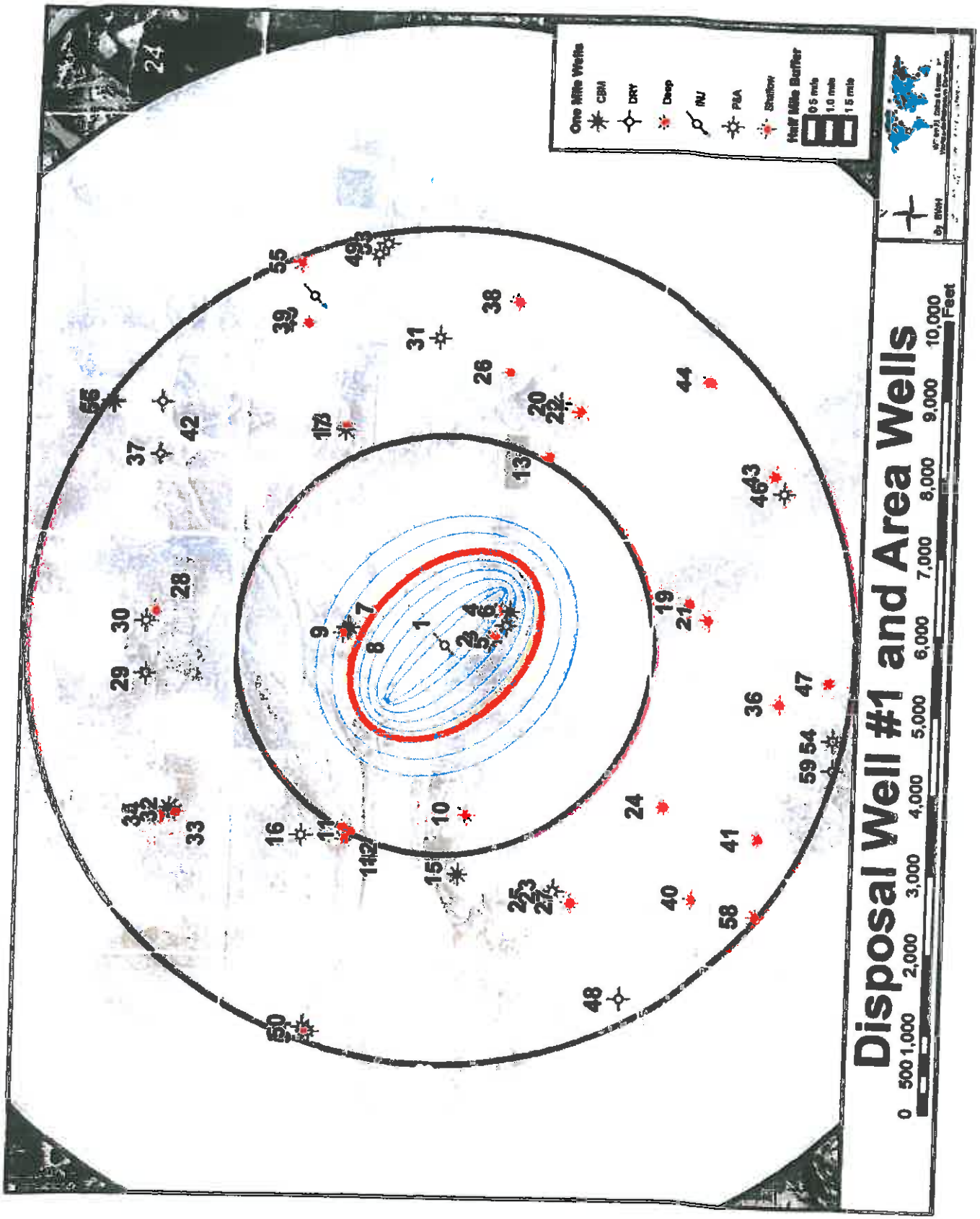

Disposal Well #1 and Area Wells
One Mile Wells
CBM
DRY
Deep
INJ
P&A
Shallow
Half Mile Buffer
0.5 mile
1.0 mile
1.5 mile
0
500
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
Feet

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

PERIOD 2012	AMOUNT OF WATER FROM RIVER (GALLONS)	AMOUNT TO SOLAR EVAP PONDS (GALLONS)	TOTALIZER AMOUNT INJECTED (GALLONS)	DOWN-TIME (HRS)	INJECTION PRESSURE			ANNULAR PRESSURE			ON-LINE FLOW RATES		
					MAX (PSIA)	MIN (PSIA)	AVG (PSIA)	MAX (PSIA)	MIN (PSIA)	AVG (PSIA)	MAX (GPM)	MIN (GPM)	AVG (GPM)
JAN	855	408,692	1,384,309	194	1045	901	929	200	131	158	86	21	42
FEB	1,806	596,588	927,412	0	922	885	906	186	158	174	30	17	23
MAR	859	875,969	841,031	0	899	882	888	239	179	207	25.0	2	19
APR	2,011	937,502	753,498	0	935	879	895	278	196	236	27	14	18
MAY	1,819	1,751,491	125,509	637	941	844	862	245	107	173	28	0	4
JUN	2,350	1,336,426	991,574	246	1016	841	893	200	107	158	64	0	23
JUL	5	2,448,221	109,779	711	989	830	849	200	132	160	62	0	4
AUG	2,630	21,272	1,390,728	360	1008	837	913	176	120	151	65	0	29
SEP	2,496	516,221	996,779	439	996	838	899	208	111	170	62	0	23
OCT	509	466,493	1,069,507	321	991	835	889	207	106	141	58	0	23
NOV	2,291	1,050,531	41,469	673	861	817	827	185	125	173	21	0	1
DEC	2,199	938,575	364,425	438	900	757	817	187	115	159	47	0	9

The total amount injected in 2012 is: **8,996,020** gallons

CERTIFICATION: Kelly Robinson DATE: 1-29-13

Table 2

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	P&A Date	ULSTR	OPERATOR	RESERVOIR	Status	Pen. Ini. 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	CBM	No
7	0.23	JACQUE	2	30-045-34409	1483	1689	1689		H-27-29N-11W	HOLCOMB O&G	FRUITLAND COAL	CBM	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	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	CBM	No
34	0.79	COOK	1	30-045-07940	6052	6226	6226		N-22-29N-11W	MANANA GAS INC	DAKOTA	Deep	Yes
35	0.79	COOK	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	#	APINO	Perf Top	Perf Bottom	Total Depth	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	CBM	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

Status	Total Wells	Pen Inj. Zone	
		Yes	No
P&A	15	3	12
Dry	4	0	4
INJ	2	2	0
CBM	*7*	*2*	*5*
Shallow	17	3	14
Deep	14	14	0
Total	59	24	35

Table 3

Injection Well
2012 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Volatile Organic Compounds *(ug/L)*					
1,1,1,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 10
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 10
1,1,2,2-Tetrachloroethane		< 2.0	< 2.0	< 2.0	< 20
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 10
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 10
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 10
1,1-Dichloropropene		< 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	< 2.0	< 20
1,2,4-Trichlorobenzene		< 1.0	< 1.0	< 1.0	< 10
1,2,4-Trimethylbenzene		< 1.0	< 1.0	< 1.0	< 10
1,2-Dibromo-3-chloropropane		< 2.0	< 2.0	< 2.0	< 20
1,2-Dibromoethane (EDB)		< 1.0	< 1.0	< 1.0	< 10
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		< 1.0	< 1.0	< 1.0	< 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		< 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	< 1.0	< 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	< 10
Bromobenzene		< 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	< 1.0	< 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		< 3.0	< 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		< 2.0	< 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	< 10
Toluene		12	< 1.0	2.6	< 10
trans-1,2-DCE		< 1.0	< 1.0	< 1.0	< 10
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 10
Trichloroethene (TCE)		< 1.0	< 1.0	< 1.0	< 10
Trichlorofluoromethane		< 1.0	< 1.0	< 1.0	< 10
Vinyl chloride	200	< 1.0	< 1.0	< 1.0	< 10
Xylenes, Total		< 1.5	< 1.5	< 1.5	< 15

Table 3

Injection Well
2012 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Semi-Volatile Organic Compounds *(ug/L)*					
1.2.4-Trichlorobenzene		< 10	< 50	< 50	< 50
1,2-Dichlorobenzene		< 10	< 50	< 50	< 50
1.3-Dichlorobenzene		< 10	< 50	< 50	< 50
1,4-Dichlorobenzene	7500	< 10	< 50	< 50	< 50
1-Methylnaphthalene		< 10	< 50	< 50	< 50
2,4.5-Trichlorophenol		< 10	< 50	< 50	< 50
2,4.6-Trichlorophenol	2000	< 10	< 50	< 50	< 50
2.4-Dichlorophenol		< 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	< 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	< 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	< 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	< 50	< 50
Acenaphthylene		< 10	< 50	< 50	< 50
Aniline		< 10	< 50	< 50	< 50
Anthracene		< 10	< 50	< 50	< 50
Azobenzene		< 10	< 50	< 50	< 50
Benz(a)anthracene		< 10	< 50	< 50	< 50
Benzo(a)pyrene		< 10	< 50	< 50	< 50
Benzo(b)fluoranthene		< 10	< 50	< 50	< 50
Benzo(g.h.i)perylene		< 10	< 50	< 50	< 50
Benzo(k)fluoranthene		< 10	< 50	< 50	< 50
Benzoic acid		< 20	< 100	< 100	< 100
Benzyl alcohol		< 10	< 50	< 50	< 50
Bis(2-chloroethoxy)methane		< 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	< 50	< 50
Carbazole		< 10	< 50	< 50	< 50
Chrysene		< 10	< 50	< 50	< 50
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
Isophorone		< 10	< 50	< 50	< 50
Naphthalene		< 10	< 50	< 50	< 50
Nitrobenzene	2000	< 10	< 50	< 50	< 50
N-Nitrosodimethylamine		< 10	< 50	< 50	< 50
N-Nitrosodi-n-propylamine		< 10	< 50	< 50	< 50
N-Nitrosodiphenylamine		< 10	< 50	< 50	< 50
Pentachlorophenol	100000	< 20	< 100	< 100	< 100
Phenanthrene		< 10	< 50	< 50	< 50
Phenol		14	< 50	< 50	< 50
Pyrene		< 10	< 50	< 50	< 50
Pyridine	5000	< 10	< 50	< 50	< 50

Table 3

Injection Well
2012 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
General Chemistry ***(mg/L unless otherwise 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	100.0	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	< 0.01
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/
"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, 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

Submit 3 Copies To Appropriate District Office
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

WELL API NO.
30-045-29002-00

5. Indicate Type of Lease
STATE ☐ FEE X ☐

6. State Oil & Gas Lease No.
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.)

7. Lease Name or Unit Agreement Name
Disposal

1. Type of Well: Oil Well ☐ Gas Well ☐ Other X (Disposal)

8. Well Number #001

2. Name of Operator
Western Refining Southwest, Inc. – Bloomfield Refinery

9. OGRID Number
037218

3. Address of Operator
#50 Road 4990 Bloomfield, NM 87413

10. Pool name or Wildcat
Blanco/Mesa Verde

4. Well Location
Unit Letter I : 2442 feet from the South line and 1250 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.)*

Pit or Below-grade Tank Application ☐ or Closure ☐

Pit type_____ Depth to Groundwater_____ Distance from nearest fresh water well_____ Distance from nearest surface water_____

Pit Liner Thickness: _____ mil Below-Grade Tank: Volume _____ bbls; Construction Material _____

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	☐		
OTHER: MIT, Bradenhead, and High Pressure Shut-Down Tests	☒			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 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Bloomfield Refinery requests permission to perform the annual High Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test on the Class I injection well referenced above on September 6th, 2012, pending final scheduling with OCD Aztec representative's schedule. Western will contact the OCD Aztec office to ensure testing is performed at a time that a representative from their office is able to be on-site to witness the testing activities

I hereby certify that the information above is true and complete to the best of my knowledge and belief. I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.

SIGNATURE Kelly Robinson TITLE Environmental Supervisor DATE 8/29/2012

Type or print name Kelly Robinson E-mail address: Kelly.Robinson@wnr.com Telephone No. (505) 632-4166

For State Use Only

APPROVED BY: Brandon Powell TITLE Environmental Engineer DATE 8/30/2012
Conditions of Approval (if any):

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); Cheryl.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/
"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

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 OR UIC)

Date of Test 8-6-12 Operator San Juan Refining API # 30-0 45-29002

Property Name Disposal Well # 1 Location: Unit I Sec 21 Twn 29 Rge 11

Land Type:
State ____
Federal ____
Private /
Indian ____

Well Type:
Water Injection ____
Salt Water Disposal /
Gas Injection ____
Producing Oil/Gas ____
Pressure obervation ____

Temporarily Abandoned Well (Y/N): ____ TA Expires: ____

Casing Pres. 0
Bradenhead Pres. 0
Tubing Pres. 960
Int. Casing Pres. N/A

Tbg. SI Pres. ____
Tbg. Inj. Pres. ____

Max. Inj. Pres. ____

Pressured annulus up to 495 psi. for 30 mins. Test passed/failed

REMARKS:
Packer set 3221
Top perf 3276 - 3308
Well was injecting when started. Chart clocked at 25 minutes - started to rise. Held at 500 lbs last 10 minutes of 40 min test.

By Kelly Roberts (Operator Representative) Witness Monica Kuehling (NMOCD)

(Position)

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 III/3distric.htm

BRADENHEAD TEST REPORT

(submit 1 copy to above address)

Date of Test 9-6-12 Operator San Juan Refining API #30-0 45 29002

Property Name Disposal Well No. 1 Location: Unit I Section 27 Township 29 Range 11

Well Status(Shut-In or Producing) Initial PSI: Tubing 960 Intermediate N/A Casing 120 Bradenhead 0

OPEN BRADENHEAD AND INTERMEDIATE TO ATMOSPHERE INDIVIDUALLY FOR 15 MINUTES EACH

PRESSURE

Testing	Bradenhead			INTERM	
TIME	BH	Int	Csg	Int	Csg
5 min	0		120		
10 min	0		120		
15 min	0		120		
20 min					
25 min					
30 min					

FLOW CHARACTERISTICS

	BRADENHEAD	INTERMEDIATE
Steady Flow		
Surges		
Down to Nothing	✓	
Nothing		
Gas		
Gas & Water		
Water		

If bradenhead flowed water, check all of the descriptions that apply below:

CLEAR_____ FRESH_____ SALTY_____ SULFUR_____ BLACK_____

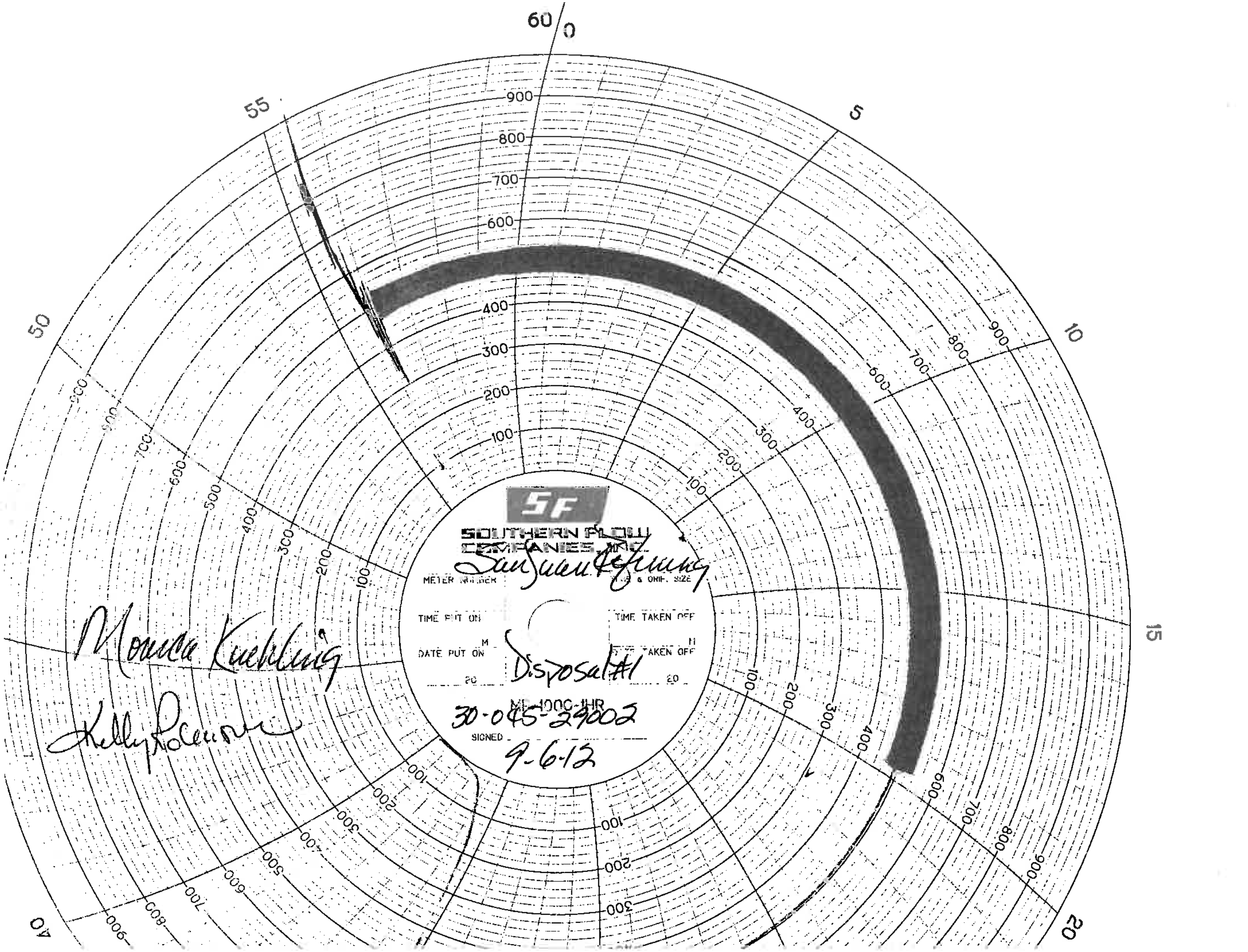
5 MINUTE SHUT-IN PRESSURE BRADENHEAD 0 INTERMEDIATE N/A

REMARKS: Puff when opened.

By [signature] Witness Monica Kuehling

(Position)

E-mail address


SOUTHERN FLOW COMPANIES, INC.
METER NUMBER
San Juan Refining
& ORIF. SIZE
TIME PUT ON
M
TIME TAKEN OFF
M
DATE PUT ON
20
Disposal #1
TAKEN OFF
20
MI-1000-1HR
30-045-29002
SIGNED
9-6-12
Monica Kuehling
Kelly Roconovi

APPENDIX B

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

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

OrderNo.: 1201473

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

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#: **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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 1st Qtr 1-17-12
Lab ID: 1201473-001 **Matrix:** AQUEOUS

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	Qual	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	1	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: SEMIVOLATILES						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	1	1/23/2012 7:42:25 PM
Benzo(b)fluoranthene	ND	10		µg/L	1	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

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.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 1st Qtr 1-17-12
Lab ID: 1201473-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **JDC**
4-Chlorophenyl phenyl ether	ND	10		µg/L	1	1/23/2012 7:42:25 PM
Chrysene	ND	10		µg/L	1	1/23/2012 7:42:25 PM
Di-n-butyl phthalate	ND	10		µg/L	1	1/23/2012 7:42:25 PM
Di-n-octyl phthalate	ND	10		µg/L	1	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 PM
1,2-Dichlorobenzene	ND	10		µg/L	1	1/23/2012 7:42:25 PM
1,3-Dichlorobenzene	ND	10		µg/L	1	1/23/2012 7:42:25 PM
1,4-Dichlorobenzene	ND	10		µg/L	1	1/23/2012 7:42:25 PM
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	1	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	1	1/23/2012 7:42:25 PM
Fluoranthene	ND	10		µg/L	1	1/23/2012 7:42:25 PM
Fluorene	ND	10		µg/L	1	1/23/2012 7:42:25 PM
Hexachlorobenzene	ND	10		µg/L	1	1/23/2012 7:42:25 PM
Hexachlorobutadiene	ND	10		µg/L	1	1/23/2012 7:42:25 PM
Hexachlorocyclopentadiene	ND	10		µg/L	1	1/23/2012 7:42:25 PM
Hexachloroethane	ND	10		µg/L	1	1/23/2012 7:42:25 PM
Indeno(1,2,3-cd)pyrene	ND	10		µg/L	1	1/23/2012 7:42:25 PM
Isophorone	ND	10		µg/L	1	1/23/2012 7:42:25 PM
1-Methylnaphthalene	ND	10		µg/L	1	1/23/2012 7:42:25 PM
2-Methylnaphthalene	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 PM
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	1	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	1	1/23/2012 7:42:25 PM
4-Nitroaniline	ND	20		µg/L	1	1/23/2012 7:42:25 PM
Nitrobenzene	ND	10		µg/L	1	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

Qualifiers:

*X	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 1st Qtr 1-17-12
Lab ID: 1201473-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						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	1	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	1	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	1	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	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	1	1/20/2012 6:00:49 PM
4-Chlorotoluene	ND	1.0		µg/L	1	1/20/2012 6:00:49 PM
cis-1,2-DCE	ND	1.0		µg/L	1	1/20/2012 6:00:49 PM
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	1/20/2012 6:00:49 PM
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	1/20/2012 6:00:49 PM

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.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 1st Qtr 1-17-12
Lab ID: 1201473-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **JDJ**
Dibromochloromethane	ND	1.0		µg/L	1	1/20/2012 6:00:49 PM
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 PM
1,3-Dichlorobenzene	ND	1.0		µg/L	1	1/20/2012 6:00:49 PM
1,4-Dichlorobenzene	ND	1.0		µg/L	1	1/20/2012 6:00:49 PM
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	1	1/20/2012 6:00:49 PM
Isopropylbenzene	ND	1.0		µg/L	1	1/20/2012 6:00:49 PM
4-Isopropyltoluene	ND	1.0		µg/L	1	1/20/2012 6:00:49 PM
4-Methyl-2-pentanone	ND	10		µg/L	1	1/20/2012 6:00:49 PM
Methylene Chloride	ND	3.0		µg/L	1	1/20/2012 6:00:49 PM
n-Butylbenzene	ND	1.0		µg/L	1	1/20/2012 6:00:49 PM
n-Propylbenzene	ND	1.0		µg/L	1	1/20/2012 6:00:49 PM
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	1	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 PM
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 PM
Vinyl chloride	ND	1.0		µg/L	1	1/20/2012 6:00:49 PM
Xylenes, Total	ND	1.5		µg/L	1	1/20/2012 6:00:49 PM
Surr: 1,2-Dichloroethane-d4	75.8	70-130		%REC	1	1/20/2012 6:00:49 PM
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

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.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 1st Qtr 1-17-12
Lab ID: 1201473-001 **Matrix:** AQUEOUS

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	Qual	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**
pH	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 SOLIDS						Analyst: **KS**
Total Dissolved Solids	1,770	200		mg/L	1	1/20/2012 2:59:00 PM

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

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 #:**	120119019
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201473
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120119019-001	**Sampling Date**	1/17/2012	**Date/Time Received**	1/19/2012 1:40 PM
Client Sample ID	1201473-001D / INJECTION WELL	**Sampling Time**	8:30 AM		
Matrix	Water	**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	
pH	6.58	ph Units		1/25/2012	KFG	EPA 150.1	
Reactive sulfide	4.80	mg/L	1	1/25/2012	JTT	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

Certifications held by Anatek Labs 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 Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; 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 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 Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Cyanide (reactive)	0.550	mg/L	0.5	110.0	80-120	1/31/2012	1/31/2012
Reactive sulfide	0.200	mg/L	0.2	100.0	70-130	1/25/2012	1/25/2012

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
120119019-001	Reactive sulfide	4.80	7.60	mg/L	4	70.0	70-130	1/25/2012	1/25/2012
120119019-001	Cyanide (reactive)	ND	0.451	mg/L	0.5	90.2	80-120	1/31/2012	1/31/2012

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide (reactive)	ND	mg/L	0.1	1/31/2012	1/31/2012
Reactive sulfide	ND	mg/kg	1	1/25/2012	1/25/2012

AR	Acceptable Range
ND	Not Detected
PQL	Practical Quantitation Limit
RPD	Relative Percentage Difference

Comments:

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
1112290B-01	12/30/11	SOIL	ST		81°F
1112220Z3-001	12-30-11	AL	"		ND
1112280Z0-001	12-30-11	4	"		ND
120105039-001	1/9/12	4/5	/ST		>200
" -002	"	5	"		Room Temp
" -003	"	5	"		>200
120179C9-001	2-2-2012	4	MH		>200

* SAFETY GLASSES REQUIRED.

PH/Alkalinity SM4500H+B / SM2320B Carbonate & Bicarbonate

Quality Control Information	Equivalent EPA Methods	150.1 & 310.1
Standards	**Concentration**	**Expires**	**Amount Spiked (mg/L)**
Matrix Spike Solution # M637-04	1N	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_2SO_4 Titrant H_2SO_4	Fisher, Lot # 000781	9/1/12
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

Equipment: Contriburette: CAT 10uL 600055; pH meter: Orion model 620A 007858

Sample	Temp (°C)	pH	pH 4 Cal	pH 10 Cal	Slope	pH 7 Buffer	Sample (mL)	Titrate to 8.3 (mL)	Titrate to 4.5 (mL)	Titrate to 4.2 (mL)	Alkalinity (mg/L)	%	Date	Init.
BLK	22,7	3,43	4,01	10,00	101,3	7,08	100	—	—	—	0		1/25/12	JLB
LFB	~~22,5~~	~~5,37~~						4,02	~~7,84~~ 9,32	—	93,2	93,2		
120120017-002MS	17,5	9,34						3,90	10,58	—	105,8	98,8		
-002MSD	16,8	9,33						3,97	10,55	—	105,5	98,5		
120123014-001	12,1	~~X~~ 5,68						—	1,21	1,39	10,3			
-002	16,9	5,79						—	1,90	1,56	12,4			
120120017-001	15,6	6,68					25	—	—	—	—			
-002	16,6	5,87					100	—	0,88	1,06	7,0			
120120018-001	15,4	6,02					25	—	—	—	—			
-002	16,9	6,08						—	—	—	—			
120120005-001	12,4	5,81						—	—	—	—			
-002	16,7	5,95						—	—	—	—			
120119019-001	19,0	6,58						—	—	—	—			
120123004-001	16,8	6,03						—	—	—	—			

Comments: Alkalinity = mL of titrant x 10 if 100 mL sample was used.

Sulfide by SM 4500-S^{2-} F

	Concentration	Date Made/Expires
Iodine	0.025 N	
HCl	6 N	
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	Sample Volume	Iodine amount (50 uL increments)	Concentration (ug/sample)	Concentration (mg/L)	Date	Initials
120124022-1 M= 28.7	50 mL	50	20 ug = 0.02 mg	0.4 x 28.7 = 11.5	1-25-12	
-1 MS M=28.7	↓	450	180 = 0.180	3.6 x 28.7 = 103.3		
-LCS	1000 mL	500	200 = 0.200	0.200		
-LCSD	↓	450	180 0.180	0.180		
-BL	↓	50	20 0.02	0.020		
120119019-1	50 mL	600	240 0.240	4.80		
-1 MS	↓	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: M825-01 Exp: 1/4/2013
Free Cyanide MS/MSD/LCS Soln: M824-05 Exp: 12/28/2012

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)
1	120124029-1	WW epa	NaOH	50mL	1x			
2	30-1	↓	↓	↓	↓			
3	-3							
4	-5							
5	-7							
6	-9							
7	-11							
8	120120025-13							
9	-14							
10	120120021-1	↓	↓	↓	↓			
11	120119019-1	reactive ww	NaOH	50mL	1x			
12	-lms	↓	↓	↓	↓		1mL	
13	-lmsD						↓	
14	-LCS							
15	-BL	↓						
16	120124035-3	WW epa						
17	-4	↓	↓	↓	↓			
18	120124029-3			25mL	2x			
19	120126019-1			50mL	1x			
20	19-1	↓	↓	↓	↓			

* 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	A041-03
18 N H_2SO_4	A043-08
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% $MgCl_2$	A043-06

Analytical Reagents:	Reagent #:
Barbituric Acid	R038-13
Sodium Phosphate	R026-23
Chloramine-t	R048-09
Pyridine	R043-03

Distillation Initials/Date Distilled: CMW 1/31/12

Analyst Initials/Date Analyzed: CMW 1/31/12

N:\Bench Sheets\Total Cyanide EPA 335.4.xls

File name: T:\DATA1\FLOW4\2012\EPA335.4\013112CN.RST
Date: January 31, 2012
Operator: CRW

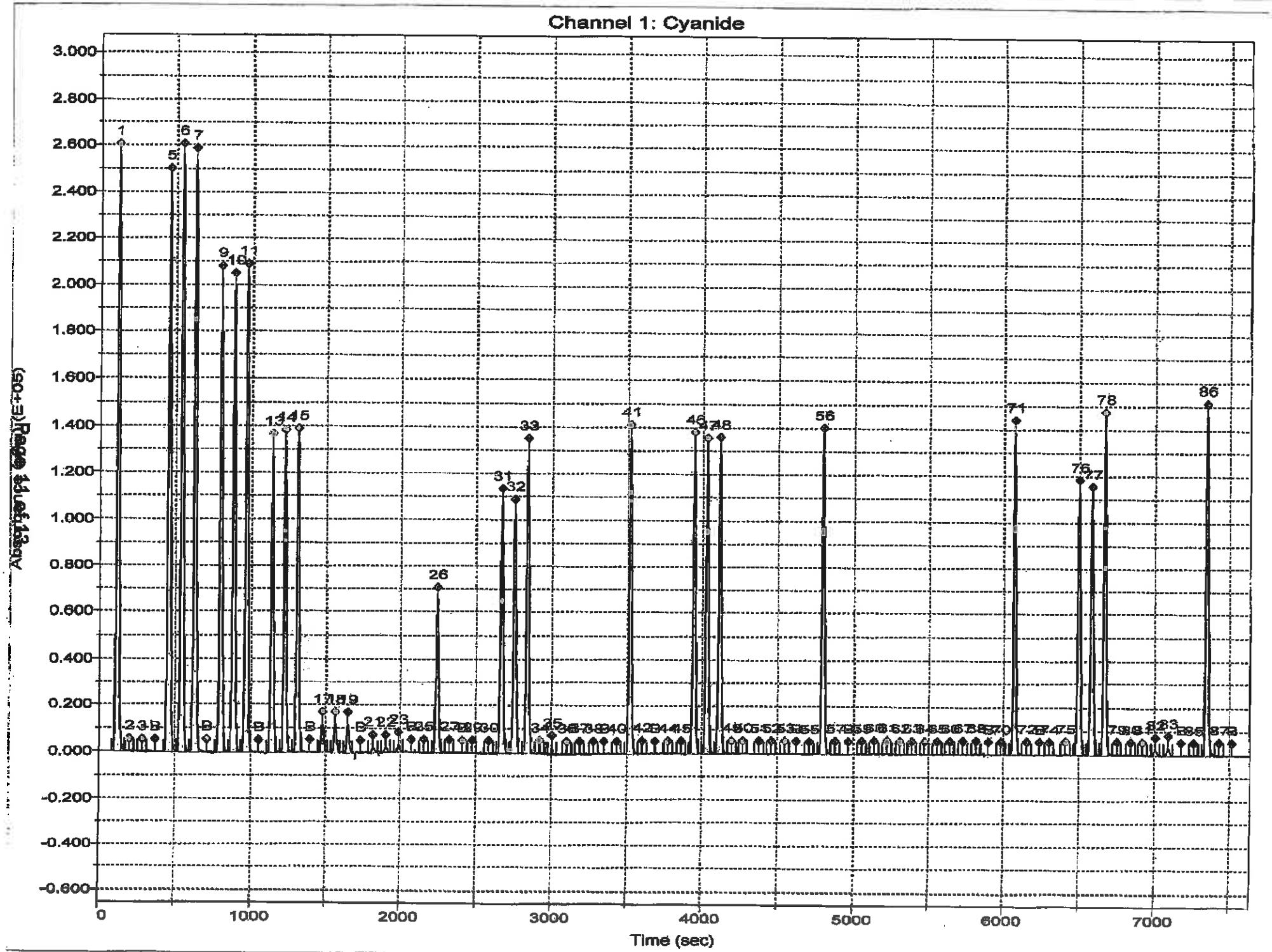
CRW 1/31/12

120131 FIACRW

Peak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
1	2	Sync	SYNC	1	1	5011022	0.976764
2	0	Carryover	CO	1	1	8239	0.003383
3	0	Carryover	CO	1	1	3828	0.002512
B	0	Baseline	RB	1	1	1088	0.001972
5	2	Cal 1.00 ppm	C	1	1	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	C	1	1	4098498	0.801292
10	3	Cal 0.80 ppm	C	1	1	4107172	0.802965
11	3	Cal 0.80 ppm	C	1	1	4110518	0.803610
B	0	Baseline	RB	1	1	-209	0.001716
13	4	Cal 0.50 ppm	C	1	1	2527944	0.497117
14	4	Cal 0.50 ppm	C	1	1	2539596	0.499384
15	4	Cal 0.50 ppm	C	1	1	2539803	0.499424
B	0	Baseline	RB	1	1	-1513	0.001458
17	5	Cal 0.05 ppm	C	1	1	229062	0.046935
18	5	Cal 0.05 ppm	C	1	1	235544	0.048213
19	5	Cal 0.05 ppm	C	1	1	237027	0.048505
B	0	Baseline	RB	1	1	9671	0.003666
21	6	Cal 0.01 ppm	C	1	1	44975	0.010632
22	6	Cal 0.01 ppm	C	1	1	45786	0.010792
23	6	Cal 0.01 ppm	C	1	1	59215	0.013442
B	0	Baseline	RB	1	1	-1438	0.001473
25	1	Blank	BLNK	1	1	-4958	0.000778
26	7	ICV 0.25 ppm	CCV	1	1	1275398	0.252564
27	1	Blank	BLNK	1	1	5769	0.002895
B	0	Baseline	RB	1	1	3279	0.002404
29	8	120119013-BL WW	U	1	1	1888	0.002129
30	9	120119013-006	U	1	1	-6289	0.000516
31	10	120119013-006MS	U	1	1	2174078	0.428203
32	11	120119013-006MSD	U	1	1	2134286	0.420445
33	12	120119013-LCS	U	1	1	2576018	0.506468
34	13	120120025-003	U	1	1	-4267	0.000915
35	14	120120025-005	U	1	1	-9250	-0.000069
36	15	120120025-007	U	1	1	-13044	-0.000818
37	16	120120025-009	U	1	1	-4512	0.000866
38	17	RINSE	U	1	1	-1957	0.001371
B	0	Baseline	RB	1	1	1425	0.002038
40	1	Blank	BLNK	1	1	2624	0.002275
41	4	CCV 0.5 ppm	CCV	1	1	2612191	0.513503
42	1	Blank	BLNK	1	1	7585	0.003254
B	0	Read Baseline	RB	1	1	-1396	0.001481
44	18	120124030-BL WAD	U	1	1	1219	0.001998
45	19	120124030-010	U	1	1	421	0.001840
46	20	120124030-010MS	U	1	1	2670406	0.524821
47	21	120124030-010MSD	U	1	1	2711906	0.532887
48	22	120124030-LCS	U	1	1	2725860	0.535599
49	23	120124030-002	U	1	1	11499	0.004026
50	24	120124030-004	U	1	1	12810	0.004285
51	25	120124030-006	U	1	1	6810	0.003101
52	26	120124030-008	U	1	1	6000	0.002941
53	27	120124030-012	U	1	1	3675	0.002482
B	0	Baseline	RB	1	1	-591	0.001640
55	1	Blank	BLNK	1	1	-8955	-0.000011
56	4	CCV 0.5 ppm	CCV	1	1	2577006	0.506660
57	1	Blank	BLNK	1	1	-1352	0.001490
B	0	Read Baseline	RB	1	1	134	0.001783
59	28	120124029-001	U	1	1	3191	0.002387
60	29	120124030-001	U	1	1	9504	0.003633
61	30	120124030-003	U	1	1	8969	0.003527
62	31	120124030-005	U	1	1	2566	0.002263
63	32	120124030-007	U	1	1	3330	0.002414
64	33	120124030-009	U	1	1	1495	0.002052
65	34	120124030-011	U	1	1	1423	0.002038
66	35	120120025-013	U	1	1	5643	0.002871

Peak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
67	36	*120120025-014	U	1	1	6558	0.003051
68	37	*120120021-001	U	1	1	8193	0.003374
B	0	Baseline	RB	1	1	359	0.001828
70	1	Blank	BLNK	1	1	-712	0.001616
71	4	CCV 0.5 ppm	CCV	1	1	2596031	0.510360
72	1	Blank	BLNK	1	1	-1250	0.001510
B	0	Read Baseline	RB	1	1	-1961	0.001370
74	38	120119019-BL	U	1	1	-2242	0.001314
75	39	120119019-001	U	1	1	2777	0.002305
76	40	120119019-001MS	U	1	1	2291410	0.451068
77	41	120119019-001MSD	U	1	1	2303223	0.453370
78	42	120119019-LCS	U	1	1	2799762	0.549957
79	43	*120124035-003	U	1	1	872	0.001929
80	44	*120124035-004	U	1	1	-1532	0.001455
81	45	*120124029-003	U	2	1	-2218	0.002638
82	46	*120126018-001	U	1	1	40713	0.009791
83	47	*120126019-001	U	1	1	57976	0.013197
B	0	Baseline	RB	1	1	-4629	0.000843
85	1	Blank	BLNK	1	1	-5813	0.000610
86	4	CCV 0.5 ppm	CCV	1	1	2720732	0.534602
87	1	Blank	BLNK	1	1	-4225	0.000923
B	0	Read Baseline	RB	1	1	226	0.001801

Peak	Cup	Flags
1	2	
2	0	
3	0	
B	0	BL
5	2	
6	2	
7	2	
B	0	BL
9	3	
10	3	
11	3	
B	0	BL
13	4	
14	4	
15	4	
B	0	BL
17	5	OL
18	5	
19	5	
B	0	BL
21	6	
22	6	
23	6	OL
B	0	BL
25	1	
26	7	
27	1	
B	0	BL
29	8	
30	9	
31	10	
32	11	
33	12	
34	13	
35	14	LO
36	15	LO
37	16	
38	17	
B	0	BL
40	1	
41	4	
42	1	
B	0	BL
44	18	


Channel 1: Cyanide
3.000
2.800
2.600
2.400
2.200
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
-0.200
-0.400
-0.600
0
1000
2000
3000
4000
5000
6000
7000
Time (sec)

File name: T:\DATA1\FLOW4\2012\EPA335.4\013112CN.RST
Date: January 31, 2012
Operator: CRW

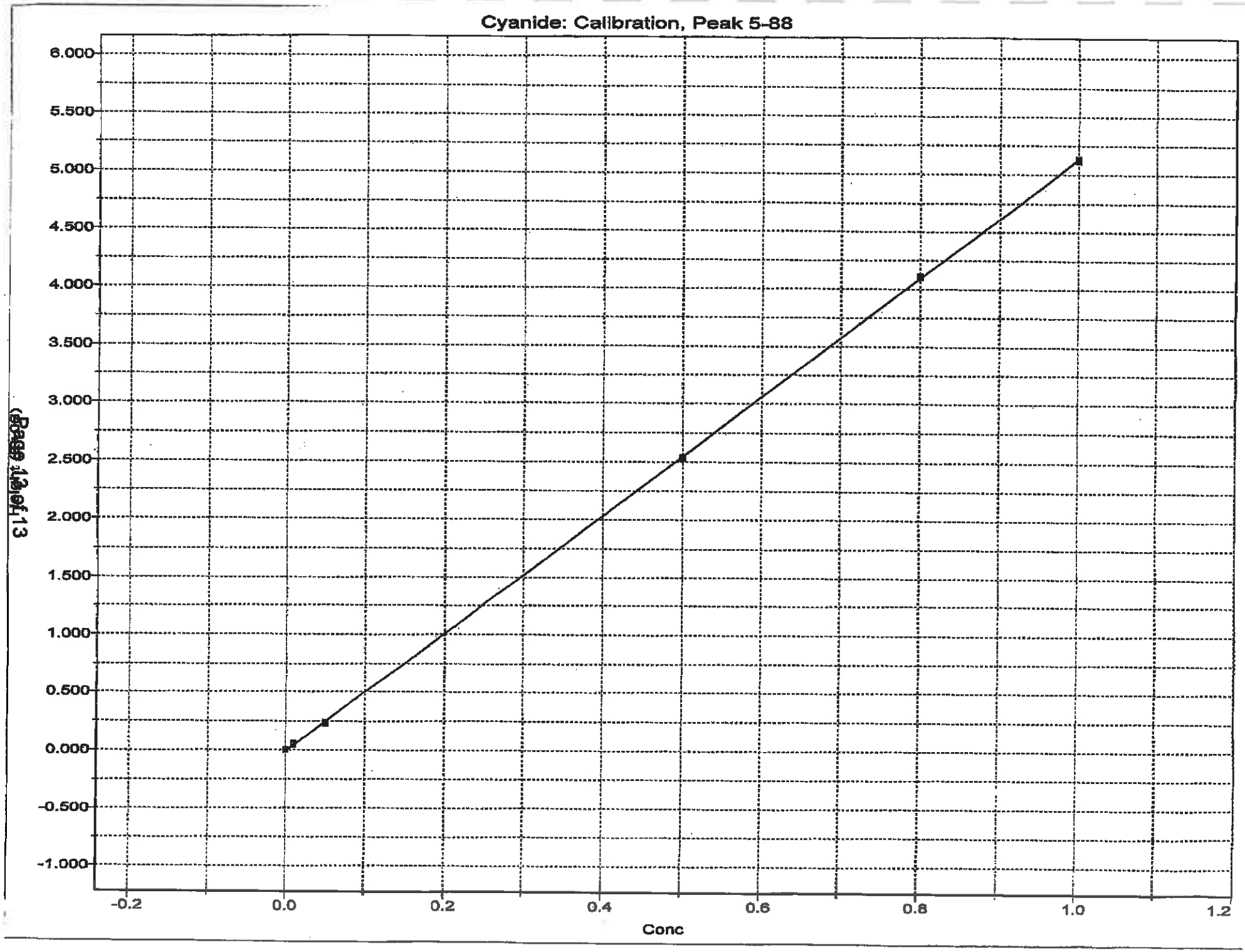
*	Name	Conc	Area
*	Cal 1.00 ppm	1.000000	5134414.000000
*	Cal 1.00 ppm	1.000000	5113915.000000
*	Cal 1.00 ppm	1.000000	5127215.000000
*	Cal 0.80 ppm	0.800000	4098498.500000
*	Cal 0.80 ppm	0.800000	4107171.750000
*	Cal 0.80 ppm	0.800000	4110518.500000
*	Cal 0.50 ppm	0.500000	2527943.750000
*	Cal 0.50 ppm	0.500000	2539596.250000
*	Cal 0.50 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


Cyanide: Calibration, Peak 5-88
6.000
5.500
5.000
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
-0.500
-1.000
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Conc

QC SUMMARY REPORT

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**	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**

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: **LCSW**	Batch ID: **R458**	RunNo: **458**
Prep Date:	Analysis Date: **1/18/2012**	SeqNo: **13151** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	94.6	90	110			
Sulfate	9.7	0.50	10.00	0	96.9	90	110			

Qualifiers:

*/X	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**	
Client ID: **PBW**	Batch ID: **R486**	RunNo: **486**	
Prep Date:	Analysis Date: **1/20/2012**	SeqNo: **13958**	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								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								

Qualifiers:

*/X	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R486**	RunNo: **486**
Prep Date:	Analysis Date: **1/20/2012**	SeqNo: **13958** 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	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	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 lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R486**	RunNo: **486**
Prep Date:	Analysis Date: **1/20/2012**	SeqNo: **13959** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	106	81.1	130			
Toluene	21	1.0	20.00	0	105	82.3	122			
Chlorobenzene	21	1.0	20.00	0	105	70	130			
1,1-Dichloroethene	23	1.0	20.00	0	113	83.1	126			
Trichloroethene (TCE)	20	1.0	20.00	0	99.1	67.4	137			
Surr: 1,2-Dichloroethane-d4	7.3		10.00		73.3	70	130			
Surr: 4-Bromofluorobenzene	9.3		10.00		93.1	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

QC SUMMARY REPORT

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 **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R486**	RunNo: **486**
Prep Date:	Analysis Date: **1/20/2012**	SeqNo: **13959** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	8.0		10.00		80.4	69.8	130			
Surr: Toluene-d8	9.2		10.00		91.8	70	130			

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R486**	RunNo: **486**
Prep Date:	Analysis Date: **1/20/2012**	SeqNo: **14361** Units: **µg/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			
Toluene	22	1.0	20.00	0	110	82.3	122			
Chlorobenzene	21	1.0	20.00	0	107	70	130			
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			
Surr: 1,2-Dichloroethane-d4	8.1		10.00		81.1	70	130			
Surr: 4-Bromofluorobenzene	9.5		10.00		95.2	70	130			
Surr: Dibromofluoromethane	8.3		10.00		82.8	69.8	130			
Surr: Toluene-d8	9.1		10.00		91.1	70	130			

Sample ID **b9**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R486**	RunNo: **486**
Prep Date:	Analysis Date: **1/20/2012**	SeqNo: **15528** 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								

Qualifiers:

*/X	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R486**	RunNo: **486**
Prep Date:	Analysis Date: **1/20/2012**	SeqNo: **15528** Units: **µg/L**

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

Qualifiers:

*/X	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R486**	RunNo: **486**
Prep Date:	Analysis Date: **1/20/2012**	SeqNo: **15528** 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	70	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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **389**	RunNo: **538**
Prep Date: **1/23/2012**	Analysis Date: **1/23/2012**	SeqNo: **15303** 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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **389**	RunNo: **538**
Prep Date: **1/23/2012**	Analysis Date: **1/23/2012**	SeqNo: **15303** 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			
Surr: Phenol-d5	80		200.0		39.9	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

QC SUMMARY REPORT

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 **lcs-389**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **389**	RunNo: **538**
Prep Date: **1/23/2012**	Analysis Date: **1/23/2012**	SeqNo: **15304** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Acenaphthene	59	10	100.0	0	58.6	37.7	119			
4-Chloro-3-methylphenol	110	10	200.0	0	55.3	48.8	104			
2-Chlorophenol	98	10	200.0	0	48.8	38.2	109			
1,4-Dichlorobenzene	50	10	100.0	0	50.3	33.7	99.1			
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			
4-Nitrophenol	61	10	200.0	0	30.3	21.7	68.6			
Pentachlorophenol	96	20	200.0	0	48.2	26.7	107			
Phenol	66	10	200.0	0	33.2	23.9	65.8			
Pyrene	61	10	100.0	0	61.0	45.7	107			
1,2,4-Trichlorobenzene	57	10	100.0	0	57.2	30.8	104			
Surr: 2,4,6-Tribromophenol	130		200.0		66.0	18.1	138			
Surr: 2-Fluorobiphenyl	72		100.0		72.1	25.9	101			
Surr: 2-Fluorophenol	70		200.0		35.0	12.5	93.2			
Surr: 4-Terphenyl-d14	67		100.0		67.3	29.5	112			
Surr: Nitrobenzene-d5	72		100.0		71.8	20.5	120			
Surr: Phenol-d5	70		200.0		34.9	11.5	73.2			

Sample ID **lcsd-389**	SampType: **LCSD**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSS02**	Batch ID: **389**	RunNo: **538**
Prep Date: **1/23/2012**	Analysis Date: **1/23/2012**	SeqNo: **15305** 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:

- *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

QC SUMMARY REPORT

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**		SeqNo: **13287**		Units: **µmhos/cm**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	2,700	0.010						0.404	20	

Qualifiers:

*/X	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

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	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-352**	SampType: **LCS**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID: **352**		RunNo: **468**					
Prep Date:	**1/19/2012**	Analysis Date: **1/19/2012**		SeqNo: **13838**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0053	0.00020	0.005000	0	107	80	120			

Sample ID	**1201473-001CMS**	SampType: **MS**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**Injection Well**	Batch ID: **352**		RunNo: **468**					
Prep Date:	**1/19/2012**	Analysis Date: **1/19/2012**		SeqNo: **13842**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0045	0.00020	0.005000	0.0001518	86.4	75	125			

Sample ID	**1201473-001CMSD**	SampType: **MSD**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**Injection Well**	Batch ID: **352**		RunNo: **468**					
Prep Date:	**1/19/2012**	Analysis Date: **1/19/2012**		SeqNo: **13843**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0045	0.00020	0.005000	0.0001518	86.3	75	125	0.104	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

QC SUMMARY REPORT

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-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**

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-371**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **371**	RunNo: **534**
Prep Date: **1/20/2012**	Analysis Date: **1/24/2012**	SeqNo: **15207** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.48	0.020	0.5000	0	96.7	80	120			
Barium	0.46	0.020	0.5000	0	92.2	80	120			
Cadmium	0.46	0.0020	0.5000	0	91.6	80	120			
Calcium	50	1.0	50.00	0	100	80	120			
Chromium	0.46	0.0060	0.5000	0	92.7	80	120			
Lead	0.45	0.0050	0.5000	0	90.4	80	120			
Magnesium	51	1.0	50.00	0	102	80	120			
Potassium	48	1.0	50.00	0	96.9	80	120			
Selenium	0.46	0.050	0.5000	0	91.8	80	120			
Silver	0.094	0.0050	0.1000	0	94.5	80	120			
Sodium	50	1.0	50.00	0	99.4	80	120			

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

QC SUMMARY REPORT

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**			SeqNo: **13243**		Units: **pH units**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH		7.31	1.68						0.137		H

Qualifiers:

*'X	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

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-1**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R459**	RunNo: **459**							
Prep Date:	Analysis Date: **1/18/2012**	SeqNo: **13288**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R459**	RunNo: **459**							
Prep Date:	Analysis Date: **1/18/2012**	SeqNo: **13289**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	81	20	80.00	5.680	94.0	88.1	104			

Sample ID **mb-2**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R459**	RunNo: **459**							
Prep Date:	Analysis Date: **1/18/2012**	SeqNo: **13312**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-2**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R459**	RunNo: **459**							
Prep Date:	Analysis Date: **1/18/2012**	SeqNo: **13313**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	81	20	80.00	0	101	88.1	104			

Sample ID **1201473-001b ms**	SampType: **MS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **Injection Well**	Batch ID: **R459**	RunNo: **459**							
Prep Date:	Analysis Date: **1/18/2012**	SeqNo: **13315**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	390	20	80.00	316.2	88.1	37.1	121			

Sample ID **1201473-001b msd**	SampType: **MSD**	TestCode: **SM2320B: Alkalinity**							
Client ID: **Injection Well**	Batch ID: **R459**	RunNo: **459**							
Prep Date:	Analysis Date: **1/18/2012**	SeqNo: **13316**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	380	20	80.00	316.2	81.9	37.1	121	1.30	7.21	

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

QC SUMMARY REPORT

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	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-349**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **349**	RunNo: **491**
Prep Date: **1/19/2012**	Analysis Date: **1/20/2012**	SeqNo: **14053** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1,000	20.0	1,000	0	100	80	120			

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 Southwest, Inc Bloomfield	Work Order Number:	1201473
Logged by:	Anne Thorne	1/18/2012 9:40:00 AM	Anne Thorne
Completed By:	Anne Thorne	1/18/2012	Anne Thorne
Reviewed By:	AT 1/18/12		

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?	UPS		

Log In

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 ☐	
9. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
10. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm?	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 ☐	
14. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
15. Is it clear what analyses were requested?	Yes ☑	No ☐	
16. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2 2 (<2 or >12 unless noted)
Adjusted? _____
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	Seal Date	Signed By
1	1.8	Good	Yes			

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4135

email or Fax#:

QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: 1st QTR
Injection Well 1-17-12

Project #:

Project Manager:

Sampler: Bob + Terry

On Ice: ☒ Yes ☐ No

Sample Temperature:

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1) TDS	EDB (Method 504.1) Backup	8310 (PNA or PAH)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F^-,Cl^-,NO_3^-,NO_2^-,PO_4^{3-},SO_4^{2-})	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability/Corrosivity	Reactivity	Ecpt, SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
1-17-12	8:30	H_2O	Injection Well	3-VOA	HCl	-1										X						
				1-Liter	Amber	-1											X					
				1-500ml	—	-1												X				
				1-500ml	—	-1				X										X		
				1-250ml	H_2SO_4	-1					X											
				1-500ml	HNO_3	-1							X									
				1-500ml	NaOH	-1													X			
				1-500ml	Zn Acetate	-1															X	

Date:	Time:	Relinquished by:	Received by:	Date	Time	Remarks:
1-17-12	3:00	Robert Krakow		01/18/12	0940	
Date:	Time:	Relinquished by:	Received by:	Date	Time	

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

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 OrderNo.: 1204158

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
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 2nd Qtr 4-3-12
Lab ID: 1204158-001 **Matrix:** AQUEOUS

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	1	4/12/2012 4:24:27 PM
Magnesium	35	1.0		mg/L	1	4/12/2012 4:24:27 PM
Potassium	15	1.0		mg/L	1	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	1	4/12/2012 4:24:27 PM
Sodium	800	10		mg/L	10	4/23/2012 2:38:11 PM
EPA METHOD 8270C: SEMIVOLATILES						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	1	4/9/2012 8:10:20 PM
Benzo(g,h,i)perylene	ND	50		µg/L	1	4/9/2012 8:10:20 PM
Benzo(k)fluoranthene	ND	50		µg/L	1	4/9/2012 8:10:20 PM
Benzoic acid	ND	100		µg/L	1	4/9/2012 8:10:20 PM
Benzyl alcohol	ND	50		µg/L	1	4/9/2012 8:10:20 PM
Bis(2-chloroethoxy)methane	ND	50		µg/L	1	4/9/2012 8:10:20 PM
Bis(2-chloroethyl)ether	ND	50		µg/L	1	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	1	4/9/2012 8:10:20 PM
4-Bromophenyl phenyl ether	ND	50		µg/L	1	4/9/2012 8:10:20 PM
Butyl benzyl phthalate	ND	50		µg/L	1	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		µg/L	1	4/9/2012 8:10:20 PM
4-Chloroaniline	ND	50		µg/L	1	4/9/2012 8:10:20 PM
2-Chloronaphthalene	ND	50		µg/L	1	4/9/2012 8:10:20 PM
2-Chlorophenol	ND	50		µg/L	1	4/9/2012 8:10:20 PM

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.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 2nd Qtr 4-3-12
Lab ID: 1204158-001 **Matrix:** AQUEOUS

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**
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	1	4/9/2012 8:10:20 PM
1,2-Dichlorobenzene	ND	50		µg/L	1	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/L	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	1	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	1	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	1	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-Methylphenol	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	1	4/9/2012 8:10:20 PM
3-Nitroaniline	ND	50		µg/L	1	4/9/2012 8:10:20 PM
4-Nitroaniline	ND	100		µg/L	1	4/9/2012 8:10:20 PM
Nitrobenzene	ND	50		µg/L	1	4/9/2012 8:10:20 PM
2-Nitrophenol	ND	50		µg/L	1	4/9/2012 8:10:20 PM
4-Nitrophenol	ND	50		µg/L	1	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	1	4/9/2012 8:10:20 PM

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.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 2nd Qtr 4-3-12
Lab ID: 1204158-001 **Matrix:** AQUEOUS

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**
Phenol	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	1	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		µg/L	1	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-Fluorobiphenyl	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	1	4/6/2012 4:13:22 PM
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	4/6/2012 4:13:22 PM
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	4/6/2012 4:13:22 PM
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	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	1	4/6/2012 4:13:22 PM
Carbon Tetrachloride	ND	1.0		µg/L	1	4/6/2012 4:13:22 PM
Chlorobenzene	ND	1.0		µg/L	1	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	1	4/6/2012 4:13:22 PM
2-Chlorotoluene	ND	1.0		µg/L	1	4/6/2012 4:13:22 PM
4-Chlorotoluene	ND	1.0		µg/L	1	4/6/2012 4:13:22 PM
cis-1,2-DCE	ND	1.0		µg/L	1	4/6/2012 4:13:22 PM
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	4/6/2012 4:13:22 PM
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	4/6/2012 4:13:22 PM

Qualifiers:

*,X	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 2nd Qtr 4-3-12
Lab ID: 1204158-001 **Matrix:** AQUEOUS

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		µg/L	1	4/6/2012 4:13:22 PM
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	1	4/6/2012 4:13:22 PM
4-Methyl-2-pentanone	ND	10		µg/L	1	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	1	4/6/2012 4:13:22 PM
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	4/6/2012 4:13:22 PM
1,1,1-Trichloroethane	ND	1.0		µg/L	1	4/6/2012 4:13:22 PM
1,1,2-Trichloroethane	ND	1.0		µg/L	1	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	1	4/6/2012 4:13:22 PM
Vinyl chloride	ND	1.0		µg/L	1	4/6/2012 4:13:22 PM
Xylenes, Total	ND	1.5		µg/L	1	4/6/2012 4:13:22 PM
Surr: 1,2-Dichloroethane-d4	104	70-130		%REC	1	4/6/2012 4:13:22 PM
Surr: 4-Bromofluorobenzene	118	70-130		%REC	1	4/6/2012 4:13:22 PM
Surr: Dibromofluoromethane	114	69.8-130		%REC	1	4/6/2012 4:13:22 PM
Surr: Toluene-d8	96.3	70-130		%REC	1	4/6/2012 4:13:22 PM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 2nd Qtr 4-3-12
Lab ID: 1204158-001 **Matrix:** AQUEOUS

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 120.1: SPECIFIC CONDUCTANCE						Analyst: **JLF**
Conductivity	2,900	0.010		µmhos/cm	1	4/6/2012 1:58:29 PM
SM4500-H+B: PH						Analyst: **JLF**
pH	6.91	1.68	H	pH units	1	4/6/2012 1:58:29 PM
SM2320B: ALKALINITY						Analyst: **JLF**
Bicarbonate (As CaCO3)	330	20		mg/L CaCO3	1	4/6/2012 1:58:29 PM
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	4/6/2012 1:58:29 PM
Total Alkalinity (as CaCO3)	330	20		mg/L CaCO3	1	4/6/2012 1:58:29 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	2,120	200		mg/L	1	4/5/2012 5:03:00 PM

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.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 2nd Qtr 4-3-12
Lab ID: 1204158-002 **Matrix:** AQUEOUS

Client Sample ID: Trip Blank
Collection Date:
Received Date: 4/4/2012 10:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **JDJ**
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	1	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	1	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	1	4/6/2012 4:41:46 PM
1,2-Dichloropropane	ND	1.0		µg/L	1	4/6/2012 4:41:46 PM
1,3-Dichloropropane	ND	1.0		µg/L	1	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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 2nd Qtr 4-3-12
Lab ID: 1204158-002 **Matrix:** AQUEOUS

Client Sample ID: Trip Blank
Collection Date:
Received Date: 4/4/2012 10:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **JDJ**
Isopropylbenzene	ND	1.0		µg/L	1	4/6/2012 4:41:46 PM
4-Isopropyltoluene	ND	1.0		µg/L	1	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	1	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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

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
1204158-001E / Injection Well	120406030-001	SW846 Ch7/EPA 1010/EPA 150.1

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?	Y	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

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

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: John A. Cobb

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 #:**	120406030
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1204158
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120406030-001	**Sampling Date**	4/3/2012	**Date/Time Received**	4/6/2012	10:25 AM
Client Sample ID	1204158-001E / INJECTION WELL	**Sampling Time**	1:20 PM			
Matrix	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	JTT	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

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):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0026; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; 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 WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120406030
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1204158
Attn:	ANDY FREEMAN		

Analytical Results Report

Quality Control Data

Lab Control Sample

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	4/9/2012	4/9/2012

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
120406030-001	Reactive sulfide	4.07	7.33	mg/L	4.07	80.1	70-130	4/9/2012	4/9/2012
120406030-001	Cyanide (reactive)	ND	0.484	mg/L	0.5	96.8	80-120	4/17/2012	4/17/2012

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide (reactive)	0.487	mg/L	0.5	97.4	0.6	0-25	4/17/2012	4/17/2012

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide (reactive)	ND	mg/L	0.1	4/17/2012	4/17/2012
Reactive sulfide	ND	mg/kg	1	4/9/2012	4/9/2012

AR	Acceptable Range
ND	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):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0026; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

Monday, April 23, 2012

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

Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 120406030
Order Date: 4/6/2012

Contact Name: ANDY FREEMAN
Project Name: 1204158
Comment:

Sample #: 120406030-001 **Customer Sample #:** 1204158-001E / INJECTION WELL

Recv'd: ☑ **Collector:** **Date Collected:** 4/3/2012
Quantity: 3 **Matrix:** Water **Date Received:** 4/6/2012 10:25:00 A
Comment:

Test	Lab	Method	Due Date	Priority
CYANIDE REACTIVE	M	SW846 CH7	4/18/2012	***Normal (6-10 Days)***
FLASHPOINT	M	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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

Hall Environmental Analysis Laboratory

120406 030 HALL Last Due 4/18/2012
1st SAMP 4/3/2012 1st RCVD 4/6/2012
1204158

SUB CONTRACTOR: Anatek Labs	COMPANY: Anatek Labs, Inc.	PHONE: (208) 883-2839	FAX: (208) 882-9246
ADDRESS: 1282 Alturas Dr		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Moscow, ID 83843			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1204158-001E	Injection Well	various	Aqueous	4/3/2012 1:20:00 PM	3	RCI, PLEASE PROVIDE LEVEL 4 DATA PACKAGE
2						0	
3		MWBS				0	
4						0	
5						0	
6						0	
7						0	
8						0	
9						0	
10						0	

SPECIAL INSTRUCTIONS / COMMENTS:

PLEASE PROVIDE QC DATA PACKAGE, 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.

Relinquished By:	Date: 4/4/2012	Time: 12:21 PM	Received By:
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

TAT: Standard ☐ RUSH Next BD ☐

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ☐ PRESERVATIVE: NaOH zinc Acetate

TEMP: 1.5 °C Ice Y Seal N

NUMBER OF CONTAINERS: 3 SHIPPED VIA: F

DATE & TIME: 4/6/12 10:25 INSPECTED BY: BT

MITTAL DESIRED:
X ☐ EMAIL ☐ ONLINE

USE ONLY

Attempt to Cool ? _____

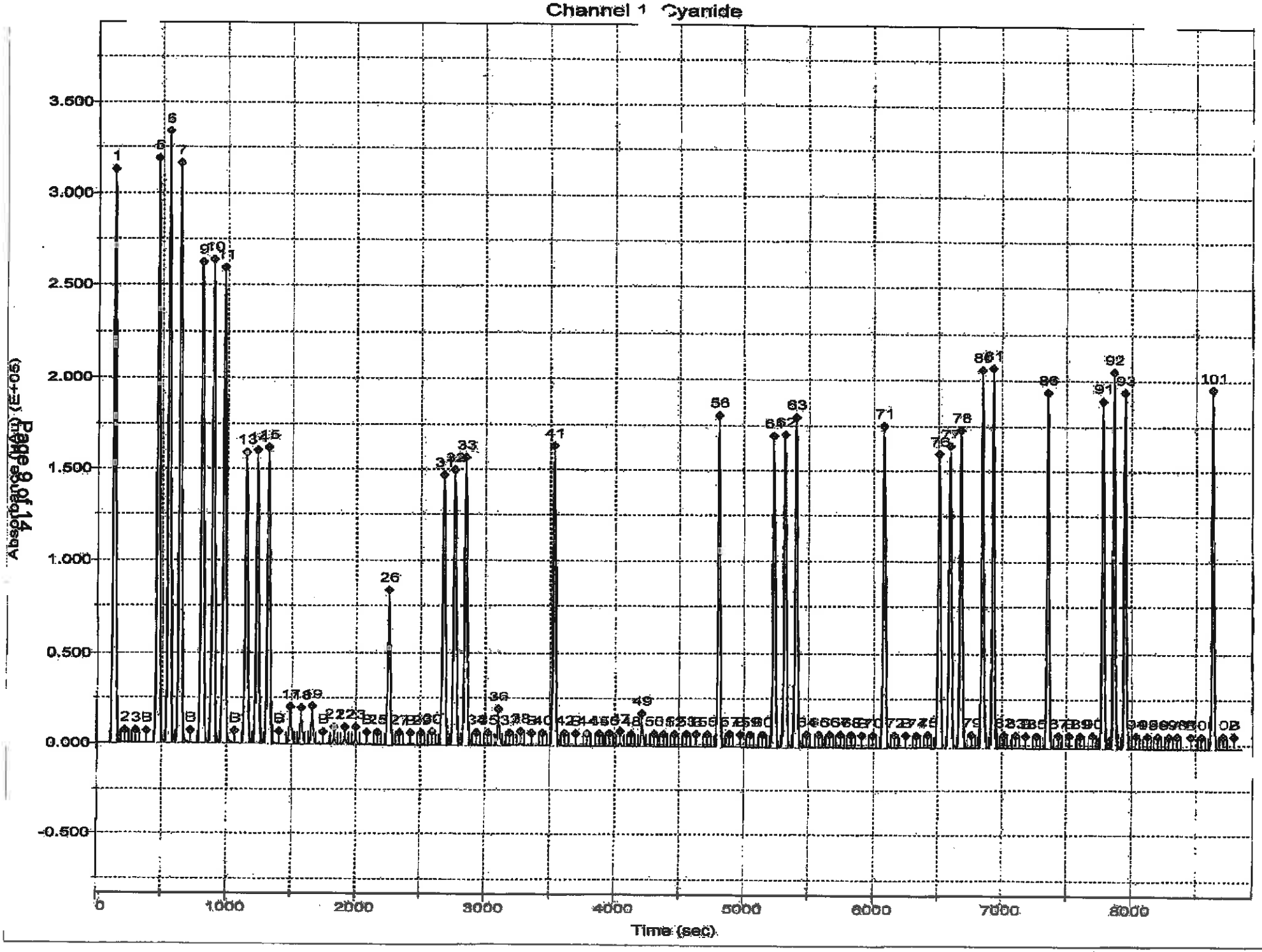
Peak Table: Cyanide

File name: T:\DATA1\FLOW4\2012\EPA335.4\041712CN.RST 120417FIACNR
Date: Unknown
Operator: CRW

Peak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
1	2	Sync	SYNC	1	1	7340982	0.993448
2	0	Carryover	CO	1	1	20703	0.004003
3	0	Carryover	CO	1	1	3005	0.001611
B	0	Baseline	RB	1	1	-85	0.001193
5	2	Cal 1.00 ppm	C	1	1	7341324	0.993494
6	2	Cal 1.00 ppm	C	1	1	7423772	1.004638
7	2	Cal 1.00 ppm	C	1	1	7353090	0.995085
B	0	Baseline	RB	1	1	2192	0.001501
9	3	Cal 0.80 ppm	C	1	1	5925124	0.802074
10	3	Cal 0.80 ppm	C	1	1	5922326	0.801696
11	3	Cal 0.80 ppm	C	1	1	5958631	0.806603
B	0	Baseline	RB	1	1	2137	0.001494
13	4	Cal 0.50 ppm	C	1	1	3660841	0.496022
14	4	Cal 0.50 ppm	C	1	1	3657522	0.495574
15	4	Cal 0.50 ppm	C	1	1	3609600	0.489096
B	0	Baseline	RB	1	1	748	0.001306
17	5	Cal 0.05 ppm	C	1	1	328263	0.045575
18	5	Cal 0.05 ppm	C	1	1	326642	0.045355
19	5	Cal 0.05 ppm	C	1	1	308151	0.042856
B	0	Baseline	RB	1	1	-634	0.001119
21	6	Cal 0.01 ppm	C	1	1	64563	0.009932
22	6	Cal 0.01 ppm	C	1	1	67778	0.010366
23	6	Cal 0.01 ppm	C	1	1	65516	0.010060
B	0	Baseline	RB	1	1	1296	0.001380
25	1	Blank	BLNK	1	1	807	0.001314
26	7	ICV 0.25 ppm	CCV	1	1	1845790	0.250691
27	1	Blank	BLNK	1	1	-1678	0.000978
B	0	Baseline	RB	1	1	-77	0.001194
29	8	120406012-BL WW	U	1	1	-3082	0.000788
30	9	120406012-001	U	1	1	3990	0.001744
31	10	120406012-001MS	U	1	1	3561078	0.482538
32	11	120406012-001MSD	U	1	1	3567900	0.483460
33	12	120406012-LCS	U	1	1	3647397	0.494205
34	13	120406018-005	U	1	1	3683	0.001703
35	14	120406019-001	U	1	1	4553	0.001820
36	15	120410036-001	U	1	1	299712	0.041716
37	16	120410036-002	U	1	1	3173	0.001634
38	17	120410036-004	U	1	1	24165	0.004471
B	0	Baseline	RB	1	1	-368	0.001155
40	1	Blank	BLNK	1	1	983	0.001338
41	4	CCV 0.5 ppm	CCV	1	1	3714273	0.503244
42	1	Blank	BLNK	1	1	431	0.001263
B	0	Read Baseline	RB	1	1	1398	0.001394
44	18	120410036-005	U	1	1	-1573	0.000992
45	19	120410036-006	U	1	1	-1532	0.000998
46	20	120410036-007	U	1	1	2194	0.001501
47	21	120410036-008	U	1	1	28664	0.005079
48	22	120410026-001	U	1	1	2741	0.001575
49	23	120406005-002	U	1	1	237933	0.033365
50	24	120413009-001	U	1	1	-226	0.001174
51	25	120413009-002	U	1	1	385	0.001257
52	26	120413009-003	U	1	1	140	0.001224
53	27	120413034-002	U	1	1	1089	0.001352
B	0	Baseline	RB	1	1	1830	0.001452
55	1	Blank	BLNK	1	1	1672	0.001431
56	4	CCV 0.5 ppm	CCV	1	1	3719207	0.503911
57	1	Blank	BLNK	1	1	1762	0.001443
B	0	Read Baseline	RB	1	1	-73	0.001195
59	28	120410034-BL S	U	1	1	-649	0.001117
60	29	120410034-001	U	1	1	1710	0.001436
61	30	120410034-001MS	U	1	1	3575736	0.484519
62	31	120410034-001MSD	U	1	1	3623661	0.490997
63	32	120410034-LCS	U	1	1	3705408	0.502046
64	33	120410034-002	U	1	1	9088	0.002433
65	34	120410034-003	U	1	1	9813	0.002531
66	35	120410034-004	U	1	1	9256	0.002456

Peak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
57	36	120410034-005	U	1	1	9152	0.002442
58	37	120410034-006	U	1	1	4183	0.001770
3	0	Baseline	RB	1	1	-748	0.001104
60	1	Blank	BLNK	1	1	-1817	0.000959
61	4	CCV 0.5 ppm	CCV	1	1	3747205	0.507696
62	1	Blank	BLNK	1	1	-2994	0.000800
3	0	Read Baseline	RB	1	1	1278	0.001378
64	38	120406030-BL R	U	1	1	-3049	0.000793
65	39	120406030-001	U	1	1	5701	0.001976
66	40	120406030-001MS	U	1	1	3575297	0.484460
67	41	120406030-001MSD	U	1	1	3597145	0.487413
68	42	120406030-LCS	U	1	1	3866508	0.523821
69	43	120406011-001 SR	U	1	1	5924	0.002006
70	44	120406011-001MS	U	1	1	3678616	0.498425
71	45	120406011-001MSD	U	1	1	3678327	0.498386
72	46	120410034-007	U	1	1	5933	0.002007
73	47	120410034-008	U	1	1	4419	0.001802
3	0	Baseline	RB	1	1	215	0.001234
75	1	Blank	BLNK	1	1	-427	0.001147
76	4	CCV 0.5 ppm	CCV	1	1	3741463	0.506919
77	1	Blank	BLNK	1	1	-1737	0.000970
3	0	Read Baseline	RB	1	1	1272	0.001377
79	48	120406004-BL F	U	1	1	-2388	0.000882
80	49	120406004-001	U	1	1	-1760	0.000967
81	50	120406004-001MS	U	1	1	3604604	0.488421
82	51	120406004-001MSD	U	1	1	3904438	0.528948
83	52	120406004-LCS	U	1	1	3686414	0.499479
84	53	120405037-001	U	1	1	-2654	0.000846
85	54	120416009-001	U	1	1	-2148	0.000915
86	55	120416014-001	U	1	1	-6720	0.000297
87	56		U	1	1	-7727	0.000160
88	57		U	1	1	-3664	0.000710
3	0	Baseline	RB	1	1	1221	0.001370
10	1	Blank	BLNK	1	1	764	0.001308
11	4	CCV 0.5 ppm	CCV	1	1	3692458	0.500296
102	1	Blank	BLNK	1	1	-473	0.001141
3	0	Read Baseline	RB	1	1	1515	0.001410

Peak	Cup	Flags
1	2	
2	0	
3	0	
3	0	BL
5	2	
5	2	
7	2	
3	0	BL
9	3	
10	3	
11	3	
3	0	BL
13	4	
14	4	
15	4	
3	0	BL
17	5	
18	5	
19	5	OL
3	0	BL
21	6	
22	6	OL
23	6	
3	0	BL
25	1	
26	7	
27	1	
3	0	BL
29	8	


Channel 1 Cyanide
Absorbance (AU) (E+05)
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
-0.500
0
1000
2000
3000
4000
5000
6000
7000
8000
Time (sec)

Cyanide: Calibration, Peak 5-105

File name: T:\DATA1\FLOW4\2012\EPA335.4\041712CN.RST
Date: Unknown
Operator: CRW

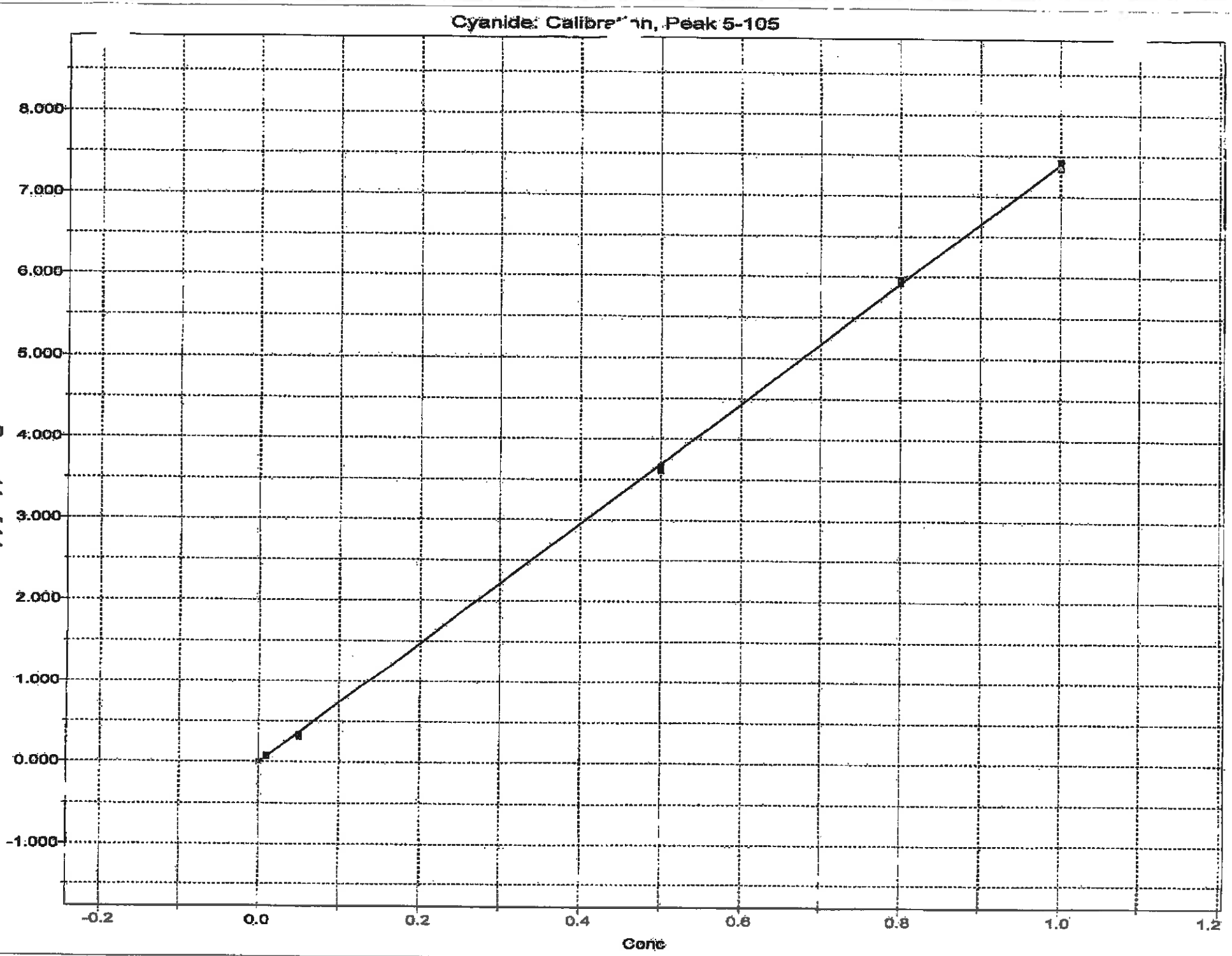
*	me	Conc	Area
*	Cal 1.00 ppm	1.000000	7341324.500000
*	Cal 1.00 ppm	1.000000	7423772.000000
*	Cal 1.00 ppm	1.000000	7353090.000000
*	Cal 0.80 ppm	0.800000	5925124.500000
*	Cal 0.80 ppm	0.800000	5922325.500000
*	Cal 0.80 ppm	0.800000	5958631.000000
*	Cal 0.50 ppm	0.500000	3660840.750000
*	Cal 0.50 ppm	0.500000	3657522.500000
*	Cal 0.50 ppm	0.500000	3609599.750000
*	Cal 0.05 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
*	Cal 0.01 ppm	0.010000	67778.046875
*	Cal 0.01 ppm	0.010000	65516.265625

Calib Coef:
y=bx+a
a: (intercept) -8.9144e+03
b: 7.3984e+06

Corr Coef: 0.999935

Carryover: 0.282%

No Drift Peaks


Cyanide: Calibration, Peak 5-105
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Conc

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
111229015-01	12/30/11	SOIL	ST		81° F
111222023-001	12-30-11	Oil	[illegible]		ND
111228030-001	12-30-11	4	[illegible]		ND
120105039-001	1/9/12	4/5	SR		>200
-002		5			Room Temp
-003		5			>200
120119009-001	2-3-2012	4	[illegible]		>200
120120011-001	2-7-12	4	[illegible]		>200
[illegible]		4			>200
[illegible]		4	[illegible]		>200
120210036-001	2/28/12	5/butter	[illegible]		134°F
120223045-001	3/6/12	Water/4	[illegible]		>200°F
-002					>200°F
120227016-001	3/7/12		[illegible]		159°F
120228006-001	3/7/12	Liquid/5	[illegible]		151°F
120302023-001	3/2/12	water/4			149°F
120308037-001	3/14/12	Liquid/5	[illegible]		>200°F
120308059-001		Liquid/5			>200°F
-004		Liquid/5			132°F
120313024-001		~~Liquid/5~~ Oil/3			>200°F
120315059-001	3/27/12	4/H2O	[illegible]		>200°F
-002					>200°F
-003					>200°F
120406030-001	4/9/12	4/H2O	[illegible]		>200°F
120418036-001		5/Liquid			
120418036-002		5/Liquid			

*** SAFETY GLASSES REQUIRED.**

pH - SM4500H+B / Alkalinity SM2320B

Equivalent EPA Methods 150.1 & 310.1

Reagent	Solution #	Expires	Method QC Requirements:	
pH Buffer 4 (Red)	M826-05	Jan 2013	pH 7 within 0.1 pH units	LFB/Blank every 10
pH Buffer 7 (Yellow)	M826-04	Jan 2013	Slope 95-102%	MS/MSD Every 20
pH Buffer 10 (Blue)	M827-01	Aug 2012		% Recovery 85-115%
0.02N H2SO4 Titrant	A040-03	Oct-12		

Standard	Solution #	Conc.	Expires	Amount Spiked (mg/L)
Matrix Spike Solution	M637-04	1N	11/18/2012	100
Contributrette: CAT 10uL, sn 600055 - pH Meter: Orion Model 620A, sn 007858				

Sample	Temp (°C)	pH	pH 4 Cal	pH 10 Cal	Slope	pH 7 Buffer	Sample Vol. (mL)	Titrant vol to pH (mL) 8.3	4.5	4.2	Alkalinity (mg/L) Total	Carbonate	Bi-carbonate	Hydroxide	%
120306027-001	18,0	10,74	4,00	10,05	101,6	7,08	~~5~~ 25								
-002	17,6	10,70					5 in 25 mL								
120306020-001	17,8	8,81													
-002	19,0	8,37													
120308040-001	18,5	8,54													
~~120405058-001~~															
~~120406030-001~~															
120405058-001	19,8	7,13	4,00	10,00	~~101,0~~ 100,5	7,09	25 mL								
120406030-001	20,7	6,58													
120410004-001	20,2	7,99													
~~120411019-001~~															
120409015-001	20,8	6,66					5 in 25mL								

Page 13 of 14

3/1

4/1

Analysis Date: 3/14/12 - 4/11/12

Analyst: JL

Sulfide by SM 4500-S$^{=}$ F

	Concentration	Date Made/Expires
Iodine	0.025 N	
HCl	6 N	
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	Sample Volume	Iodine amount (50 uL increments)	Concentration (ug/sample)	Concentration (mg/L)	Date	Initials
120327021-1	579.1	50	20 → 0.02 mg	0.0385	4.9.12	
-1MS	"	450	180	0.180	0.347	
-LCS	1000	450	180	0.180	0.180	
-LCSD		450	180	0.180	0.180	
-BL	"	50	20	0.02	0.02	
406031-1	49.1	500	200	0.200	4.07	
-1MS	"	900	360	0.360	7.33	

Comments 120409L125R

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R1922**	RunNo: **1922**
Prep Date:	Analysis Date: **4/4/2012**	SeqNo: **53441** 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: **LCSW**	Batch ID: **R1922**	RunNo: **1922**
Prep Date:	Analysis Date: **4/4/2012**	SeqNo: **53442** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.8	0.50	5.000	0	95.5	90	110			
Sulfate	9.8	0.50	10.00	0	97.6	90	110			

Qualifiers:

*/X	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**	
Client ID: **PBW**	Batch ID: **R1980**	RunNo: **1980**	
Prep Date:	Analysis Date: **4/6/2012**	SeqNo: **55138**	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								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								

Qualifiers:

*,X	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R1980**	RunNo: **1980**
Prep Date:	Analysis Date: **4/6/2012**	SeqNo: **55138** 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	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 lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R1980**	RunNo: **1980**
Prep Date:	Analysis Date: **4/6/2012**	SeqNo: **55139** 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

QC SUMMARY REPORT

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 **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R1980**	RunNo: **1980**
Prep Date:	Analysis Date: **4/6/2012**	SeqNo: **55139** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	10		10.00		103	69.8	130			
Surr: Toluene-d8	9.4		10.00		93.5	70	130			

Qualifiers:

*/X	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**	
Client ID: **PBW**	Batch ID: **1425**	RunNo: **1991**	
Prep Date: **4/9/2012**	Analysis Date: **4/9/2012**	SeqNo: **55578**	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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **1425**	RunNo: **1991**
Prep Date: **4/9/2012**	Analysis Date: **4/9/2012**	SeqNo: **55578** 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

QC SUMMARY REPORT

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 **lcs-1425**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **1425**	RunNo: **1991**
Prep Date: **4/9/2012**	Analysis Date: **4/9/2012**	SeqNo: **55579** 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			

Sample ID **lcsd-1425**	SampType: **LCSD**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSS02**	Batch ID: **1425**	RunNo: **1991**
Prep Date: **4/9/2012**	Analysis Date: **4/9/2012**	SeqNo: **55580** 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
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

QC SUMMARY REPORT

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-1543**	SampType: **MBLK**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID: **1543**		RunNo: **2165**					
Prep Date:	**4/16/2012**	Analysis Date: **4/17/2012**		SeqNo: **60357**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-1543**	SampType: **LCS**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID: **1543**		RunNo: **2165**					
Prep Date:	**4/16/2012**	Analysis Date: **4/17/2012**		SeqNo: **60358**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0053	0.00020	0.005000	0	105	80	120			

Sample ID	**LCSD-1543**	SampType: **LCSD**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**LCSS02**	Batch ID: **1543**		RunNo: **2165**					
Prep Date:	**4/16/2012**	Analysis Date: **4/17/2012**		SeqNo: **60359**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0053	0.00020	0.005000	0	107	80	120	1.13	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

QC SUMMARY REPORT

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: **2113**
Prep Date: **4/11/2012**	Analysis Date: **4/12/2012**	SeqNo: **58542** 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								

Sample ID **LCS-1477**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **1477**	RunNo: **2113**
Prep Date: **4/11/2012**	Analysis Date: **4/12/2012**	SeqNo: **58544** 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			
Barium	0.49	0.020	0.5000	0	98.1	80	120			
Cadmium	0.50	0.0020	0.5000	0	100	80	120			
Calcium	51	1.0	50.00	0	101	80	120			
Chromium	0.49	0.0060	0.5000	0.0008200	98.2	80	120			
Lead	0.50	0.0050	0.5000	0	99.2	80	120			
Magnesium	52	1.0	50.00	0	103	80	120			
Potassium	50	1.0	50.00	0	100	80	120			
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**	SampType: **LCSD**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSS02**	Batch ID: **1477**	RunNo: **2113**
Prep Date: **4/11/2012**	Analysis Date: **4/12/2012**	SeqNo: **58546** 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

QC SUMMARY REPORT

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	%RPD	RPDLimit	Qual
Sodium	ND	1.0								

Sample ID **LCS-1477**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **1477**	RunNo: **2176**
Prep Date: **4/11/2012**	Analysis Date: **4/17/2012**	SeqNo: **60601** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	51	1.0	50.00	0	102	80	120			

Sample ID **LCS-1477**	SampType: **LCSD**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSS02**	Batch ID: **1477**	RunNo: **2176**
Prep Date: **4/11/2012**	Analysis Date: **4/17/2012**	SeqNo: **60602** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	49	1.0	50.00	0	97.7	80	120	4.68	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

QC SUMMARY REPORT

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	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**
Client ID: **LCSW**	Batch ID: **R1996**	RunNo: **1996**
Prep Date:	Analysis Date: **4/6/2012**	SeqNo: **55666** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	79	20	80.00	0	98.6	88.1	104			

Sample ID **mb-1**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**
Client ID: **PBW**	Batch ID: **R1996**	RunNo: **1996**
Prep Date:	Analysis Date: **4/10/2012**	SeqNo: **56416** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**
Client ID: **LCSW**	Batch ID: **R1996**	RunNo: **1996**
Prep Date:	Analysis Date: **4/10/2012**	SeqNo: **56417** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	6.880	90.9	88.1	104			

Qualifiers:

*/X	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

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	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-1382**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **1382**	RunNo: **1941**
Prep Date: **4/4/2012**	Analysis Date: **4/5/2012**	SeqNo: **54077** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1,010	20.0	1,000	0	101	80	120			

Qualifiers:

*,X	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 Southwest, Inc Bloomfield	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 11:46:12 AM	
Reviewed By:		04/04/12	

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?	UPS		

Log In

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 ☐	
9.	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 ☐	
14.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
15.	Is it clear what analyses were requested?	Yes ☑	No ☐	
16.	Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2 2
(<2 or >12 unless noted)
Adjusted? —
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	Seal Date	Signed By
1	3.3	Good	Yes			

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4135

email or Fax#:

QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other ______

☐ EDD (Type) ______

Turn-Around Time:
☒ Standard ☐ Rush ______

Project Name: 4-3-12
Injection Well 2nd QTR

Project #:

Project Manager:

Sampler: Bob & Terry

On Ice: [illegible]

Sample Temperature: [illegible]

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	[redacted] TDS	[redacted] Backup	8310 (PNA or PAH)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Ec, pH, SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
4-3-12	1:20	H_2O	Injection Well	3-VOA	HCl	-001										X						
				1-Liter	Amber												X					
				1-500ml	—													X				
				1-500ml	—					X										X		
				1-125ml	H_2SO_4						X											
				1-500ml	HNO_3								X									
				1-500ml	NaOH														X			
				1-500ml	Zn Acetate																X	
			Trip Blank	3-40ml	HCl	-002										X						

[illegible] 04/04/12

Date:	Time:	Relinquished by:	Received by:	Date	Time
4-3-12	3:00	Robert Krakow	[signature]	04/04/12	1015
Date:	Time:	Relinquished by:	Received by:	Date	Time

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.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

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

OrderNo.: 1208093

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.

Analytical Report
Lab Order **1208093**
Date Reported: **8/30/2012**

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 3rd Qtr
Lab ID: 1208093-001 **Matrix:** AQUEOUS

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	Qual	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	8/14/2012 11:50:46 AM
Magnesium	44	1.0		mg/L	1	8/14/2012 9:53:17 AM
Potassium	17	1.0		mg/L	1	8/14/2012 9:53:17 AM
Selenium	ND	0.050		mg/L	1	8/14/2012 11:50:46 AM
Silver	ND	0.0050		mg/L	1	8/14/2012 9:53:17 AM
Sodium	760	10		mg/L	10	8/14/2012 11:53:30 AM
EPA METHOD 8270C: SEMIVOLATILES						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	ND	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	8/7/2012 12:00:44 PM
4-Chloro-3-methylphenol	ND	50		µg/L	1	8/7/2012 12:00:44 PM
4-Chloroaniline	ND	50		µg/L	1	8/7/2012 12:00:44 PM
2-Chloronaphthalene	ND	50		µg/L	1	8/7/2012 12:00:44 PM
2-Chlorophenol	ND	50		µg/L	1	8/7/2012 12:00:44 PM

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
- 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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 3rd Qtr
Lab ID: 1208093-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **JDC**
4-Chlorophenyl phenyl ether	ND	50		µg/L	1	8/7/2012 12:00:44 PM
Chrysene	ND	50		µg/L	1	8/7/2012 12:00:44 PM
Di-n-butyl phthalate	ND	50		µg/L	1	8/7/2012 12:00:44 PM
Di-n-octyl phthalate	ND	50		µg/L	1	8/7/2012 12:00:44 PM
Dibenz(a,h)anthracene	ND	50		µg/L	1	8/7/2012 12:00:44 PM
Dibenzofuran	ND	50		µg/L	1	8/7/2012 12:00:44 PM
1,2-Dichlorobenzene	ND	50		µg/L	1	8/7/2012 12:00:44 PM
1,3-Dichlorobenzene	ND	50		µg/L	1	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		µg/L	1	8/7/2012 12:00:44 PM
2,4-Dichlorophenol	ND	100		µg/L	1	8/7/2012 12:00:44 PM
2,4-Dimethylphenol	ND	50		µg/L	1	8/7/2012 12:00:44 PM
4,6-Dinitro-2-methylphenol	ND	100		µg/L	1	8/7/2012 12:00:44 PM
2,4-Dinitrophenol	ND	100		µg/L	1	8/7/2012 12:00:44 PM
2,4-Dinitrotoluene	ND	50		µg/L	1	8/7/2012 12:00:44 PM
2,6-Dinitrotoluene	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	1	8/7/2012 12:00:44 PM
Indeno(1,2,3-cd)pyrene	ND	50		µg/L	1	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		µg/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/L	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

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
- 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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 3rd Qtr
Lab ID: 1208093-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **JDC**
Phenol	ND	50		µg/L	1	8/7/2012 12:00:44 PM
Pyrene	ND	50		µg/L	1	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	1	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	1	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/L	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	1	8/6/2012 11:46:06 AM
2-Chlorotoluene	ND	1.0		µg/L	1	8/6/2012 11:46:06 AM
4-Chlorotoluene	ND	1.0		µg/L	1	8/6/2012 11:46:06 AM
cis-1,2-DCE	ND	1.0		µg/L	1	8/6/2012 11:46:06 AM
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	8/6/2012 11:46:06 AM
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	8/6/2012 11:46:06 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 3rd Qtr
Lab ID: 1208093-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **JDJ**
Dibromochloromethane	ND	1.0		µg/L	1	8/6/2012 11:46:06 AM
Dibromomethane	ND	1.0		µg/L	1	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	1	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	1	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		µg/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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 3rd Qtr
Lab ID: 1208093-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: **DBD**
Conductivity	4200	0.010		µmhos/cm	1	8/13/2012 1:40:32 PM
SM4500-H+B: PH						Analyst: **DBD**
pH	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

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
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

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	Anatek Sample ID	Method/Prep Method
1208093-001E Injection Well	120806003-001	Various

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?	Y	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

No problems encountered.

6. Method Blank Requirements

No problems encountered.

7. Internal Standard(s) Response Requirements

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: John W. Coll

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 #:**	120806003
Address:	4901 HAWKINS NE SUITE D	**Project Name:**	1208093
	ALBUQUERQUE, NM 87109		
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	1208093-001E / INJECTION WELL	**Sampling Time**	1:30 PM			
Matrix	Water	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	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

Certifications held by Anatek Labs 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 Anatek Labs WA: EPA:WA00169; ID:WA00169; 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 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 #: 120806003
Project Name: 1208093

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Reactive sulfide	0.180	mg/L	0.2	90.0	70-130	8/13/2012	8/13/2012
Cyanide (reactive)	0.504	mg/L	0.5	100.8	80-120	8/10/2012	8/10/2012

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
120806003-001	Reactive sulfide	10.0	28.0	mg/L	20	90.0	70-130	8/13/2012	8/13/2012
120806003-001	Cyanide (reactive)	ND	0.454	mg/L	0.5	90.8	80-120	8/10/2012	8/10/2012

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide (reactive)	0.476	mg/L	0.5	95.2	4.7	0-25	8/10/2012	8/10/2012

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide (reactive)	ND	mg/L	0.1	8/10/2012	8/10/2012
Reactive sulfide	ND	mg/kg	1	8/13/2012	8/13/2012

AR	Acceptable Range
ND	Not Detected
PQL	Practical Quantitation Limit
RPD	Relative Percentage Difference

Comments:

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

Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 120806003
Order Date: 8/6/2012

Contact Name: ANDY FREEMAN

Project Name: 1208093

Comment:

Sample #: 120806003-001 **Customer Sample #:** 1208093-001E / INJECTION WELL

Recv'd: ☑ **Collector:** **Date Collected:** 7/31/2012
Quantity: 3 **Matrix:** Water **Date Received:** 8/3/2012 2:01:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
CYANIDE REACTIVE	M	SW846 CH7	8/15/2012	***Normal (6-10 Days)***
FLASHPOINT	M	EPA 1010	8/15/2012	***Normal (6-10 Days)***
pH	M	EPA 150.1	8/15/2012	***Normal (6-10 Days)***
SULFIDE REACTIVE	M	SW846 CH7	8/15/2012	***Normal (6-10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

120806 003 HALL Last Due 8/15/2012
1st SAMP 7/31/2012 1st RCVD 8/3/2012
1208093

WEBSITE: www.hallenvironmental.com

SUB CONTRATOR: Anatek Labs	COMPANY: Anatek Labs, Inc.	PHONE: (208) 883-2839	FAX: (208) 882-9246		
ADDRESS: 1282 Alturas Dr		ACCOUNT #:	EMAIL:		
CITY, STATE, ZIP: Moscow, ID 83843					

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1208093-001E	Injection Well	500HDPE	Aqueous	7/31/2012 1:30:00 PM	3	RCI LEVEL 4 QC AT 08/02/12 MWBS
2						0	
3						0	
4						0	
5						0	
6						0	
7						0	
8						0	
9						0	
10						0	

SPECIAL INSTRUCTIONS / COMMENTS:

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.

Relinquished By:	Date: 8/2/2012	Time: 12:54 PM	Received By:
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

TAT: (Standard) RUSH Next

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 3.0 °C
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ICE / ICE-PACKS PRESENT: Y
- CUSTODY SEALS PRESENT: Y
- PRESERVATIVES: NAOH NaOH
- NUMBER OF CONTAINERS: 3 SHIPPED VIA: F
- DATE & TIME: 8/3/12 14:01 INSPECTED BY: BT

T TRANSMITTAL DESIRED:

FAX EMAIL ONLINE

OR LAB USE ONLY

°C Attempt to Cool ?

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
1207270 18-001	7/30/2012	4/ H_2O			>200° F
1207270 29-001	8/5/2012	5/ Liquid			150 F
-002	"	"	"		141° F
1208060 03-001	8/9/2012	4/ H_2O			>200° F
1208070 45-001					<63° F
-002					<50° F
1208080 28-001	8/10/2012	5/ Liquid			>200° F
1208100 57-001	8/21/2012	4/ H_2O			>200° F

* SAFETY GLASSES REQUIRED.

pH - SM4500H+B / Alkalinity SM2320B

Equivalent EPA Methods 150.1 & 310.1

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)	M854-02	Dec-13	Slope 95-102%	MS/MSD Every 20
pH Buffer 10 (Blue)	M854-03	Sep-12		% Recovery 85-115%
0.02N H2SO4 Titrant	A046-07	Apr 2013		

Standard	Solution #	Conc.	Expires	Amount Spiked (mg/L)
Matrix Spike Solution	M637-04	1N	11/18/2012	100
Contriburette: CAT 10uL, sn 600055 - pH Meter: Orion Model 620A, sn 007858				

Sample	Temp (°C)	pH	pH 4 Cal	pH 10 Cal	Slope	pH 7 Buffer	Sample Vol. (mL)	Titrant vol to pH (mL) A 8.3	B 4.5	C 4.2	Alkalinity (mg/L) Total	Carbonate	Bi-carbonate	Hydroxide	%
1208020650-001	19.4	6.48	4.01	10.04	101.2	7.10					0	0	0	0	
1208020712-001	18.8	7.25									0	0	0	0	
1208080227-001	19.4	6.45									0	0	0	0	
~~1208070757-001~~	~~20.3~~	~~7.00~~									0	0	0	0	
1208090241-001 wet	18.7	7.32									0	0	0	0	
1208090919001	18.2	7.08	4.00	10.05	100.1	7.09					0	0	0	0	
002	18.2	7.02									0	0	0	0	
003	16.5	7.09									0	0	0	0	
004	17.7	6.60									0	0	0	0	
005	16.9	6.06									0	0	0	0	
006	17.9	6.52									0	0	0	0	
1208060003-001	20.7	7.55									0	0	0	0	
07045-001	20.6	7.46									0	0	0	0	
-002	20.6	7.28									0	0	0	0	
1208100222-001	16.3	6.96									0	0	0	0	
-002	16.7	7.13													

Page 8 of 17

8-10-12 CS

Analysis Date: 8/9/12 8/10/12

Analyst: AJP AJT

Sulfide by SM 4500-S^{2-} F

	Concentration	Date Made/Expires
Iodine	0.025 N	
HCl	6 N	
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	Sample Volume	Iodine amount (50 uL increments)	Concentration (ug/sample)	Concentration (mg/L)	Date	Initials
120731034-1 m: 52.0	50 mL	50	20 ug = 0.020mg	0.4 X52.0 = 20.8	8-13-12	~~AA~~
-2 m: 52.4	↓	50	20 0.020	0.4 X52.4 = 20.96	↓	↓
-3 m: 52.2	↓	50	20 0.020	0.4 X52.4 = 20.88		
-3MS m: 52.2	↓	500	200 0.200	4.0 X52.4 = 208.8		
-LCS	1000	450	180 0.180	0.180		
-LCSD	↓	500	200 0.200	0.200		
-BL	↓	50	20 0.020	0.020		
809018-1 m: 54.1	1.0	300	120 0.120	120 x 54.1 = 6492		
-2 m: 52.7	5.0	250	100 0.100	20 x 52.7 = 1054		
806003-1	10.0	250	100 0.100	10.0		
-1MS	↓	700	280 0.280	28.0		
7045-1	10.0	250	100 0.100	10.0		
-2	10.0	150	60 0.060	6.00	↓	↓

Comments 120813 H2S R

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: M863-03 Exp:7/9/2013
Free Cyanide MS/MSD/LCS Soln: M855-02 Exp:5/17/2013

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)
1	120806003-1	reactive soil	NaOH	50mL	1x			
2	-1ms	↓	↓	↓	↓			
3	-1msd	↓	↓	↓	↓			
4	120807045-1	↓	↓	10mL	5x			
5	-2	↓	↓	↓	↓			
6	120809018-1	reactive soil	↓	50mL	54.1			
7	-2	↓	↓	↓	52.7			
8	120809028-1	raw eggs	↓	↓	1x			
9	-2	↓	↓	↓	↓			
10	17-1	↓	↓	↓	↓			
11	120803018-3	wad	MeOH	50mL	1x			
12	-3ms	↓	↓	↓	↓			
13	-3msd	↓	↓	↓	↓			
14	-LCS	↓	↓	↓	↓			
15	-BL	↓	↓	↓	↓			
16	120807038-1	↓	↓	↓	↓			
17	120807042-6	dw	↓	↓	↓			
18	-6ms	↓	↓	↓	↓			
19	-6msd	↓	↓	↓	↓			
20	43-6	↓	↓	↓	↓			

* 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 H_2SO_4	A050-07
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% $MgCl_2$	A050-06

Analytical Reagents:	Reagent #:
Barbituric Acid	R038-13
Sodium Phosphate	R026-23
Chloramine-t	R048-09
Pyridine	R043-03

Distillation Initials/Date Distilled: 8/10/12 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: M863-03 Exp:7/9/2013
Free Cyanide MS/MSD/LCS Soln: M855-02 Exp:5/17/2013

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)
1	120731034-1	reactive soil	NaOH	50mL	52.0			
2	-1MS	↓	↓	↓	↓		1mL	
3	-1MSD				↓		↓	
4	-1LCS				1x		↓	
5	-1BL				↓			
6	-2				52.4			
7	-3	↓			52.2			
8	120801023-1	WW ppm			1x			
9	7042-1	↓			↓			
10	6002-1	↓	↓	↓	↓			
11	120802042-2	WW ppm	NaOH	50mL	1x			
12	-3	↓	↓	↓	↓			
13	-3MS						1mL	
14	-3MSD						↓	
15	-LCS							
16	-BL							
17	-4							
18	120803018-3							
19	120806002-2							
20	120731042-1	↓	↓	↓	↓			

* 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 H_2SO_4	A050-07
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% $MgCl_2$	A050-06

Analytical Reagents:	Reagent #:
Barbituric Acid	R038-13
Sodium Phosphate	R026-23
Chloramine-t	R048-09
Pyridine	R043-03

Distillation Initials/Date Distilled: MW 8/9/12

Analyst Initials/Date Analyzed: MW 8/10/12

File name: T:\DATA1\FLOW4\2012\EPA335.4\081012CY.RST
Date: August 10, 2012
Operator: CRW

DRW 8/13/12

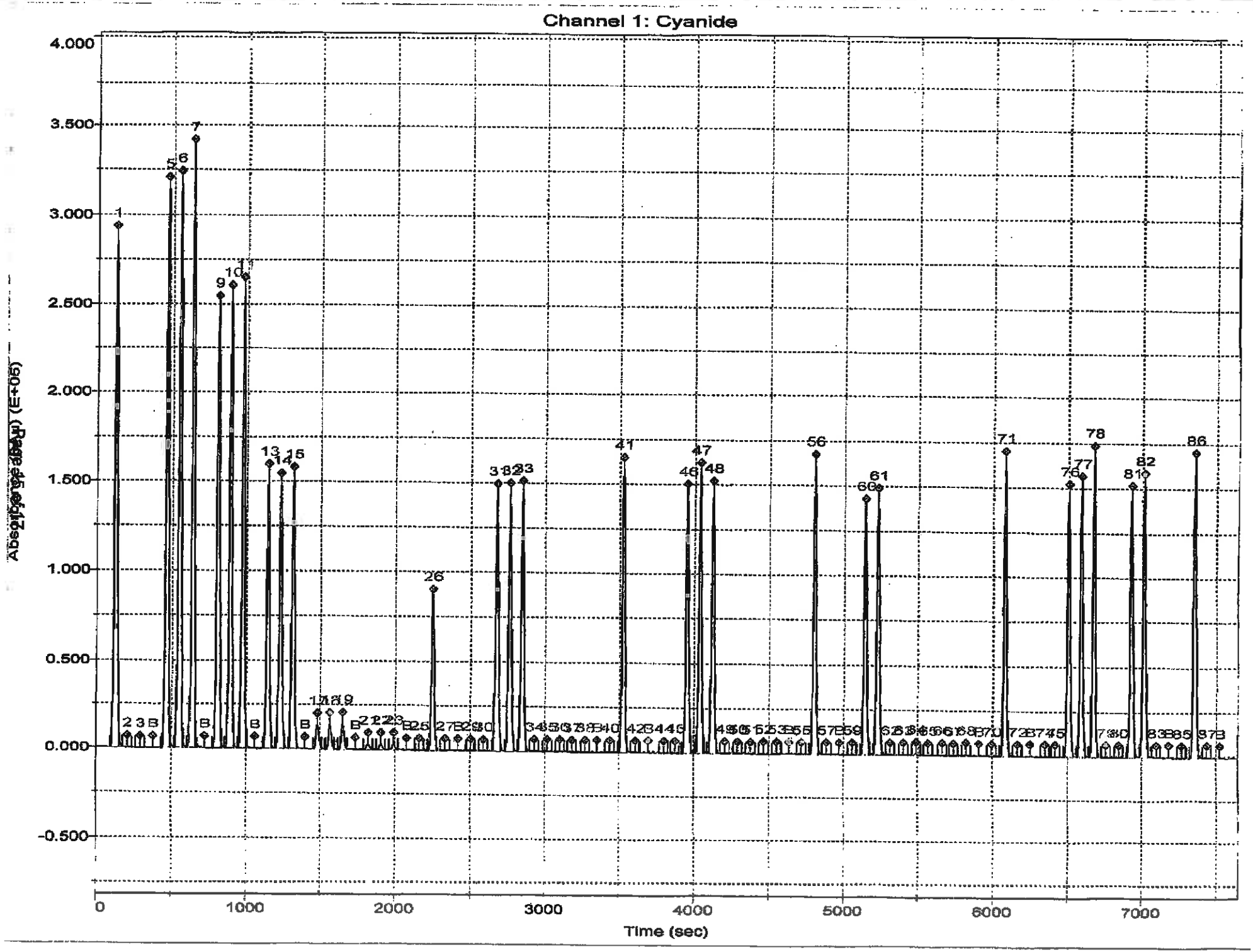
120810EIACNR

Peak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
1	2	Sync	SYNC	1	1	6663245	0.992821
2	0	Carryover	CO	1	1	14306	0.001362
3	0	Carryover	CO	1	1	994	-0.000623
4	0	Baseline	RB	1	1	3117	-0.000306
5	2	Cal 1.00 ppm	C	1	1	6700923	0.998440
6	2	Cal 1.00 ppm	C	1	1	6651245	0.991032
7	2	Cal 1.00 ppm	C	1	1	6511306	0.970165
8	0	Baseline	RB	1	1	-468	-0.000841
9	3	Cal 0.80 ppm	C	1	1	5479693	0.816335
10	3	Cal 0.80 ppm	C	1	1	5470805	0.815010
11	3	Cal 0.80 ppm	C	1	1	5483462	0.816898
12	0	Baseline	RB	1	1	739	-0.000661
13	4	Cal 0.50 ppm	C	1	1	3390538	0.504810
14	4	Cal 0.50 ppm	C	1	1	3347330	0.498367
15	4	Cal 0.50 ppm	C	1	1	3366900	0.501286
16	0	Baseline	RB	1	1	1201	-0.000592
17	5	Cal 0.05 ppm	C	1	1	321394	0.047154
18	5	Cal 0.05 ppm	C	1	1	318560	0.046731
19	5	Cal 0.05 ppm	C	1	1	323271	0.047434
20	0	Baseline	RB	1	1	103	-0.000756
21	6	Cal 0.01 ppm	C	1	1	68145	0.009390
22	6	Cal 0.01 ppm	C	1	1	63259	0.008662
23	6	Cal 0.01 ppm	C	1	1	65909	0.009057
24	0	Baseline	RB	1	1	-548	-0.000853
25	1	Blank	BLNK	1	1	-2549	-0.001151
26	7	ICV 0.25 ppm	CCV	1	1	1797901	0.267324
27	1	Blank	BLNK	1	1	-1867	-0.001049
28	0	Baseline	RB	1	1	-4633	-0.001462
29	8	120731034-BL R	U	1	1	-1626	-0.001014
30	9	120731034-001	U	52	1	-9380	-0.112826
31	10	120731034-001MS	U	52	1	3179464	24.613474
32	11	120731034-001MSD	U	52	1	3271425	25.326532
33	12	120731034-LCS	U	1	1	3387101	0.504298
34	13	120731034-002	U	52.4	1	-3138	-0.064918
35	14	120731034-003	U	52.2	1	1938	-0.025165
36	15	120801023-001	U	1	1	1508	-0.000546
37	16	120802042-001	U	1	1	-4894	-0.001501
38	17	120806002-001	U	1	1	-3932	-0.001357
39	0	Baseline	RB	1	1	-3990	-0.001366
40	1	Blank	BLNK	1	1	-6028	-0.001670
41	4	CCV 0.5 ppm	CCV	1	1	3355048	0.499518
42	1	Blank	BLNK	1	1	-5979	-0.001663
43	0	Read Baseline	RB	1	1	-2215	-0.001101
44	18	120802042-BL WW	U	1	1	-4296	-0.001412
45	19	120802042-003	U	1	1	-3281	-0.001260
46	20	120802042-003MS	U	1	1	3155951	0.469830
47	21	120802042-003MSD	U	1	1	3260448	0.485412
48	22	120802042-LCS	U	1	1	3149826	0.468917
49	23	120802042-002	U	1	1	-2211	-0.001101
50	24	120802042-004	U	1	1	-2988	-0.001217
51	25	~~120803018-003WMD~~	U	1	1	-6266	-0.001705
52	26	120806002-002	U	1	1	-4862	-0.001496
53	27	120731042-001	U	1	1	-2299	-0.001114
54	0	Baseline	RB	1	1	1128	-0.000603
55	1	Blank	BLNK	1	1	2166	-0.000448
56	4	CCV 0.5 ppm	CCV	1	1	3421294	0.509397
57	1	Blank	BLNK	1	1	3812	-0.000203
58	0	Read Baseline	RB	1	1	2616	-0.000381
59	28	120806003-001 R	U	1	1	1468	-0.000552
60	29	120806003-001MS	U	1	1	3052389	0.454387
61	30	120806003-001MSD	U	1	1	3199691	0.476352
62	31	120807045-001	U	5	1	5103	-0.000051
63	32	120807045-002	U	5	1	10059	0.003644
64	33	120809018-001 RS	U	54.1	1	23636	0.148961
65	34	120809018-002	U	52.7	1	11167	0.047124
66	35	120809028-001	U	1	1	8244	0.000458

Peak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
67	36	120809028-002	U	1	1	-2027	-0.001073
68	37	120809017-001	U	1	1	11843	0.000995
B	0	Baseline	RB	1	1	-3030	-0.001223
70	1	Blank	BLNK	1	1	-5751	-0.001629
71	4	CCV 0.5 ppm	CCV	1	1	3401767	0.506485
72	1	Blank	BLNK	1	1	-7012	-0.001817
B	0	Baseline	RB	1	1	-2009	-0.001071
74	38	120803018-BL	U	1	1	-3946	-0.001359
75	39	120803018-003	U	1	1	-7131	-0.001834
76	40	120803018-003MS	U	1	1	3109609	0.462920
77	41	120803018-003MSD	U	1	1	3128768	0.465776
78	42	120803018-LCS	U	1	1	3439192	0.512065
79	43	120802038-001	U	1	1	-5414	-0.001578
80	44	120807042-006DW	U	1	1	-3586	-0.001306
81	45	120807042-006MS	U	1	1	3198054	0.476108
82	46	120807042-006MSD	U	1	1	3389696	0.504685
83	47	120807043-006	U	1	1	-5382	-0.001574
B	0	Baseline	RB	1	1	-3961	-0.001362
85	1	Blank	BLNK	1	1	-7342	-0.001866
86	4	CCV 0.5 ppm	CCV	1	1	3511794	0.522892
87	1	Blank	BLNK	1	1	-7093	-0.001829
B	0	Read Baseline	RB	1	1	-1283	-0.000962

Peak	Cup	Flags
1	2	
2	0	
B	0	LO
B	0	BL
5	2	
6	2	
7	2	
B	0	BL
9	3	
10	3	
11	3	
B	0	BL
13	4	
14	4	
15	4	
B	0	BL
17	5	
18	5	
19	5	
B	0	BL
21	6	
22	6	OL
23	6	
B	0	BL
25	1	LO
26	7	
27	1	LO
B	0	BL
29	8	LO
30	9	LO
31	10	
32	11	
33	12	
34	13	LO
35	14	LO
36	15	LO
37	16	LO
38	17	LO
B	0	BL
40	1	LO
41	4	
42	1	LO
B	0	BL
44	18	LO

Peak	Cup	Flags
45	19	LO
46	20	
47	21	
48	22	
49	23	LO
50	24	LO
51	25	LO
52	26	LO
53	27	LO
B	0	BL
55	1	LO
56	4	
57	1	LO
B	0	BL
59	28	LO
60	29	
61	30	
62	31	LO
63	32	
64	33	
65	34	
66	35	
67	36	LO
68	37	
B	0	BL
70	1	LO
71	4	
72	1	LO
B	0	BL
74	38	LO
75	39	LO
76	40	
77	41	
78	42	
79	43	LO
80	44	LO
81	45	
82	46	
83	47	LO
B	0	BL
85	1	LO
86	4	
87	1	LO
B	0	BL


Channel 1: Cyanide
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
-0.500
0
1000
2000
3000
4000
5000
6000
7000
Time (sec)

File name: T:\DATA1\FLOW4\2012\EPA335.4\081012CY.RST
Date: August 10, 2012
Operator: CRW

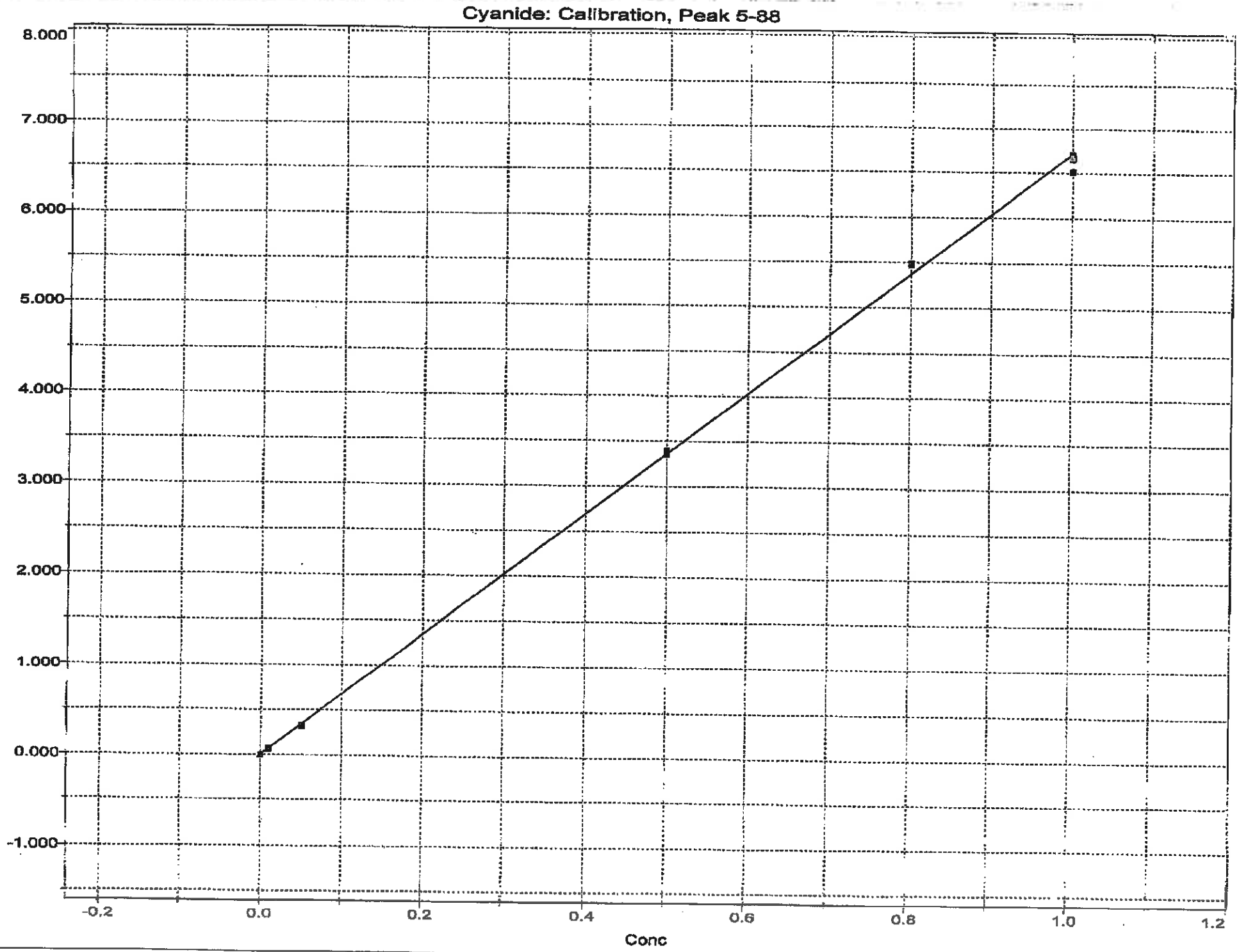
*	Name	Conc	Area
*	Cal 1.00 ppm	1.000000	6700923.000000
*	Cal 1.00 ppm	1.000000	6651245.000000
*	Cal 1.00 ppm	1.000000	6511306.500000
*	Cal 0.80 ppm	0.800000	5479693.000000
*	Cal 0.80 ppm	0.800000	5470805.000000
*	Cal 0.80 ppm	0.800000	5483462.500000
*	Cal 0.50 ppm	0.500000	3390537.500000
*	Cal 0.50 ppm	0.500000	3347330.250000
*	Cal 0.50 ppm	0.500000	3366900.000000
*	Cal 0.05 ppm	0.050000	321394.125000
*	Cal 0.05 ppm	0.050000	318560.156250
*	Cal 0.05 ppm	0.050000	323271.312500
*	Cal 0.01 ppm	0.010000	68145.109375
*	Cal 0.01 ppm	0.010000	63259.187500
*	Cal 0.01 ppm	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


Cyanide: Calibration, Peak 5-88
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Conc

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1208093

30-Aug-12

Client: Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr

Sample ID	MB	SampType:	MBLK	TestCode:	EPA Method 300.0: Anions					
Client ID:	PBW	Batch ID:	R4626	RunNo:	4626					
Prep Date:		Analysis Date:	8/2/2012	SeqNo:	129896	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	MB	SampType:	MBLK	TestCode:	EPA Method 300.0: Anions					
Client ID:	PBW	Batch ID:	R4626	RunNo:	4626					
Prep Date:		Analysis Date:	8/2/2012	SeqNo:	129948	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								

Qualifiers:

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

QC SUMMARY REPORT

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 ID: **R4783**	RunNo: **4783**
Prep Date:	Analysis Date: **8/8/2012**	SeqNo: **134870** Units: **%REC**

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			

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1208093**

30-Aug-12

Client: Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr

Sample ID **5ml b**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**	
Client ID: **PBW**	Batch ID: **R4693**	RunNo: **4693**	
Prep Date:	Analysis Date: **8/6/2012**	SeqNo: **131924**	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								
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								

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1208093**

30-Aug-12

Client: Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr

Sample ID **5ml b**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R4693**	RunNo: **4693**
Prep Date:	Analysis Date: **8/6/2012**	SeqNo: **131924** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
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								
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			
Surr: Toluene-d8	9.4		10.00		94.1	70	130			

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	%RPD	RPDLimit	Qual
Benzene	18	1.0	20.00	0	92.1	66.8	128			
Toluene	23	1.0	20.00	2.589	103	70	130			
Chlorobenzene	20	1.0	20.00	0	99.0	70	130			
1,1-Dichloroethene	19	1.0	20.00	0	94.4	70	130			
Trichloroethene (TCE)	18	1.0	20.00	0	92.3	70	130			
Surr: 1,2-Dichloroethane-d4	9.9		10.00		99.2	70	130			
Surr: 4-Bromofluorobenzene	9.2		10.00		91.7	70	130			
Surr: Dibromofluoromethane	9.8		10.00		98.4	70	130			

Qualifiers:

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

QC SUMMARY REPORT

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	%RPD	RPDLimit	Qual
Surr: Toluene-d8	9.4		10.00		93.8	70	130			

Sample ID **1208093-001amsd**	SampType: **MSD**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **Injection Well**	Batch ID: **R4693**	RunNo: **4693**
Prep Date:	Analysis Date: **8/6/2012**	SeqNo: **131928** 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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R4783**	RunNo: **4783**
Prep Date:	Analysis Date: **8/8/2012**	SeqNo: **134876** 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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R4783**	RunNo: **4783**
Prep Date:	Analysis Date: **8/9/2012**	SeqNo: **135116** 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	9.7		10.00		97.1	70	130			
Surr: 4-Bromofluorobenzene	9.9		10.00		99.3	70	130			
Surr: Dibromofluoromethane	10		10.00		100	70	130			
Surr: Toluene-d8	9.4		10.00		93.8	70	130			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1208093**

30-Aug-12

Client: Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr

Sample ID **b17**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R4783**	RunNo: **4783**
Prep Date:	Analysis Date: **8/9/2012**	SeqNo: **135117** 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			
Surr: Toluene-d8	10		10.00		101	70	130			

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

QC SUMMARY REPORT

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: **TCLP Volatiles by 8260B**
Client ID: **PBW**	Batch ID: **R4783**	RunNo: **4783**
Prep Date:	Analysis Date: **8/8/2012**	SeqNo: **134943** Units: **%REC**

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

QC SUMMARY REPORT

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: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **3177**	RunNo: **4706**
Prep Date: **8/3/2012**	Analysis Date: **8/7/2012**	SeqNo: **132557** 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
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- RL Reporting Detection Limit
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

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: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **3177**	RunNo: **4706**
Prep Date: **8/3/2012**	Analysis Date: **8/7/2012**	SeqNo: **132557** 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	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	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1208093**

30-Aug-12

Client: Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr

Sample ID	**MB-3160**	SampType: **MBLK**	TestCode: **EPA Method 7470: Mercury**
Client ID:	**PBW**	Batch ID: **3160**	RunNo: **4640**
Prep Date:	**8/2/2012**	Analysis Date: **8/3/2012**	SeqNo: **130457** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1208093**

30-Aug-12

Client: Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr

Sample ID **MB-3199**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **3199**	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								
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:

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

QC SUMMARY REPORT

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					
Prep Date:		Analysis Date:	8/13/2012	SeqNo:	136497	Units:	mg/L CaCO3			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1208093**

30-Aug-12

Client: Western Refining Southwest, Inc.

Project: Injection Well 3rd Qtr

Sample ID	**MB-3211**	SampType: **MBLK**		TestCode: **SM2540C MOD: Total Dissolved Solids**						
Client ID:	**PBW**	Batch ID: **3211**		RunNo: **4720**						
Prep Date:	**8/6/2012**	Analysis Date: **8/8/2012**		SeqNo: **132985**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID	**1208093-001CMS**	SampType: **MS**		TestCode: **SM2540C MOD: Total Dissolved Solids**						
Client ID:	**Injection Well**	Batch ID: **3211**		RunNo: **4720**						
Prep Date:	**8/6/2012**	Analysis Date: **8/8/2012**		SeqNo: **132996**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	4740	40.0	2000	2742	100	80	120			

Sample ID	**1208093-001CMSD**	SampType: **MSD**		TestCode: **SM2540C MOD: Total Dissolved Solids**						
Client ID:	**Injection Well**	Batch ID: **3211**		RunNo: **4720**						
Prep Date:	**8/6/2012**	Analysis Date: **8/8/2012**		SeqNo: **132997**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	4770	40.0	2000	2742	101	80	120	0.505	20	

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 Southwest, Inc Bloomfield Work Order Number: 1208093

Received by/date: KMS 08/01/12

Logged By: Lindsay Mangin 8/1/2012 9:30:00 AM

Completed By: Lindsay Mangin 8/2/2012 12:55:15 PM

Reviewed By: 08/02/12

Chain of Custody

		Yes	No	Not Present
1.	Were seals intact?			✓
2.	Is Chain of Custody complete?	✓		
3.	How was the sample delivered?	UPS		

Log In

		Yes	No	NA
4.	Coolers are present? (see 19. for cooler specific information)	✓		
5.	Was an attempt made to cool the samples?	✓		
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)?	✓		
8.	Sufficient sample volume for indicated test(s)?	✓		
9.	Are samples (except VOA and ONG) properly preserved?	✓		
10.	Was preservative added to bottles?		✓	
11.	VOA vials have zero headspace?	✓		No VOA Vials
12.	Were any sample containers received broken?		✓	
13.	Does paperwork match bottle labels? (Note discrepancies on chain of custody)	✓		# of preserved bottles checked for pH:
14.	Are matrices correctly identified on Chain of Custody?	✓		(<2 or >12 unless noted)
15.	Is it clear what analyses were requested?	✓		Adjusted?
16.	Were all holding times able to be met? (If no, notify customer for authorization.)	✓		Checked by:

Special Handling (if applicable)

		Yes	No	NA
17.	Was client notified of all discrepancies with this order?			✓

Person Notified: Bibtrator Date:

By Whom: AT Via: eMail Phone ✓ Fax In Person

Regarding: Sample temp

Client Instructions: proceed w/ analysis

18. Additional remarks: AT 08/02/12

19. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	7.4	Good	Yes			

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990 Bloomfield NM 87413

Phone #: 505-632-4135

email or Fax#:

QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: 3rd QTR Injection Well

Project #:

Project Manager:

Sampler: Bob

On Ice: ☒ Yes ☐ No

Sample Temperature: 7.4

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1208073
7-31-12	1:30	H_2O	Injection Well	3-VOA	HCl	-001
				1-liter	amber	
				1-500ml		
				1-500ml		
				1-250ml	H_2SO_4	
				1-500ml	NaOH	
				1-500ml	Zn Acetate	
				1-500ml	HNO_3	

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TDS	[redacted] Back up	8310 (PNA or PAH)	RCRA 8 Metals Ca, Mg, Na, K	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity, Reactivity, Alk, Cl	Ext'd SOV	Sulfides	Air Bubbles (Y or N)
									X					
										X				
											X			
				X								X		
					X									
											X			
													X	
						X								

Date:	Time:	Relinquished by:	Received by:	Date	Time
7-31-12	3:80	Robert Krakow		8/1/12	9:30
Date:	Time:	Relinquished by:	Received by:	Date	Time

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.

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

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

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

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.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 10-11-12
Lab ID: 1210682-001 **Matrix:** AQUEOUS

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	Qual	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 AM
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: SEMIVOLATILES						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	1	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	1	10/20/2012 7:09:26 PM
Bis(2-chloroisopropyl)ether	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Bis(2-ethylhexyl)phthalate	ND	50		µg/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/L	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

Qualifiers:

- * 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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 10-11-12
Lab ID: 1210682-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **JDC**
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 PM
Di-n-butyl phthalate	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Di-n-octyl phthalate	ND	100		µg/L	1	10/20/2012 7:09:26 PM
Dibenz(a,h)anthracene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Dibenzofuran	ND	50		µg/L	1	10/20/2012 7:09:26 PM
1,2-Dichlorobenzene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
1,3-Dichlorobenzene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
1,4-Dichlorobenzene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
3,3'-Dichlorobenzidine	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Diethyl phthalate	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Dimethyl phthalate	ND	50		µg/L	1	10/20/2012 7:09:26 PM
2,4-Dichlorophenol	ND	100		µg/L	1	10/20/2012 7:09:26 PM
2,4-Dimethylphenol	ND	50		µg/L	1	10/20/2012 7:09:26 PM
4,6-Dinitro-2-methylphenol	ND	100		µg/L	1	10/20/2012 7:09:26 PM
2,4-Dinitrophenol	ND	100		µg/L	1	10/20/2012 7:09:26 PM
2,4-Dinitrotoluene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
2,6-Dinitrotoluene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Fluoranthene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Fluorene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Hexachlorobenzene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Hexachlorobutadiene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Hexachlorocyclopentadiene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Hexachloroethane	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Indeno(1,2,3-cd)pyrene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Isophorone	ND	50		µg/L	1	10/20/2012 7:09:26 PM
1-Methylnaphthalene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
2-Methylnaphthalene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
2-Methylphenol	ND	50		µg/L	1	10/20/2012 7:09:26 PM
3+4-Methylphenol	ND	50		µg/L	1	10/20/2012 7:09:26 PM
N-Nitrosodi-n-propylamine	ND	50		µg/L	1	10/20/2012 7:09:26 PM
N-Nitrosodimethylamine	ND	50		µg/L	1	10/20/2012 7:09:26 PM
N-Nitrosodiphenylamine	ND	50		µg/L	1	10/20/2012 7:09:26 PM
Naphthalene	ND	50		µg/L	1	10/20/2012 7:09:26 PM
2-Nitroaniline	ND	50		µg/L	1	10/20/2012 7:09:26 PM
3-Nitroaniline	ND	50		µg/L	1	10/20/2012 7:09:26 PM
4-Nitroaniline	ND	50		µg/L	1	10/20/2012 7:09:26 PM
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

Qualifiers:

- * 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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 10-11-12
Lab ID: 1210682-001 **Matrix:** AQUEOUS

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	Qual	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	1	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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 10-11-12
Lab ID: 1210682-001 **Matrix:** AQUEOUS

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	Qual	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 PM
1,1-Dichloroethane	ND	10		µg/L	10	10/19/2012 1:17:34 PM
1,1-Dichloroethene	ND	10		µg/L	10	10/19/2012 1:17:34 PM
1,2-Dichloropropane	ND	10		µg/L	10	10/19/2012 1:17:34 PM
1,3-Dichloropropane	ND	10		µg/L	10	10/19/2012 1:17:34 PM
2,2-Dichloropropane	ND	20		µg/L	10	10/19/2012 1:17:34 PM
1,1-Dichloropropene	ND	10		µg/L	10	10/19/2012 1:17:34 PM
Hexachlorobutadiene	ND	10		µg/L	10	10/19/2012 1:17:34 PM
2-Hexanone	ND	100		µg/L	10	10/19/2012 1:17:34 PM
Isopropylbenzene	ND	10		µg/L	10	10/19/2012 1:17:34 PM
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/L	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-Tetrachloroethane	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 PM
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 PM
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 PM
Vinyl chloride	ND	10		µg/L	10	10/19/2012 1:17:34 PM
Xylenes, Total	ND	15		µg/L	10	10/19/2012 1:17:34 PM
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 PM
Surr: Dibromofluoromethane	102	70-130		%REC	10	10/19/2012 1:17:34 PM
Surr: Toluene-d8	96.0	70-130		%REC	10	10/19/2012 1:17:34 PM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 10-11-12
Lab ID: 1210682-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: **JML**
Conductivity	4600	0.010		µmhos/cm	1	10/15/2012 12:32:45 PM
SM4500-H+B: PH						Analyst: **JML**
pH	7.35	1.68	H	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 DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	2910	100		mg/L	1	10/16/2012 7:08:00 PM

Qualifiers:

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

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	Anatek Sample ID	Method/Prep Method
1210682-001E / Injection Well	121017011-001	EPA 1010/150.1/SW 846 CH7

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	Y	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?	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

No problems encountered.

6. Method Blank Requirements

No problems encountered.

7. Internal Standard(s) Response Requirements

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: John. Cobb

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

Sample Number	121017011-001	**Sampling Date**	10/11/2012	**Date/Time Received**	10/16/2012 1:05 PM
Client Sample ID	1210682-001E / INJECTION WELL			**Sampling Time**	9:00 AM
Matrix	Water	**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	°F		10/26/2012	KFG	EPA 1010	
pH	7.37	ph Units		10/18/2012	ETL	EPA 150.1	
Reactive sulfide	6.43	mg/L	1	10/24/2012	JTT	SW846 CH7	

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation 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
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 Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Reactive sulfide	0.180	mg/L	0.2	90.0	70-130	10/24/2012	10/24/2012
Cyanide (reactive)	0.487	mg/L	0.5	97.4	80-120	10/22/2012	10/22/2012

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Reactive sulfide	0.180	mg/L	0.2	90.0	0.0	0-25	10/24/2012	10/24/2012

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
121017011-001	Reactive sulfide	6.43	12.9	mg/L	8.03	80.6	70-130	10/24/2012	10/24/2012
121017011-001	Cyanide (reactive)	ND	0.453	mg/L	0.5	90.6	80-120	10/22/2012	10/22/2012

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide (reactive)	0.468	mg/L	0.5	93.6	3.3	0-25	10/22/2012	10/22/2012

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide (reactive)	ND	mg/L	0.1	10/22/2012	10/22/2012
Reactive sulfide	ND	mg/kg	1	10/24/2012	10/24/2012

AR	Acceptable Range
ND	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):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; 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 WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 121017011
Order Date: 10/17/2012

Contact Name: ANDY FREEMAN
Project Name: 1210682
Comment:

Sample #: 121017011-001 **Customer Sample #:** 1210682-001E / INJECTION WELL

Recv'd: ☑ **Collector:** **Date Collected:** 10/11/201
Quantity: 3 **Matrix:** Water **Date Received:** 10/16/2012 1:05:00 P
Comment:

Test	Lab	Method	Due Date	Priority
CYANIDE REACTIVE	M	SW846 CH7	10/26/2012	***Normal (6-10 Days)***
FLASHPOINT	M	EPA 1010	10/26/2012	***Normal (6-10 Days)***
pH	M	EPA 150.1	10/26/2012	***Normal (6-10 Days)***
SULFIDE REACTIVE	M	SW846 CH7	10/26/2012	***Normal (6-10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	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

ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

121017 011 HALL Last Due 10/26/2012
1st SAMP 10/11/201 1st RCVD 10/16/2012
1210682

SUB CONTRATOR: Anatek Labs	COMPANY: Anatek Labs, Inc.	PHONE: (208) 883-2839	FAX: (208) 882-9246
ADDRESS: 1282 Alturas Dr		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Moscow, ID 83843			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1210682-001E	Injection Well	500HDPE	Aqueous	10/11/2012 9:00:00 AM	3	RCI LEVEL 4
2						0	
3						0	MWBS
4						0	
5						0	
6						0	
7						0	
8						0	
9						0	
10						0	

Page 6 of 16

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all ... coolers and blue ice. Thank you.

Relinquished By:	Date: 10/15/2012	Time: 3:51 PM
Relinquished By:	Date:	Time:
Relinquished By:	Date:	Time:

TAT: Standard ☐ RUSH

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 4.5 °C
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE

ICE / ICE-PACKS PRESENT: Y

CUSTODY SEALS PRESENT: Y

PRESERVATIVES: NaOH NaOH

NUMBER OF CONTAINERS: 3 SHIPPED VIA: F

DATE & TIME: 10/16/12 1305 INSPECTED BY: BT

REPORT TRANSMITTAL DESIRED:

(extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY

_____ °C Attempt to Cool ? _____

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
120727018-001	7/30/2012	4/ H_2O	[illegible]		>200° F
120727025-001	8/5/2012	5/ Liquid	[illegible]		145° F
-002	↓	↓	↓		141° F
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	↓	↓	↓		[illegible]
-[illegible]	↓	↓	↓		[illegible]
[illegible]	8/10/2012	5/ Liquid	[illegible]		>200°F
120810057-001	8/21/2012	4/ H_2O	[illegible]		>200°F
120829003-001	8/29/2012	5/Liquid	[illegible]		>200°F
120830001-001	8/31/2012	4/H_2O	[illegible]		>200°F
120831042-001	9/04/2012	5/Liquid	[illegible]		>200°F
120831043-001	↓	↓	↓		<50°F
-002	↓	↓	↓		>200°F
-003	↓	↓	↓		>200°F
-004	↓	↓	↓		~~105°F~~ 115°F [illegible] 4/4/12
121002054-002	10/04/2012	5/Liquid	[illegible]		85°F
121004001-001	↓	↓	↓		<64°F
121005005-001	10/08/2012	5/Liquid	[illegible]		135°F
-002	↓	↓	↓		150°F
121017011-001	10/25/2012	4/Water	[illegible]		>200°F

*** SAFETY GLASSES REQUIRED.**

pH - SM4500H+B / Alkalinity SM2320B

Equivalent EPA Methods 150.1 & 310.1

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)	M854-02	Dec-13	Slope 95-102%	MS/MSD Every 20
pH Buffer 10 (Blue)	M854-03	Sep-12		% Recovery 85-115%
0.02N H2SO4 Titrant	A046-07	Apr 2013		

Standard	Solution #	Conc.	Expires	Amount Spiked (mg/L)
Matrix Spike Solution	M637-04	1N	11/18/2012	100
Contriburette: CAT 10uL, sn 600055 - pH Meter: Orion Model 620A, sn 007858				

Sample	Temp (°C)	pH	pH 4 Cal	pH 10 Cal	Slope	pH 7 Buffer	Sample Vol. (mL)	Titrant vol to pH (mL) A 8.3	B 4.5	C 4.2	Alkalinity (mg/L) Total	Carbonate	Bi-carbonate	Hydroxide	%
1210170 18-001	24.8	7.53	3.95	10.00	101.5	7.10					0		0		
-002	19.9	7.51									0	0			
-003	19.0	7.08									0		0		
1210170 11-001	19.8	7.37									0		0		
1216034-001	20.6	10.29									0		0		
											0	0			
											0	0			
											0		0		
											0		0		
											0		0		
											0	0			
											0	0		0	
											0	0	0	0	
											0	0	0	0	
											0	0	0	0	

Analysis Date: 10-18-12 Analyst: EST

Sulfide by SM 4500 S-2

	Concentration	Date Made/Expires
Iodine	0.025 N	
HCl	6 N	
Starch Indicator	1% by weight	12/31/2009
Zinc Acetate	99.9%	

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

121024H2SR

Sample	Sample Volume	Iodine amount (50 uL increments)	Concentration (mg/sample)	Concentration (mg/L)	Date	Initials
12041062-B1	525	50	0.020	0.0381	10.24.12	
-3	522	50	0.020	0.0383		
-3MS	↓	450	0.180	0.345		
-LCS	1000	450	0.180	0.180		
-LCSD	↓	450	0.180	0.180		
-BL	↓	50	0.020	0.020		
18045-7	503	100	0.040	0.0795		
19049-5	525	50	0.020	0.0381		
23016-5	525	50	0.020	0.0381		
-10	515	50	0.020	0.0388		
-15	528	50	0.020	0.0379		
-20	529	50	0.020	0.0378		
17011-1	24.9	400	0.160	6.43		
-1MS	↓	800	0.320	12.86		

Comments

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: M884-06 Exp:10/15/13
ree Cyanide MS/MSD/LCS Soln: 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)
	12101-049-4	soil gen	NaOH	50mL	28.8	28.8		
	-4ms	↓	↓	↓	↓	↓	1mL	
	-4msd				↓	↓	↓	
	-4s				1x	1x	↓	
	-BC				↓	↓		
	-5				29.9	29.9		
	-6				30.4	30.4		
	-7				28.9	28.9		
	12010018-1	↓						
	12101864-2	ww gen	↓	↓	1X	1X		
	12101802A-1	reactive soil	NaOH	50mL	27.9	27.9		
	-1ms	↓	↓	↓	↓	↓	1mL	
	-1msd				↓	↓	↓	
	-1s				1x	1x	↓	
	-BL				↓	↓		
	25-1				28.7	28.7		
	26-1	↓			27.9	27.9		
	12101701A-1	ww reactive			1x	1x		
	-1ms	↓	↓	↓	↓	↓	1mL	
	-1msp	↓	↓	↓	↓	↓	↓	

* 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 H_2SO_4	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: DMW 10/22/12

Analyst Initials/Date Analyzed: DMW 10/22/12

f'e name: T:\DATA1\FLOW4\2012\EPA335.4\102212C2.RST
ate: October 22, 2012
perator: CRW

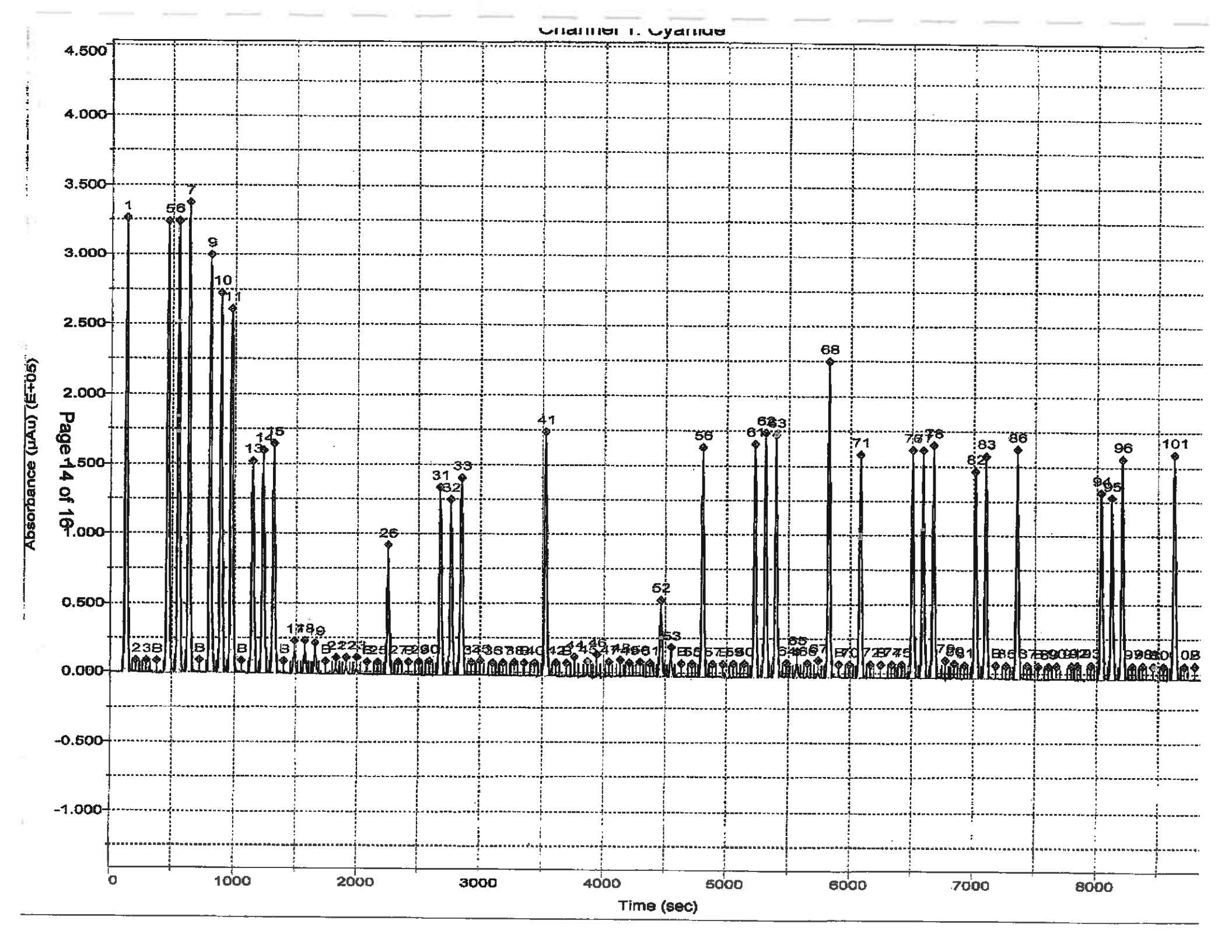
121022FIACNRW

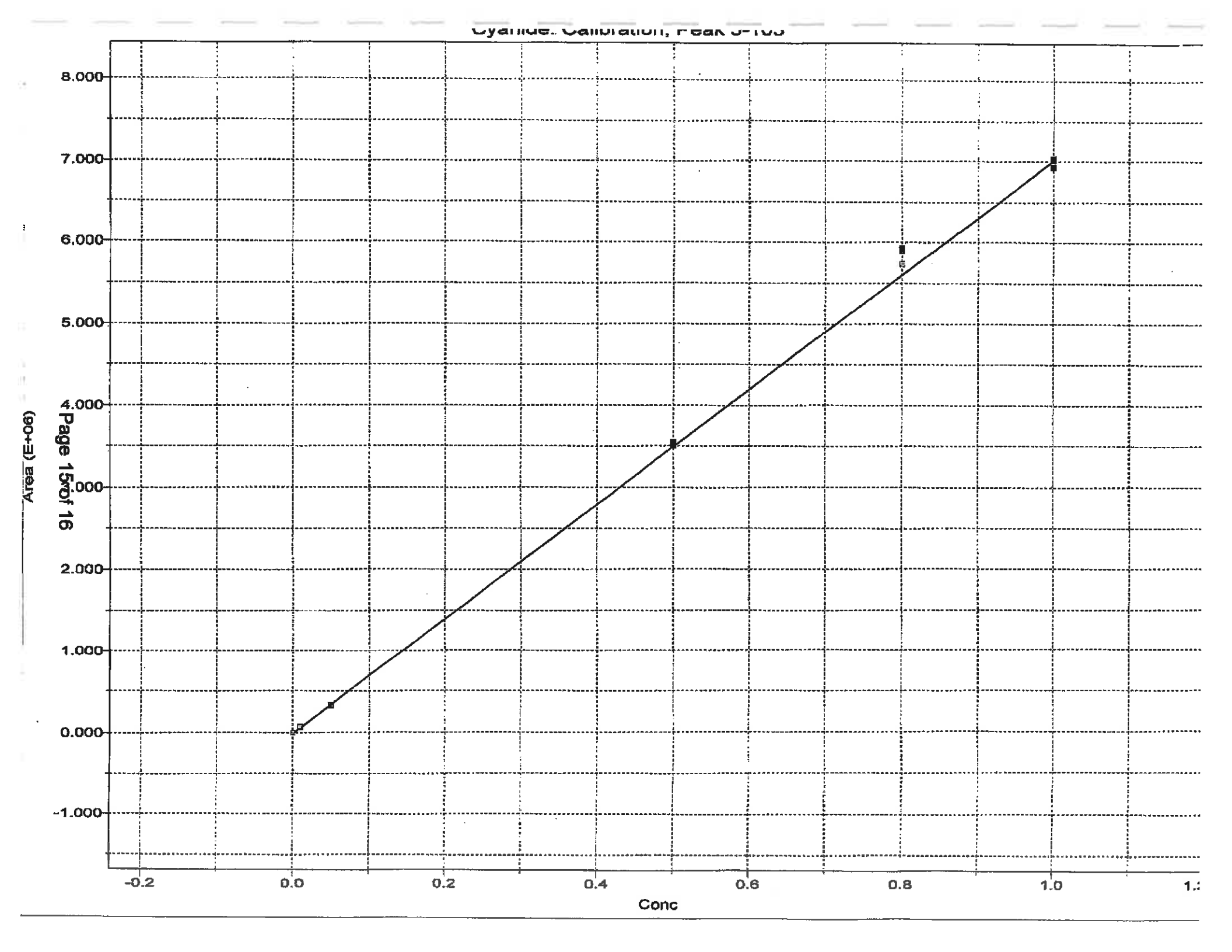
eak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
	2	Sync	SYNC	1	1	6896128	0.985156
	0	Carryover	CO	1	1	16248	0.004798
	0	Carryover	CO	1	1	-1347	0.002291
	0	Baseline	RB	1	1	-5625	0.001681
	2	Cal 1.00 ppm	C	1	1	7026224	1.003694
	2	Cal 1.00 ppm	C	1	1	6923783	0.989097
	2	Cal 1.00 ppm	C	1	1	7012644	1.001759
	0	Baseline	RB	1	1	-4419	0.001853
	3	Cal 0.80 ppm	C	1	1	5734824	0.819675
0	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	C	1	1	3525813	0.504898
4	4	Cal 0.50 ppm	C	1	1	3503091	0.501661
5	4	Cal 0.50 ppm	C	1	1	3544872	0.507614
	0	Baseline	RB	1	1	7206	0.003509
7	5	Cal 0.05 ppm	C	1	1	330488	0.049576
8	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	1	3289	0.002951
1	6	Cal 0.01 ppm	C	1	1	67522	0.012104
2	6	Cal 0.01 ppm	C	1	1	64335	0.011650
3	6	Cal 0.01 ppm	C	1	1	71374	0.012653
	0	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
7	1	Blank	BLNK	1	1	3475	0.002978
	0	Baseline	RB	1	1	3745	0.003016
9	8	121017039-BL	U	1	1	21154	0.005497
0	9	121017039-001	U	1	1	5777	0.003306
1	10	121017039-001MS	U	1	1	2830796	0.405861
2	11	121017039-001MSD	U	1	1	2704044	0.387799
3	12	121017039-LCS	U	1	1	3068466	0.439728
4	13	121017039-002	U	1	1	701	0.002582
5	14	121017039-003	U	1	1	10956	0.004044
6	15	121017039-004	U	1	1	180	0.002508
7	16	121011045-001	U	1	1	4229	0.003085
8	17	121011047-001	U	1	1	-5655	0.001677
	0	Baseline	RB	1	1	-2539	0.002121
0	1	Blank	BLNK	1	1	-6362	0.001576
1	4	CCV 0.5 ppm	CCV	1	1	3683226	0.527329
2	1	Blank	BLNK	1	1	-4448	0.001849
	0	Read Baseline	RB	1	1	-2614	0.002110
4	18	121011044-001	U	1	1	8811	0.003738
5	19	121011046-001	U	1	1	17784	0.005017
6	20	121012023-001	U	1	1	19745	0.005296
7	21	121012023-002	U	1	1	3578	0.002992
8	22	121016064-001	U	1	1	16321	0.004808
9	23	121016064-002	U	1	1	12962	0.004330
0	24	121016064-003	U	1	1	24899	0.006031
1	25	121016064-004	U	1	1	7742	0.003586
2	26	121017039-005	U	1	1	1065183	0.154267
3	27	121017039-006	U	1	1	259646	0.039481
	0	Baseline	RB	1	1	-4918	0.001782
5	1	Blank	BLNK	1	1	-3462	0.001989
6	4	CCV 0.5 ppm	CCV	1	1	3553014	0.508774
7	1	Blank	BLNK	1	1	-1855	0.002218
	0	Read Baseline	RB	1	1	8664	0.003717
9	28	121011049-BL	U	1	1	-2062	0.002189
0	29	121011049-004	U	28.8	1	4978	0.091925
1	30	121011049-004MS	U	28.8	1	3504808	14.454871
2	31	121011049-004MSD	U	28.8	1	3560151	14.681992
3	32	121011049-LCS	U	1	1	3570142	0.511215
4	33	121011049-005	U	29.9	1	14327	0.135268
5	34	121011049-006	U	29.4	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	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	U	27.9	1	3329258	13.305229
	41	121018024-001MSD	U	27.9	1	3400022	13.586565
	42	121018024-LCS	U	1	1	3401070	0.487123
	43	121018025-001	U	28.7	1	4755	0.090695
	44	121018026-001	U	27.9	1	25061	0.168897
	45	121017011-001	U	1	1	-6380	0.001573
	46	121017011-001MS	U	1	1	3158807	0.452601
	47	121017011-001MSD	U	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	CCV	1	1	3558024	0.509488
	1	Blank	BLNK	1	1	9428	0.003826
	0	Baseline	RB	1	1	1524	0.002700
	48	R	U	1	1	-137	0.002463
	49	R	U	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	U	1	1	10798	0.004021
	53	121017039-001MS	U	1	1	2855315	0.409355
	54	121017039-001MSD	U	1	1	2727674	0.391166
	55	121017039-LCS	U	1	1	3254267	0.466204
	56	R	U	1	1	3157	0.002932
	57	R	U	1	1	6806	0.003452
	0	Baseline	RB	1	1	376	0.002536
0	1	Blank	BLNK	1	1	-7122	0.001468
1	4	CCV 0.5 ppm	CCV	1	1	3616182	0.517776
2	1	Blank	BLNK	1	1	-5670	0.001675
	0	Baseline	RB	1	1	-6489	0.001558

ak	Cup	Flags
	2	
	0	
	0	
	0	BL
	2	
	2	
	2	
	0	BL
	3	OL
	3	
	3	
	0	BL
	4	
	4	
	4	
	0	BL
	5	
	5	
	5	
	0	BL
	6	
	6	
	6	OL
	0	BL
	1	
	7	
	1	
	0	BL
	8	

```
--- ----- --------
0       9
1      10
2      11
3      12
4      13
5      14
6      15
7      16
8      17
        0    BL
9       1
1       4
2       1
        0    BL
4      18
5      19
6      20
7      21
8      22
9      23
0      24
1      25
2      26
3      27
        0    BL
5       1
6       4
7       1
        0    BL
9      28
0      29
1      30
2      31
3      32
4      33
5      34
6      35
7      36
8      37
        0    BL
0       1
1       4
2       1
        0    BL
4      38
5      39
6      40
7      41
8      42
9      43
0      44
1      45
2      46
3      47
        0    BL
5       1
6       4
7       1
        0    BL
9      48
0      49
1      50
2      51
3      52
4      53
5      54
6      55
7      56
8      57
        0    BL
00      1
```


Channel 1: Cyanide
Absorbance (µAu) (E+05)
Time (sec)
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
-0.500
-1.000
0
1000
2000
3000
4000
5000
6000
7000
8000


Cyanide: Calibration, Peak 3-103
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
Area (E+06)
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
Conc

File Name: I:\DATA1\FLOW4\2012\EPA335.4\10221202.RST
Date: October 22, 2012
Operator: 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
Cal 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **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**
Prep Date:	Analysis Date: **10/13/2012**	SeqNo: **179335** 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								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R6432**	RunNo: **6432**
Prep Date:	Analysis Date: **10/19/2012**	SeqNo: **184843** 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								
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
- 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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R6432**	RunNo: **6432**
Prep Date:	Analysis Date: **10/19/2012**	SeqNo: **184843** 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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R6432**	RunNo: **6432**
Prep Date:	Analysis Date: **10/19/2012**	SeqNo: **184881** 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								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2
- R RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1210682**

07-Nov-12

Client: Western Refining Southwest, Inc.

Project: Injection Well 10-11-12

Sample ID **b6**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R6432**	RunNo: **6432**
Prep Date:	Analysis Date: **10/19/2012**	SeqNo: **184881** 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								

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1210682**

07-Nov-12

Client: Western Refining Southwest, Inc.

Project: Injection Well 10-11-12

Sample ID **b6**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R6432**	RunNo: **6432**
Prep Date:	Analysis Date: **10/19/2012**	SeqNo: **184881** 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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1210682**

07-Nov-12

Client: Western Refining Southwest, Inc.

Project: Injection Well 10-11-12

Sample ID **mb-4322**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **4322**	RunNo: **6287**
Prep Date: **10/16/2012**	Analysis Date: **10/16/2012**	SeqNo: **181174** 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:

- * 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1210682**

07-Nov-12

Client: Western Refining Southwest, Inc.

Project: Injection Well 10-11-12

Sample ID	mb-4322	SampType:	MBLK	TestCode:	EPA Method 8270C: Semivolatiles					
Client ID:	PBW	Batch ID:	4322	RunNo:	6287					
Prep Date:	10/16/2012	Analysis Date:	10/16/2012	SeqNo:	181174	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	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	140		200.0		71.8	44.2	126			
Surr: 2-Fluorobiphenyl	86		100.0		86.2	37	114			
Surr: 2-Fluorophenol	110		200.0		56.3	23.4	98			
Surr: 4-Terphenyl-d14	76		100.0		75.8	41.3	116			
Surr: Nitrobenzene-d5	98		100.0		97.6	39.5	118			
Surr: Phenol-d5	100		200.0		52.2	20.9	95.9			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits

QC SUMMARY REPORT

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**	RunNo:	**6237**				
Prep Date:		Analysis Date:	**10/15/2012**	SeqNo:	**179731**	Units:	**µmhos/cm**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	4600	0.010						0.651	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **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**	RunNo: **6596**
Prep Date: **10/30/2012**	Analysis Date: **10/30/2012**	SeqNo: **190478** 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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1210682**

07-Nov-12

Client: Western Refining Southwest, Inc.

Project: Injection Well 10-11-12

Sample ID **MB-4329**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **4329**	RunNo: **6333**
Prep Date: **10/16/2012**	Analysis Date: **10/18/2012**	SeqNo: **182303** 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								

Sample ID **MB-4329**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **4329**	RunNo: **6462**
Prep Date: **10/16/2012**	Analysis Date: **10/24/2012**	SeqNo: **185746** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Selenium	ND	0.050								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits

QC SUMMARY REPORT

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: **SM4500-H+B: pH**						
Client ID:	**Injection Well**	Batch ID: **R6237**		RunNo: **6237**						
Prep Date:		Analysis Date: **10/15/2012**		SeqNo: **179738**		Units: **pH units**				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH		7.36	1.68								H

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **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**	RunNo: **6237**							
Prep Date:	Analysis Date: **10/15/2012**	SeqNo: **179709**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

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

QC SUMMARY REPORT

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** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **1210682-001CMS**	SampType: **MS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **Injection Well**	Batch ID: **4296**	RunNo: **6273**
Prep Date: **10/15/2012**	Analysis Date: **10/16/2012**	SeqNo: **180774** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	8040	100	5000	2910	103	80	120			

Sample ID **1210682-001CMSD**	SampType: **MSD**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **Injection Well**	Batch ID: **4296**	RunNo: **6273**
Prep Date: **10/15/2012**	Analysis Date: **10/16/2012**	SeqNo: **180775** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	8000	100	5000	2910	102	80	120	0.498	20	

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

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 Southwest, Inc Bloomfield	Work Order Number:	1210682
Received by/date:		10/12/12	
Logged By:	Lindsay Mangin	10/12/2012 10:30:00 AM	
Completed By:	Lindsay Mangin	10/12/2012 2:40:37 PM	
Reviewed By:		10/12/12	

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?	FedEx		

Log In

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 ☐	
9.	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 ☐	
14.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
15.	Is it clear what analyses were requested?	Yes ☑	No ☐	
16.	Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 2,2 (<2 or >12 unless noted)
Adjusted?
Checked by: MG

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	Seal Date	Signed By
1	1.3	Good	Yes			

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 ☒ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name:
Injection Well 10-11-12

Project #:

Project Manager:

Sampler: MATT A Bob
On Ice: Yes No
Sample Temperature: 4.3

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL NO. 1210012
10-11-12	9:00	H2O	Injection Well	3-VOA	HCl	-001
				1-liter	Amber	
				1-500ml	—	
				1-500ml	—	
				1-250ml	H_2SO_4	
				1-500ml	HNO_3	
				1-500ml	NaOH	
				1-500ml	Zn Acetate	

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TDS	Backup	8310 (PNA or PAH)	RCRA 8 Metals Ag, As, Ba, Cd, Cr, Pb, Hg, Se	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	EC, pH, SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
									X						
										X					
											X				
			X										X		
				X											
						X									
												X			
														X	

Date:	Time:	Relinquished by:	Received by:	Date	Time
10-11-12	3:00	Robert Krakow			
Date:	Time:	Relinquished by:	Received by:	10/12/12	1030 1500

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.

APPENDIX C

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory

QUALITY ASSURANCE PLAN

Effective Date: July 2nd, 2012

Revision 9.5

www.hallenvironmental.com

Control Number: 00000120

Approved By:

6/29/12

Andy Freeman
Laboratory Manager

Date

Approved By:

6/29/2012

Carolyn Swanson
Quality Assurance/Quality Control Officer

Date

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Approved By:

6/29/12

Andy Freeman Date
Organics Technical Director

Approved By:

7/2/12

Ian Cameron Date
Inorganics Technical Director

Approved By:

7/2/12

Leva Jensen Date
Microbiology Technical Director

Table of Contents

This Page was intentionally left blank.

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

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.

Laboratory Director
Quality Assurance Quality Control Officer
Assistant Quality Assurance Quality Control Officer
Laboratory Manager
Health/Safety & Chemical Hygiene Officer
Assistant Health/Safety & Chemical Hygiene Officer
Technical Staff
Microbiology Technical Director
Microbiology Analyst III
Microbiology Analyst II
Microbiology Analyst I
Inorganics Technical Director
Metals Supervisor
Metals Analyst III
Metals Analyst II
Metals Analyst I
Wet Chemistry Analyst III
Wet Chemistry Analyst II
Wet Chemistry Analyst I
Laboratory Technician
Organics Technical Director
Organics Supervisor
Semi-Volatiles Analyst III
Semi-Volatiles Analyst II
Semi-Volatiles Analyst I
Volatiles Analyst III
Volatiles Analyst II
Volatiles Analyst I
Laboratory Technician
Administrative Staff
Bookkeeper
Administrative Assistant
IT Specialist
Project Manager
Sample Control Manager
Sample Custodians
Sample Disposal
Laboratory Technician

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 NPW	"Conductance(Specific Conductance, umohms 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 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"
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 Derivatization"
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"

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)
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-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 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.

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 </= 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.
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 re-extraction 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.

$$RPD = \frac{2 \times (\text{Sample Result} - \text{Duplicate Result})}{(\text{Sample Result} + \text{Duplicate Result})} \times 100$$

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

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.

$$\text{Average} = (\Sigma x_i) / n$$

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^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.

$$\text{Standard deviation} = s = [\Sigma (x_i - \text{average})^2 / (n - 1)]^{1/2}$$

Percent Recovery (LCS and LCSD)

$$\text{Percent Recovery} = \frac{\text{(Spike Sample Result)}}{\text{(Spike Added)}} \text{X100}$$

Percent Recovery (MS, MSD)

$$\text{Percent Recovery} = \frac{\text{(Spike Sample Result} - \text{Sample Result)}}{\text{(Spike Added)}} \text{X100}$$

Control Limits

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

$$\text{Upper Control Limit} = x + 3s$$
$$\text{Lower Control Limit} = x - 3s$$

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:

$$RPD = \frac{2 \times (\text{Sample Result} - \text{Duplicate Result})}{(\text{Sample Result} + \text{Duplicate Result})} \times 100$$

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:

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

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 x s) is 0.0652.

Total Nitrogen

Total nitrogen is calculated as follows:

Total Nitrogen = TKN + NO_2 + NO_3

Calibration Calculations

1. Response Factor or Calibration Factor:

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

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

$RSD = s / RF_{AVE}$

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
Σ = the sum of all the individual values

2. Linear Regression

$y=mx+b$

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)

$$CC (r) =\{ \Sigma((x_i-x_{ave})*(y_i-y_{ave})) \} / \{ SQRT((\Sigma(x_i-x_{ave})^2)*(\Sigma(y_i-y_{ave})^2)) \}$$

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
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

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

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*(Cx/Cis)^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
$w = S^{-2} / (\Sigma S^{-2}/n)$
$S_{(xx)} = (\Sigma x^2w) - [(\Sigma xw)^2 / n]$
$S_{(xy)} = (\Sigma xyw) - [(\Sigma xw)*(\Sigma yw) / n]$
$S_{(xx2)} = (\Sigma x^3w) - [(\Sigma xw)*(\Sigma x^2w) / n]$
$S_{(x2y)} = (\Sigma x^2yw) - [(\Sigma x^2w)*(\Sigma yw) / n]$

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

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
A_{is} = 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(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 = $\frac{\text{(On-Column Conc)(Dilution)(Final Volume)}}{\text{(Initial Amount)(Injection Volume)}}$

Concentration for Purged Samples = $\frac{\text{(On-Column Conc)(Purged Amount)(Dilution)}}{\text{(Purged Amount)}}$

Dry Weight Concentration

Dry Weight Concentration = $\frac{\text{Final Concentration Wet Weight}}{\text{Total Solids}}$

Percent Difference

% Difference= $\frac{\text{Absolute(Continuing Calibration RRF - Average RRF)}}{}$ * 100

Average RRF

Percent Drift

$$\% \text{ Drift} = \frac{\text{Absolute(Calculated Concentration - Theoretical Concentration)}}{\text{Theoretical Concentration}} * 100$$

Dilution Factor

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

Relative Retention Time

RRT =RT of Compound / RT of ISTD

Breakdown Percent

$$\text{Breakdown} = \frac{\text{Area of DDD + Area of DDE}}{\text{Average (DDT, DDE and DDD)}}$$

-or-

$$\frac{\text{Area of Endrin Ketone + Area of Endrin Aldehyde}}{\text{Average (Endrin, Endrin Ketone, Endrin Aldehyde)}}$$

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.

Western Refining
LOGISTICS

WNR LISTED NYSE

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 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.

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

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

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

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:

- 04/24/13 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 up-stream 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.

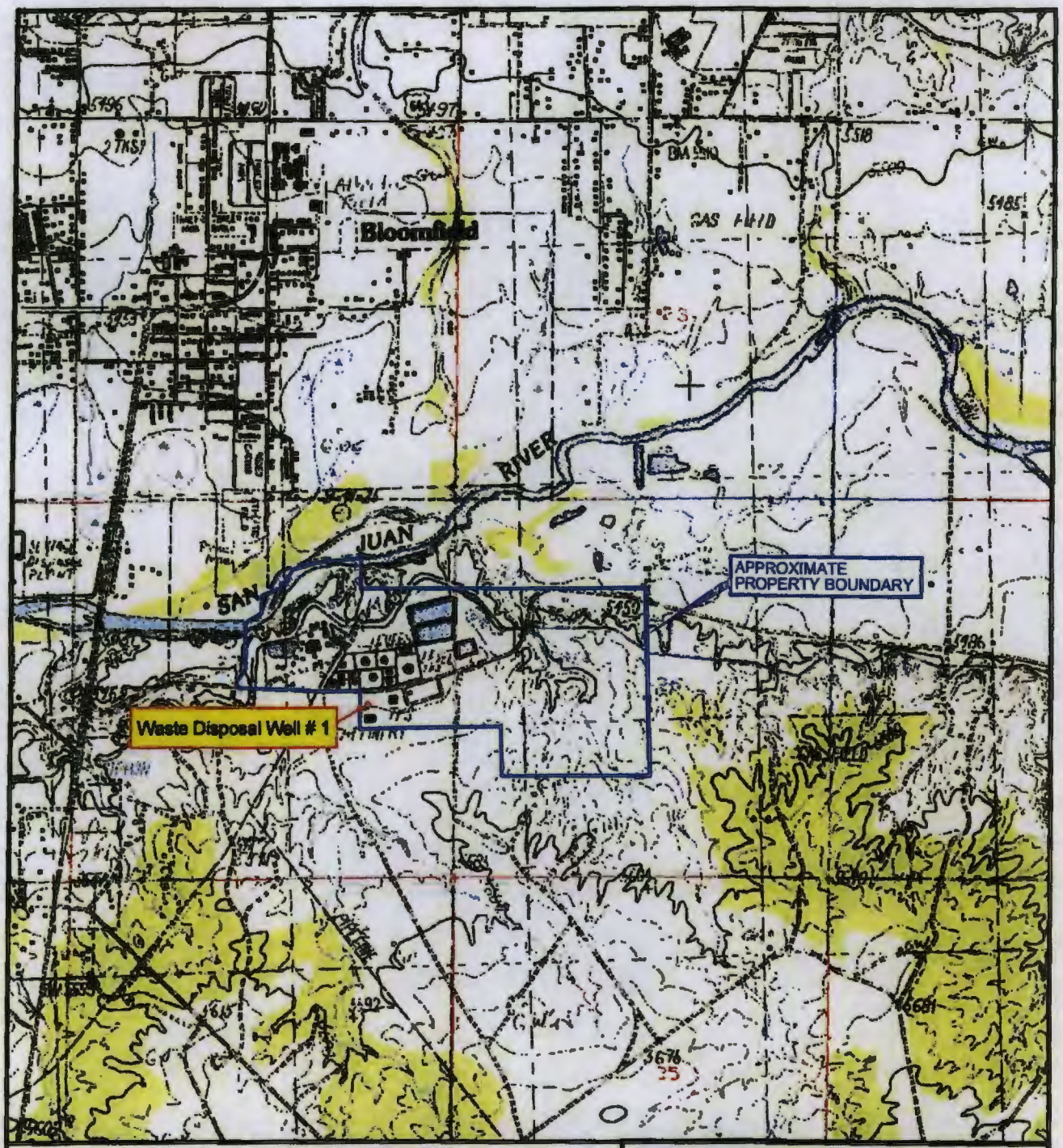
8.0 REFERENCES

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



Map Source: USGS 7.5 Min. Quad Sheet BLOOMFIELD, NM., 1985.

N

0 2000

SCALE IN FEET

NEW MEXICO

QUADRANGLE LOCATION

Western Refining

WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 01/06/10 | FILE: WestRef-A25

FIGURE 1
SITE LOCATION MAP
BLOOMFIELD REFINERY

WESTERN REFINING DISPOSAL WELL #1

NW, SW SECTION 26, T29N, R11W

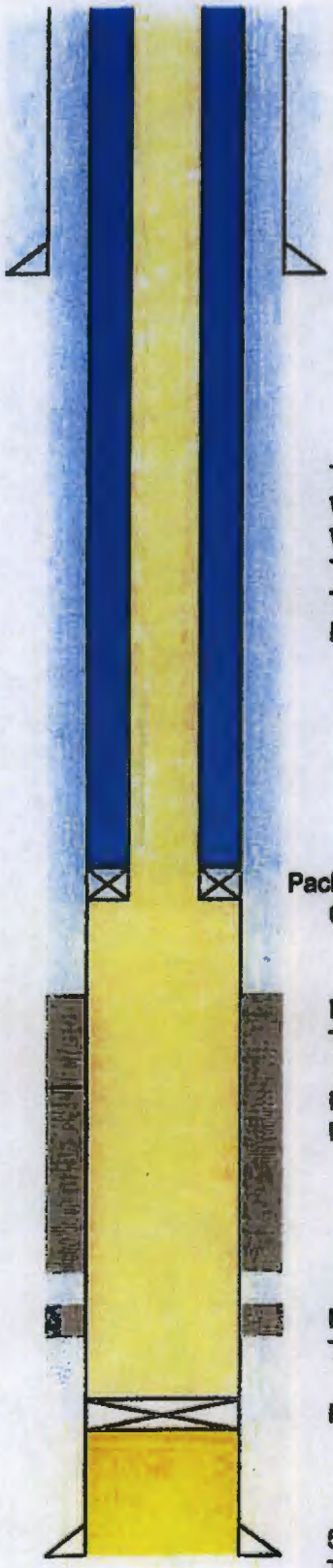
NO.: 30-045-29002

SUBSURFACE — HOUSTON, TX; SOUTH BEND, IN; BATON ROUGE, LA

Figure 2

DISPOSAL WELL #1 WELL SCHEMATIC
Western Refining Inc.
Bloomfield, NM

Date:	4/20/2006	Approved By:	rls	Job No.:	70F5830
Drawn By:	rls	Checked By:		Scale:	NA



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'

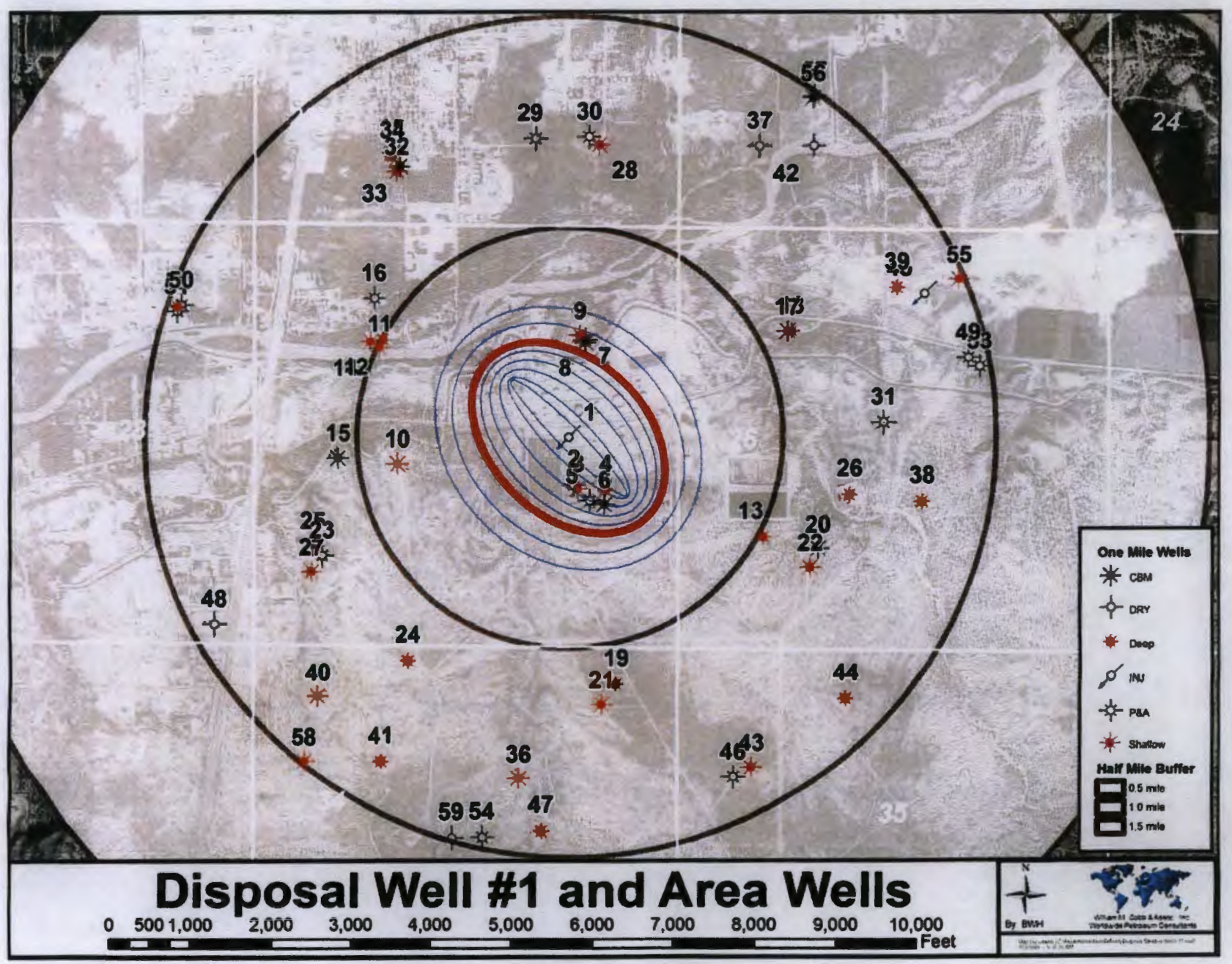
Fill was cleaned out of well on 4/20/06
Fill was orginally tagged at 3325'

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


Disposal Well #1 and Area Wells
0 500 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000
Feet
One Mile Wells
CBM
DRY
Deep
INJ
P&A
Shallow
Half Mile Buffer
0.5 mile
1.0 mile
1.5 mile
By BMH

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

PERIOD 2013	AMOUNT OF WATER FROM RIVER (GALLONS)	AMOUNT TO SOLAR EVAP PONDS (GALLONS)	TOTALIZER AMOUNT INJECTED (GALLONS)	DOWN-TIME (HRS)	INJECTION PRESSURE MAX (PSIA)	INJECTION PRESSURE MIN (PSIA)	INJECTION PRESSURE AVG (PSIA)	ANNULAR PRESSURE MAX (PSIA)	ANNULAR PRESSURE MIN (PSIA)	ANNULAR PRESSURE AVG (PSIA)	ON-LINE FLOW RATES MAX (GPM)	ON-LINE FLOW RATES MIN (GPM)	ON-LINE FLOW RATES AVG (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: **12,110,780** gallons

CERTIFICATION: Kelly Robinson DATE: 1/28/14

Table 2

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	P&A Date	ULSTR	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	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	CBM	No
7	0.23	JACQUE	2	30-045-34409	1483	1689	1689		H-27-29N-11W	HOLCOMB O&G	FRUITLAND COAL	CBM	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	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	CBM	No
34	0.79	COOK	1	30-045-07940	6052	6226	6226		N-22-29N-11W	MANANA GAS INC	DAKOTA	Deep	Yes
35	0.79	COOK	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	#	APINO	Perf Top	Perf Bottom	Total Depth	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	CBM	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			Frtlnd		-34-29N-11W	Pre-Ongard	FRUITLAND SAND	DRY	No

Status	Total Wells	Pen Inj. Zone	
		Yes	No
P&A	15	3	12
Dry	4	0	4
INJ	2	2	0
CBM	7	2	5
Shallow	17	3	14
Deep	14	14	0
Total	59	24	35

Table 3

Injection Well
2013 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Volatile Organic Compounds *(ug/L)*			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		ns	<2.0	< 1.0	< 1.0
1,2,3-Trichloropropane		ns	<4.0	< 2.0	< 2.0
1,2,4-Trichlorobenzene		ns	<2.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene		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
1-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	< 10	< 10
Acetone		ns	81	78	34
Benzene	500	ns	<2.0	< 1.0	< 1.0
Bromobenzene		ns	<2.0	< 1.0	< 1.0
Bromodichloromethane		ns	<2.0	< 1.0	< 1.0
Bromoform		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
Dibromochloromethane		ns	<2.0	< 1.0	< 1.0
Dibromomethane		ns	<2.0	< 1.0	< 1.0
Dichlorodifluoromethane		ns	<2.0	< 1.0	< 1.0
Ethylbenzene		ns	<2.0	< 1.0	< 1.0
Hexachlorohutadiene	500	ns	<2.0	< 1.0	< 1.0
Isopropylbenzene		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		ns	<2.0	< 1.0	< 1.0
Vinyl chloride	200	ns	<2.0	< 1.0	< 1.0
Xylenes, Total		ns	<3.0	< 1.5	< 1.5

Table 3

Injection Well
2013 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Semi-Volatile Organic Compounds *(ug/L)*					
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		ns	< 50	<50	< 50
2,4,6-Trichlorophenol	2000	ns	< 50	<50	< 50
2,4-Dichlorophenol		ns	< 100	<100	< 100
2,4-Dimethylphenol		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		ns	< 50	< 50	< 50
2-Nitrophenol		ns	< 50	< 50	< 50
3,3′-Dichlorobenzidine		ns	< 50	< 50	< 50
3+4-Methylphenol		ns	< 50	< 50	< 50
3-Nitroaniline		ns	< 50	< 50	< 50
4,6-Dinitro-2-methylphenol		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
Azobenzene		ns	< 50	<50	< 50
Benz(a)anthracene		ns	< 50	<50	< 50
Benzo(a)pyrene		ns	< 50	<50	< 50
Benzo(b)fluoranthene		ns	< 50	<50	< 50
Benzo(g,h,i)perylene		ns	< 50	<50	< 50
Benzo(k)fluoranthene		ns	< 50	<50	< 50
Benzoic acid		ns	< 100	<100	<200
Benzyl alcohol		ns	< 50	<50	< 50
Bis(2-chloroethoxy)methane		ns	< 50	<50	< 50
Bis(2-chloroethyl)ether		ns	< 50	<50	< 50
Bis(2-chloroisopropyl)ether		ns	< 50	<50	< 50
Bis(2-ethylhexyl)phthalate		ns	< 50	<50	< 50
Butyl benzyl phthalate		ns	< 50	<50	< 50
Carbazole		ns	< 50	<50	< 50
Chrysene		ns	< 50	<50	< 50
Dibenz(a,h)anthracene		ns	< 50	<50	< 50
Dibenzofuran		ns	< 50	<50	< 50
Diethyl phthalate		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
Hexachlorobutadiene	500	ns	< 50	<50	< 50
Hexachlorocyclopentadiene		ns	< 50	<50	< 50
Hexachloroethane	3000	ns	< 50	<50	< 50
Indeno(1,2,3-cd)pyrene		ns	< 50	<50	< 50
Isophorone		ns	< 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		ns	< 50	<50	< 50
Pyridine	5000	ns	< 50	<50	< 50

Table 3

Injection Well
2013 Quarterly Analytical Summary

	Toxicity Characteristics	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
General Chemistry *(mg/L unless otherwise 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)*		ns	7.40	7.41	7.42
Bicarbonate (As CaCO3)		ns	490	340	430
Carbonate (As CaCO3)		ns	<2.0	<2.0	<2.0
Calcium		ns	230	100	190
Magnesium		ns	51	26	51
Potassium		ns	17	10	21
Sodium		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
Ignitability, Corrosivity, and Reactivity					
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: Follow up
Flag Status: 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
District I – (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II – (575) 748-1283
811 S. First St., Artesia, NM 88210
District III – (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV – (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised August 1, 2011

WELL API NO.
30-045-29002-00

5. Indicate Type of Lease
STATE ☐ FEE ☒

6. State Oil & Gas Lease No.
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.)

7. Lease Name or Unit Agreement Name
Disposal

1. Type of Well: Oil Well ☐ Gas Well ☒ Other – (Disposal Well)

8. Well Number: #001

2. Name of Operator San Juan Refining Co. / Western Refining Southwest, Inc. – Bloomfield Refinery

9. OGRID Number: 037218

3. Address of Operator
50 Road 4990, Bloomfield, NM, 87413

10. Pool name or Wildcat:
Blanco/Mesa Verde

4. Well Location
Unit Letter I : 2442 feet from the south line and 1250 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 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: Annual MIT,Bradenhead, High Pressure Shutdown Test	☒			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 Refinery requests permission to perform the annual MIT, Bradenhead and High Pressure Shutdown Test on the Class I injection well referenced above. The tests will be performed on Thursday, September 19th, 2013. Monica Kuehling has agreed to be here to monitor the tests.

Spud Date: Rig Release Date:

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE [signature] TITLE Environmental Coordinator DATE 9/17/2013

Type or print name Matthew Krakow E-mail address: matt.krakow@wnr.com PHONE: 505-632-4169

For State Use Only

APPROVED BY: [signature] TITLE Environmental Engineer DATE 9/18/2013
Conditions of Approval (if any):

7-17-13

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

MECHANICAL INTEGRITY TEST REPORT

(TA OR UIC)

Date of Test 9-19-13 Operator San Juan Refining API # 30-0 _____

Property Name Disposal Well # 1 Location: Unit I Sec 27 Twp 29 Rge 11

Land Type:
State _____
Federal _____
Private ✓
Indian _____

Well Type:
Water Injection _____
Salt Water Disposal ✓
Gas Injection _____
Producing Oil/Gas _____
Pressure obervation _____

Temporarily Abandoned Well (Y/N): _____ TA Expires: _____

Casing Pres. 0
Bradenhead Pres. 0
Tubing Pres. 830
Int. Casing Pres. _____

Tbg. SI Pres. _____
Tbg. Inj. Pres. _____

Max. Inj. Pres. _____

Pressured annulus up to 520 psi. for 30 mins. Test passed/failed

REMARKS:

Packer Set at 3221
Top Perf 3208-3276

Well lose to 530 lost 15 min of test.

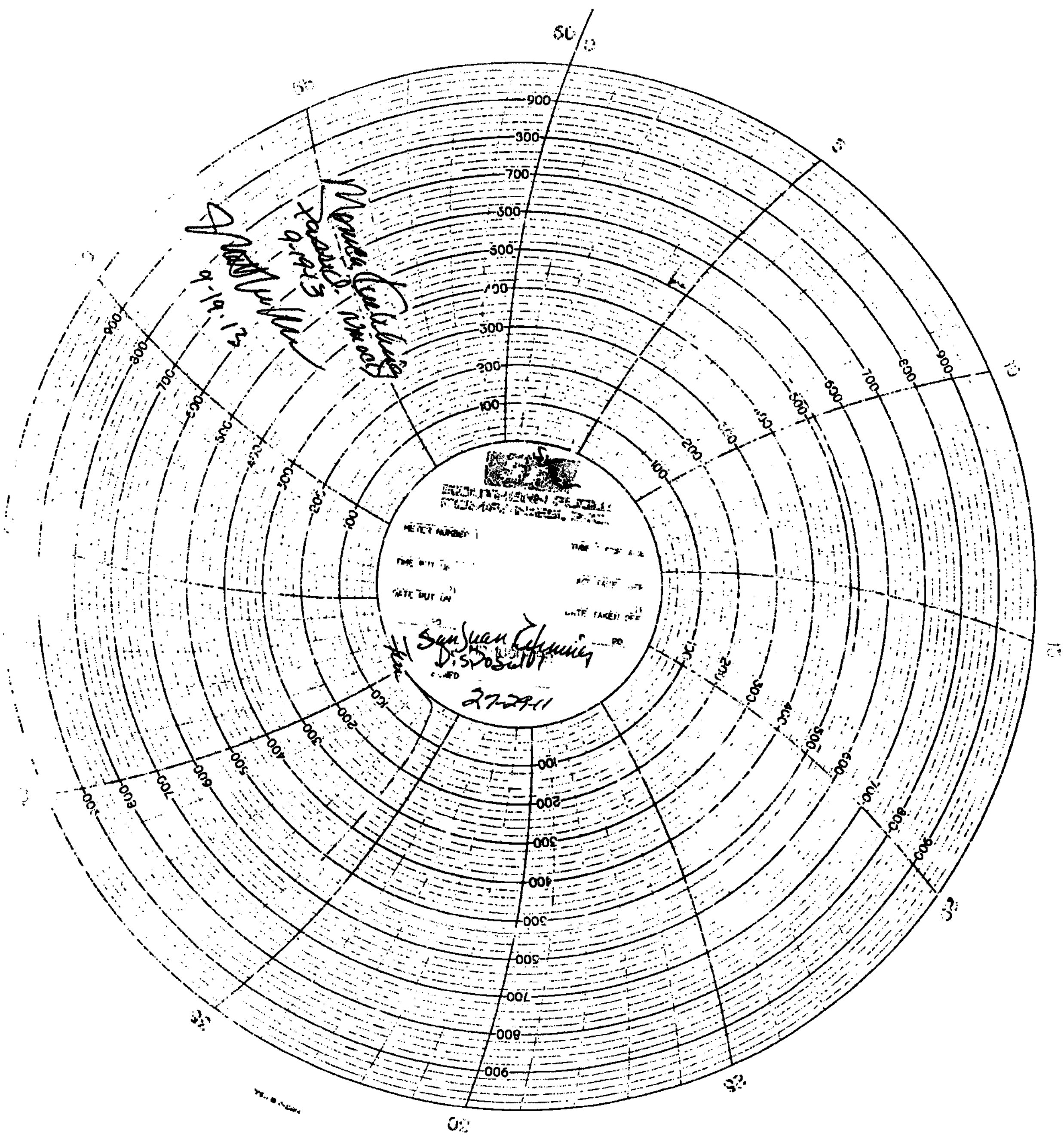
Kills at 1136

By _____ Witness _____
(Operator Representative) (NMOCD)

_____
(Position)

Revised 02-11-02

Mike Charlie witnessed the test


METER NUMBER
TIME PUT ON
DATE PUT ON
TIME TAKEN OFF
DATE TAKEN OFF
San Juan Gathering
Disposal
9-19-13
9-19-13

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 of Test 9-19-13 Operator San Juan Refining API #30-0 _____

Property Name Disposal Well No. 1 Location: Unit I Section 27 Township 29 Range 11

Well Status (Shut-In or Producing) Initial PSI: Tubing 830 Intermediate N/A Casing 160 Bradenhead 0

OPEN BRADENHEAD AND INTERMEDIATE TO ATMOSPHERE INDIVIDUALLY FOR 15 MINUTES EACH

Testing	PRESSURE Bradenhead BH	Bradenhead Int	Bradenhead Csg	INTERM Int	INTERM Csg
TIME 5 min	0		160		
10 min	0		160		
15 min	0		160		
20 min					
25 min					
30 min					

FLOW CHARACTERISTICS	BRADENHEAD	INTERMEDIATE
Steady Flow		
Surges		
Down to Nothing	✓	
Nothing		
Gas	✓	
Gas & Water		
Water		

If bradenhead flowed water, check all of the descriptions that apply below:

CLEAR_____ FRESH_____ SALTY_____ SULFUR_____ BLACK_____

5 MINUTE SHUT-IN PRESSURE BRADENHEAD 0 INTERMEDIATE N/A

REMARKS: Puff when opened.

By _____ Witness _____

_____
(Position)

E-mail address _____

APPENDIX B

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 Qtr 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

Analytical Report
Lab Order **1304A43**
Date Reported: **5/23/2013**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 2nd Qtr 4-24-13
Lab ID: 1304A43-001 **Matrix:** AQUEOUS

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	Qual	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 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: SEMIVOLATILES						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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 2nd Qtr 4-24-13
Lab ID: 1304A43-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **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		µg/L	1	5/2/2013 5:17:31 PM	7235
3-Nitroaniline	ND	50		µg/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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 2nd Qtr 4-24-13
Lab ID: 1304A43-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **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						Analyst: **RAA**	
Benzene	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Toluene	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Ethylbenzene	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Methyl tert-butyl ether (MTBE)	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
1,2,4-Trimethylbenzene	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
1,3,5-Trimethylbenzene	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
1,2-Dichloroethane (EDC)	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
1,2-Dibromoethane (EDB)	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Naphthalene	ND	4.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
1-Methylnaphthalene	ND	8.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
2-Methylnaphthalene	ND	8.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Acetone	81	20		µg/L	2	4/29/2013 12:25:05 PM	R10192
Bromobenzene	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Bromodichloromethane	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Bromoform	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Bromomethane	ND	6.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
2-Butanone	ND	20		µg/L	2	4/29/2013 12:25:05 PM	R10192
Carbon disulfide	ND	20		µg/L	2	4/29/2013 12:25:05 PM	R10192
Carbon Tetrachloride	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Chlorobenzene	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Chloroethane	ND	4.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Chloroform	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Chloromethane	ND	6.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
2-Chlorotoluene	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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	Qual	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	R10192
trans-1,2-DCE	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
trans-1,3-Dichloropropene	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
1,2,3-Trichlorobenzene	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
1,2,4-Trichlorobenzene	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
1,1,1-Trichloroethane	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
1,1,2-Trichloroethane	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Trichloroethene (TCE)	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Trichlorofluoromethane	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
1,2,3-Trichloropropane	ND	4.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Vinyl chloride	ND	2.0		µg/L	2	4/29/2013 12:25:05 PM	R10192

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 2nd Qtr 4-24-13
Lab ID: 1304A43-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Xylenes, Total	ND	3.0		µg/L	2	4/29/2013 12:25:05 PM	R10192
Surr: 1,2-Dichloroethane-d4	85.4	70-130		%REC	2	4/29/2013 12:25:05 PM	R10192
Surr: 4-Bromofluorobenzene	88.3	69.5-130		%REC	2	4/29/2013 12:25:05 PM	R10192
Surr: Dibromofluoromethane	81.0	70-130		%REC	2	4/29/2013 12:25:05 PM	R10192
Surr: Toluene-d8	84.6	70-130		%REC	2	4/29/2013 12:25:05 PM	R10192
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **JML**	
Conductivity	5100	0.010		µmhos/cm	1	4/29/2013 6:42:20 PM	R10197
SM4500-H+B: PH						Analyst: **JML**	
pH	7.40	1.68	H	pH units	1	4/29/2013 6:42:20 PM	R10197
SM2320B: ALKALINITY						Analyst: **JML**	
Bicarbonate (As CaCO3)	490	20		mg/L CaCO3	1	4/29/2013 6:42:20 PM	R10197
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	4/29/2013 6:42:20 PM	R10197
Total Alkalinity (as CaCO3)	490	20		mg/L CaCO3	1	4/29/2013 6:42:20 PM	R10197
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**	
Total Dissolved Solids	3360	100	*	mg/L	1	5/1/2013 3:31:00 PM	7222

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	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
1304A43-001E / INJECTION WELL	130430038-001	SW846 Ch7/EPA 1010/150.1

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?	Y	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: John W. Cobb

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 #:**	130430038
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1304A43
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	1304A43-001E / 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	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 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
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130430038
Project Name: 1304A43

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Cyanide (reactive)	0.528	mg/L	0.5	105.6	80-120	5/14/2013	5/14/2013
Reactive sulfide	0.18	mg/L	0.2	90.0	80-120	5/3/2013	5/3/2013

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Reactive sulfide	0.16	mg/L	0.2	80.0	11.8	0-20	5/3/2013	5/3/2013

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
130501035-001	Reactive sulfide	ND	17.93	mg/L	20	89.7	70-130	5/3/2013	5/3/2013
130430038-001	Cyanide (reactive)	ND	0.493	mg/L	0.5	98.6	80-120	5/14/2013	5/14/2013

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide (reactive)	0.481	mg/L	0.5	96.2	2.5	0-25	5/14/2013	5/14/2013

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide (reactive)	ND	mg/L	0.1	5/14/2013	5/14/2013
Reactive sulfide	ND	mg/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 Anatek Labs 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 Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C586; MT:Cert0095

Tuesday, May 21, 2013 Page 1 of 1

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

Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 130430038
Order Date: 4/30/2013

Contact Name: ANDY FREEMAN
Project Name: 1304A43

Comment:

Sample #: 130430038-001 **Customer Sample #:** 1304A43-001E / INJECTION WELL

Recv'd: ☑ **Collector:** **Date Collected:** 4/24/2013
Quantity: 3 **Matrix:** Water **Date Received:** 4/30/2013 12:18:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
CYANIDE REACTIVE	M	SW846 CH7	5/10/2013	***Normal (6-10 Days)***
FLASHPOINT	M	EPA 1010	5/10/2013	***Normal (6-10 Days)***
pH	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 OF: 1

130430 038 HALL Last Due 5/10/2013
1st SAMP 4/24/2013 1st RCVD 4/30/2013
1304A43

SUB CONTRATOR: Anatek Labs	COMPANY: Anatek Labs, Inc.	PHONE: (208) 883-2839	FAX: (208) 882-9246
ADDRESS: 1282 Alturas Dr		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Moscow, ID 83843			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1304A43-001E	Injection Well	500PLNAOH ZNAC	Aqueous	4/24/2013 10:15:00 AM	2	RCI MWB

SPECIAL INSTRUCTIONS / COMMENTS:

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.

Relinquished By:	Date: 4/25/2013	Time: 2:21 PM
Relinquished By:	Date:	Time:
Relinquished By:	Date:	Time:

TAT: Standard ☐ RUSH

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 2.7 °C
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ☑ ICE / ICE-PACKS PRESENT
- ☐ CUSTODY SEALS PRESENT

PRESERVATIVES: Zinc Acetate NaOH

NUMBER OF CONTAINERS: 3 SHIPPED VIA: F

DATE & TIME: 4/30/13 12:18 INSPECTED BY: BT

REPORT TRANSMITTAL DESIRED:

extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY

_____ °C Attempt to Cool ? _____

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: M918-03 Exp:4/16/14
Free Cyanide MS/MSD/LCS Soln: M918-04 Exp:4/17/14

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)
1	1305010028-1	soil/sed	NaOH	50mL	25g	25g		
2	-1MS						1mL	
3	-1MSD							
4	-LCS				1x	1x		
5	-BL							
6	1304270022-7				20	200		
7	1305100075-1				100	100		
8	1305080054-6	dw			1x	1x		
9	1305090042-6							
10	1305130012-2	ww						
11	1304300038-1	reactive ww	NaOH	50mL	1x	1x		
12	-1MS						1mL	
13	-1MSD							
14	-LCS							
15	-BL							
16	1305080054-6MS	dw					1mL	
17	-6MSD							
18	1305100074-1	ww						
19	-1MS						1mL	
20	-1MSD							

* 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	A063-01
18 N H_2SO_4	A065-02
sulfamic acid	R068-19
0.025N NaOH	R014-16
51% $MgCl_2$	A063-03

Analytical Reagents:	Reagent #:
Barbituric Acid	R038-13
Sodium Phosphate	R029-16
Chloramine-t	R048-09
Pyridine	R043-03

Distillation Initials/Date Distilled: DMV 5/14/13

Analyst Initials/Date Analyzed: DMV 5/14/13

Anatek Labs, Inc
1282 Alturas Drive
Moscow, ID 83843

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)

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 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: CMW 5/14/13

Pipettes: A04003282
2751528/2752498

N:\Calibration Standard Prep Forms\Cyanide EPA 335.4.doc

eak Table: Cyanide

File name: T:\DATA1\FLOW4\2013\EPA335.4\051413CM.RST
Date: May 14, 2013
Operator: CRW

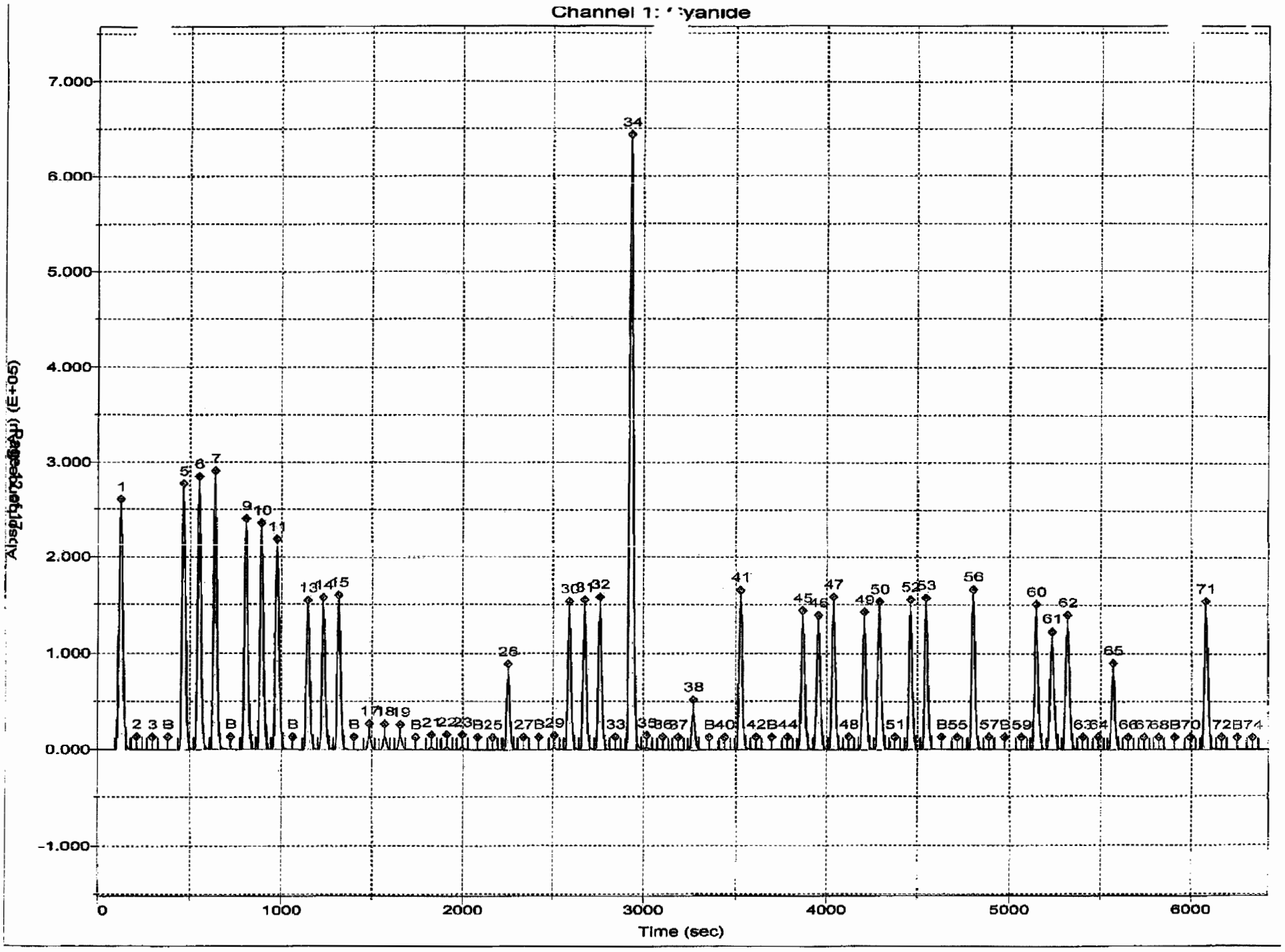
CRW 5-15-13

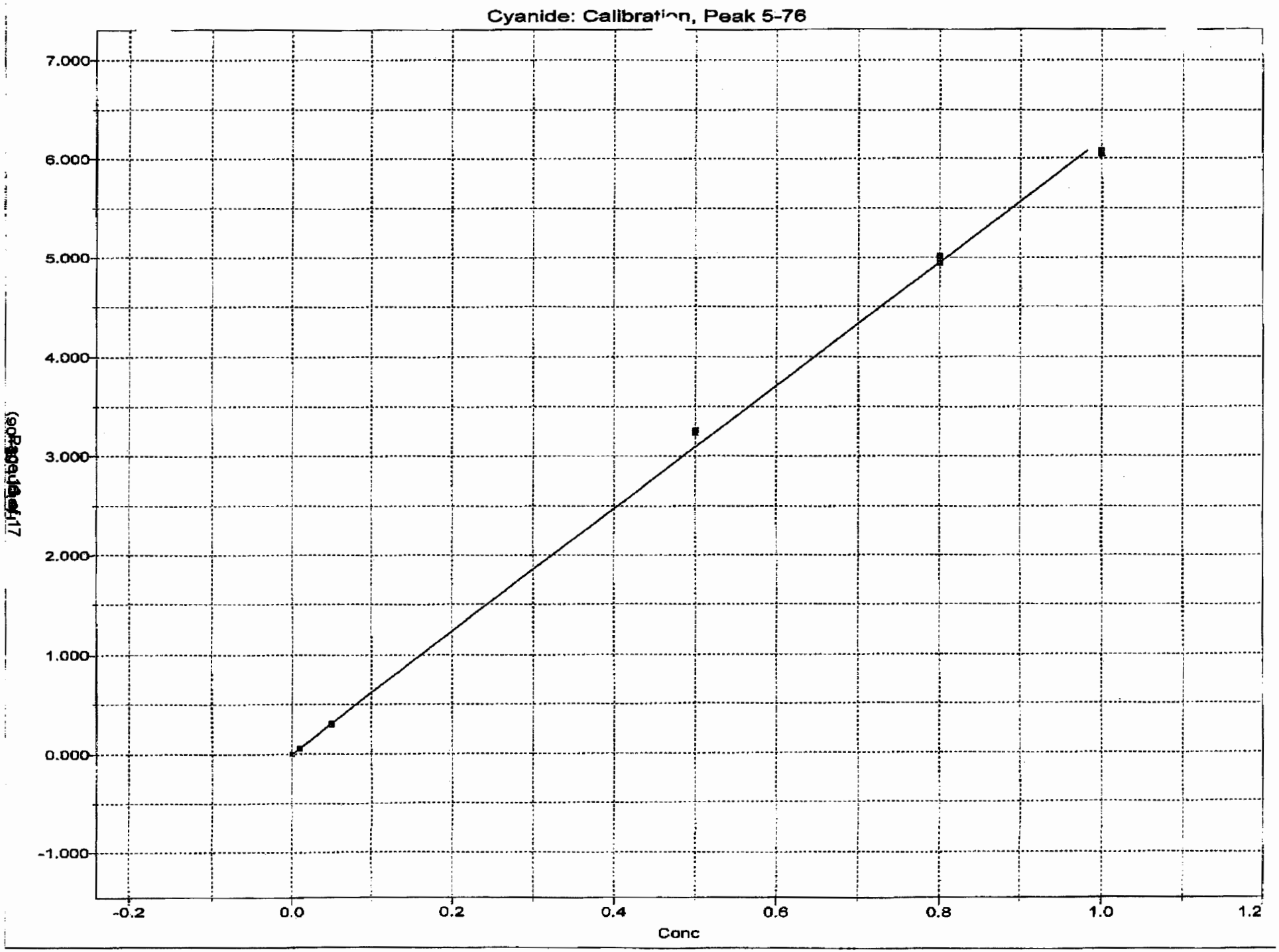
	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)	
	2	Sync	SYNC	1	1	6038980	0.976643	
	0	Carryover	CO	1	1	18010	0.003511	
	0	Carryover	CO	1	1	2575	0.001016	
	0	Baseline	RB	1	1	-1881	0.000296	
	2	Cal 1.00 ppm	C	1	1	6044285	0.977500	
	2	Cal 1.00 ppm	C	1	1	6066860	0.981149	
	2	Cal 1.00 ppm	C	1	1	6074882	0.982445	
	0	Baseline	RB	1	1	-2392	0.000214	
	3	Cal 0.80 ppm	C	1	1	4942340	0.799399	
0	3	Cal 0.80 ppm	C	1	1	4946887	0.800135	
1	3	Cal 0.80 ppm	C	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	C	1	1	3234827	0.523425	
5	4	Cal 0.50 ppm	C	1	1	3256325	0.526900	
	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	C	1	1	304102	0.049750	
	0	Baseline	RB	1	1	-224	0.000564	
1	6	Cal 0.01 ppm	C	1	1	58197	0.010006	
2	6	Cal 0.01 ppm	C	1	1	57781	0.009939	
3	6	Cal 0.01 ppm	C	1	1	58574	0.010067	
	0	Baseline	RB	1	1	-308	0.000550	
5	1	Blank	BLNK	1	1	-1103	0.000422	
6	7	ICV 0.25 ppm	CCV	1	1	1652560	0.267693	
7	1	Blank	BLNK	1	1	-290	0.000553	
	0	Baseline	RB	1	1	897	0.000745	
	8	130501028-001	U	259	1	38284	1.758032	
0	9	130501028-001MS	U	259	1	3088314	129.433945	
1	10	130501028-001MSD	U	259	1	3102506	130.028030	
2	11	130501028-LCS	U	1	1	3260699	0.527606	
3	12	130501028-BL	U	1	1	3377	0.001146	
4	13	130422022-007	U	20	1	14952298	48.344933	additional 10X below
5	14	130510075-001	U	109	1	30035	0.594545	
6	15	130508054-006	U	1	1	7690	0.001843	
7	16	130509042-006	U	1	1	914	0.000748	
8	17	130513012-002	U	1	1	824775	0.133903	
	0	Baseline	RB	1	1	-79	0.000587	
0	1	Blank	BLNK	1	1	-944	0.000448	
1	4	CCV 0.5 ppm	CCV	1	1	3311329	0.535790	
2	1	Blank	BLNK	1	1	-2419	0.000209	
	0	Read Baseline	RB	1	1	-814	0.000469	
4	18	130430038-001 R	U	1	1	4148	0.001270	
5	19	130430038-001MS	U	1	1	3043535	0.492508	
6	20	130430038-001MSD	U	1	1	2971315	0.480835	
7	21	130430038-LCS	U	1	1	3261260	0.527697	
8	22	130430038-BL	U	1	1	-1539	0.000351	
9	23	130508054-006MSDW	U	1	1	3000574	0.485564	
0	24	130508054-006MSD	U	1	1	3198242	0.517512	
1	25	130510074-001 NW	U	1	1	-7577	-0.000625	
2	26	130510074-001MS	U	1	1	3073429	0.497339	
3	27	130510074-001MSD	U	1	1	3041355	0.492155	
	0	Baseline	RB	1	1	-1660	0.000332	
5	1	Blank	BLNK	1	1	-5872	-0.000349	
6	4	CCV 0.5 ppm	CCV	1	1	3256631	0.526949	
7	1	Blank	BLNK	1	1	-4282	-0.000092	
	0	Read Baseline	RB	1	1	-899	0.000455	
	28	130510079-001 F	U	1.1	1	-2333	0.000245	
0	29	130510079-001MS	U	1.1	1	3130370	0.557196	
1	30	130510079-001MSD	U	1.1	1	2792482	0.497125	
2	31	130510079-LCS	U	1	1	3273632	0.529697	
3	32	130510079-BL	U	1	1	-1264	0.000396	
4	33	130513014-001	U	1.1	1	1884	0.000995	
5	34	130422022-007	U	200	1	1775712	57.519485	✓
6	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
	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
	2	
	0	
	0	
	0	BL
	2	
	2	
	2	
	0	BL
	3	
0	3	
1	3	
	0	BL
3	4	
4	4	
5	4	
	0	BL
7	5	
8	5	
9	5	
	0	BL
	6	
2	6	
3	6	
	0	BL
5	1	
6	7	
7	1	
	0	BL
9	8	
0	9	
1	10	
2	11	
3	12	
4	13	HI
5	14	FL
6	15	FL
7	16	
8	17	
	0	BL
0	1	
1	4	
2	1	
	0	BL
4	18	
5	19	
6	20	
7	21	
8	22	
9	23	
0	24	
1	25	LO
2	26	
3	27	
	0	BL
5	1	LO
6	4	
7	1	LO
	0	BL

Peak	Cup	Flags
59	28	
60	29	
61	30	
62	31	
63	32	
64	33	
65	34	
66	35	
67	36	
68	37	
3	0	BL
70	1	
71	4	
72	1	LO
3	0	BL
74	38	


Channel 1: Cyanide
Absorbance (Reading) (E+05)
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
0
1000
2000
3000
4000
5000
6000
Time (sec)


Cyanide: Calibration, Peak 5-76
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Conc

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
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 ppm	0.010000	58197.007812
Cal 0.01 ppm	0.010000	57780.523438
Cal 0.01 ppm	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 ID	Analyses Date	Sample Matrix	Analyst Initials	Temp - °C	Temp - °F
1303060010001	3/8/2013	Liquid/5	MH		<50°F
1303120420001	3/14/13	Liquid/5	MH		<50°F
1303220840001	3/27/13	0:9 / 3	MH		178°F
1303220350001	3/27/13	H_2O/4	MH		>200°F
-002	↓	↓	↓		↓
1303270250001	3/28/2013	H_2O/4	MH		>200°F
1303270260001	3/29/2013	↓	↓		>200°F
1303280400001	3/29/2013	H_2O/4	MH		>200°F
1304010260001	4/11/2013	H_2O/4	MH		>200°F
1304150080001	4/15/2013	H_2O/4	MH		>200°F
1304160310002	4/23/13	H_2O/4	MH		>200°F
1304260200001	4/30/13	H_2O/4	MH		>200°F
-002	↓	↓	↓		>200°F
1304260380002	5/7/13	Liquid/5	MH		>200°F
-003					150°F
-004					<140°F<150°F
-008					150°F
-009					177°F
-010	↓	↓	↓		530°F
1304300450002	5/10/13	Liquid/5	MH		>200°F
1304300380001	↓	H_2O/4	↓		>200°F
1305100760001	5/15/13	Liquid/5	MH		147°F

*** SAFETY GLASSES REQUIRED.**

pH - SM4500H+B / Alkalinity SM2320B

Equivalent EPA Methods 150.1 & 310.1

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)	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				

								Titrant vol to pH (mL)			Alkalinity (mg/L)				
Sample	Temp (°C)	pH	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	%
1305222-001	23.3	6.86	4.01	10.00	1025	7.10									
-003	24.4	6.91													
-005	24.0	8.14													
1304300356-001	21.8	7.29													
1305222626-003	24.0	7.93													

Analysis Date: 5-6-2013 Analyst: AST

Sulfide by SM 4500-S^{2-} 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 µL iodine reacts with 0.02 mg Sulfide

Spike Standard Number:

Sample	Sample Volume	Iodine amount (50 µL increments)	Concentration (mg/sample)	Concentration (mg/L)	Spike Amt	Date	% Recovery	Initials
1305020 25-001 ~~(m=5.19)~~ AST 5/4	523.00	100	0.04	0.0765		5/3/13		AST
1304230 44-001 ~~(m=5.0)~~ m=19.5	50 mL	100	0.04	0.8 × 19.5 = 15.6				
1305020 17-001 m= 0.548	5 mL (10x Dil)	350	0.14	28 ~~2.9~~ × 0.548 = 15.34				
-003 m = 0.535	5 mL 10x10	250	0.10	20 ~~2.0~~ × 0.535 = 10.70				
-005 m= 0.497	5 mL (10x D)	450	0.18	36 ~~3.6~~ × 0.497 = 17.89				
1304300 38-001	427.97 mL	850	0.34	0.7113				
1305010 31-001 m= 5.01	50 mL	100	0.04	0.8 × 5.01 = 4.008				
033-001 m= 5.04	50 mL	50	0.02	0.4 × 5.04 = 2.02				
034-001 m= 4.938	50 mL	100	0.04	0.8 × 4.93 = 3.94				
035-001 m= 4.98	50 mL	50	0.02	0.4 × 4.98 = 1.99				
035-001 MS	50 mL	450	0.18	36 × 4.98 = 17.93	200 µL		89.7%	
-LFB	1000 mL	450	0.18	0.18	200 µL		90%	
-LFBD		400	0.16	0.16			80%	

Comments: Andrew Tomasello 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 WELL	130430038-001	SW846 Ch7/EPA 1010/150.1

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?	Y	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: John W. Coffey

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 #:**	130430038
Address:	4901 HAWKINS NE SUITE D	**Project Name:**	1304A43
	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	1304A43-001E / 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	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 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
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130430038
Project Name: 1304A43

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Cyanide (reactive)	0.528	mg/L	0.5	105.6	80-120	5/14/2013	5/14/2013
Reactive sulfide	0.18	mg/L	0.2	90.0	80-120	5/3/2013	5/3/2013

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Reactive sulfide	0.16	mg/L	0.2	80.0	11.8	0-20	5/3/2013	5/3/2013

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
130501035-001	Reactive sulfide	ND	17.93	mg/L	20	89.7	70-130	5/3/2013	5/3/2013
130430038-001	Cyanide (reactive)	ND	0.493	mg/L	0.5	98.6	80-120	5/14/2013	5/14/2013

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide (reactive)	0.481	mg/L	0.5	96.2	2.5	0-25	5/14/2013	5/14/2013

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide (reactive)	ND	mg/L	0.1	5/14/2013	5/14/2013
Reactive sulfide	ND	mg/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 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:C586; MT:Cert0086

Tuesday, May 21, 2013

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

Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 130430038
Order Date: 4/30/2013

Contact Name: ANDY FREEMAN
Project Name: 1304A43
Comment:

Sample #: 130430038-001 **Customer Sample #:** 1304A43-001E / INJECTION WELL

Recv'd: ☑ **Collector:** **Date Collected:** 4/24/2013
Quantity: 3 **Matrix:** Water **Date Received:** 4/30/2013 12:18:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
CYANIDE REACTIVE	M	SW846 CH7	5/10/2013	***Normal (6-10 Days)***
FLASHPOINT	M	EPA 1010	5/10/2013	***Normal (6-10 Days)***
pH	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 OF: 1

130430 038 HALL Last Due 5/10/2013
1st SAMP 4/24/2013 1st RCVD 4/30/2013
1304A43

SUB CONTRACTOR: Anatek Labs	COMPANY: Anatek Labs, Inc.	PHONE: (208) 883-2839	FAX: (208) 882-9246
ADDRESS: 1282 Alturas Dr		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Moscow, ID 83843			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1304A43-001E	Injection Well	500PLNAOH ZNAC	Aqueous	4/24/2013 10:15:00 AM	2	RCI MWBs

SPECIAL INSTRUCTIONS / COMMENTS:

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.

Relinquished By:	Date: 4/25/2013	Time: 2:21 PM
Relinquished By:	Date:	Time:
Relinquished By:	Date:	Time:

TAT: Standard ☐ RUSH

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 2.7 °C
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ☑ ICE / ICE-PACKS PRESENT
- ☐ CUSTODY SEALS PRESENT

PRESERVATIVES: Zinc Acetate NaOH
NUMBER OF CONTAINERS: 3 SHIPPED VIA: F
DATE & TIME: 4/30/13 1218 INSPECTED BY: BT

REPORT TRANSMITTAL DESIRED:
(extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY
_____ °C Attempt to Cool ? _____ _____

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: M918-03 Exp:4/16/14
Free Cyanide MS/MSD/LCS Soln: M918-04 Exp:4/17/14

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)
1	1305010028-1	soil/sed	NaOH	50mL	25	25		
2	-lms						1mL	
3	-lmsd							
4	-LCS				1x	1x		
5	-BL							
6	1304270022-7				20	200		
7	1305100 75-1				100	100		
8	1305080 54-6	dw			1x	1x		
9	1305090 42-6							
10	1305130 12-2	ww						
11	1304300 38-1	reactive ww	NaOH	50mL	1x	1x		
12	-lms						1mL	
13	-lmsd							
14	-LCS							
15	-BL							
16	1305080 54-6ms	dw					1mL	
17	-lmsd							
18	1305100 74-1	ww						
19	-lms						1mL	
20	-lmsd							

* 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	A063-01
18 N H_2SO_4	A065-02
sulfamic acid	R068-19
0.025N NaOH	R014-16
51% $MgCl_2$	A063-03

Analytical Reagents:	Reagent #:
Barbituric Acid	R038-13
Sodium Phosphate	R029-16
Chloramine-t	R048-09
Pyridine	R043-03

Distillation Initials/Date Distilled: DW 5/14/13

Analyst Initials/Date Analyzed: DW 5/14/13

Anatek Labs, Inc
1282 Alturas Drive
Moscow, ID 83843

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)

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 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: CMW 5/14/13

Pipettes: A04003282
2751528/2752498

N:\Calibration Standard Prep Forms\Cyanide EPA 335.4.doc

'eak Table: Cyanide

'ile name: T:\DATA1\FLOW4\2013\EPA335.4\051413CM.RST
)ate: May 14, 2013
)perator: CRW

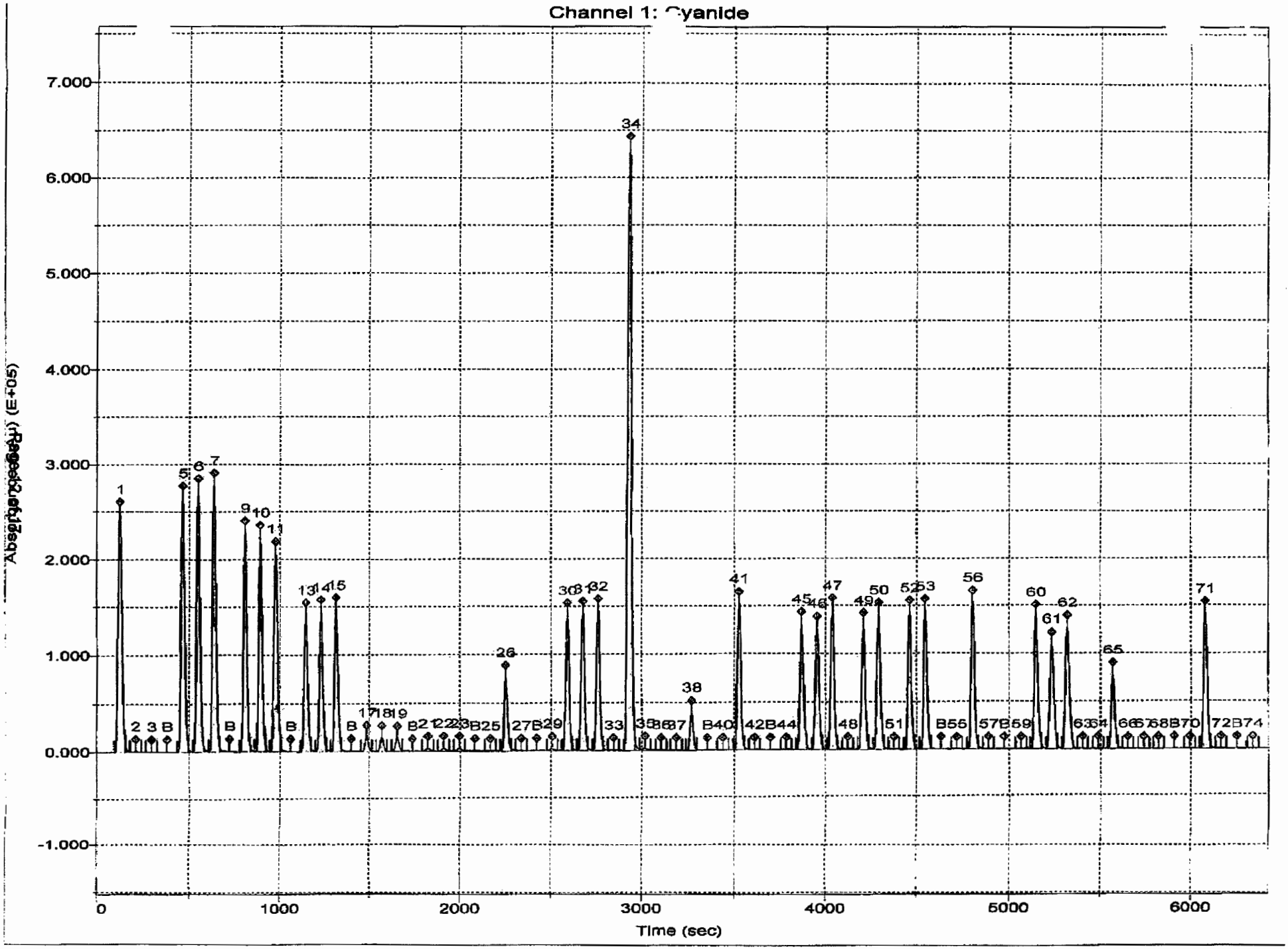
CRW 5-15-13

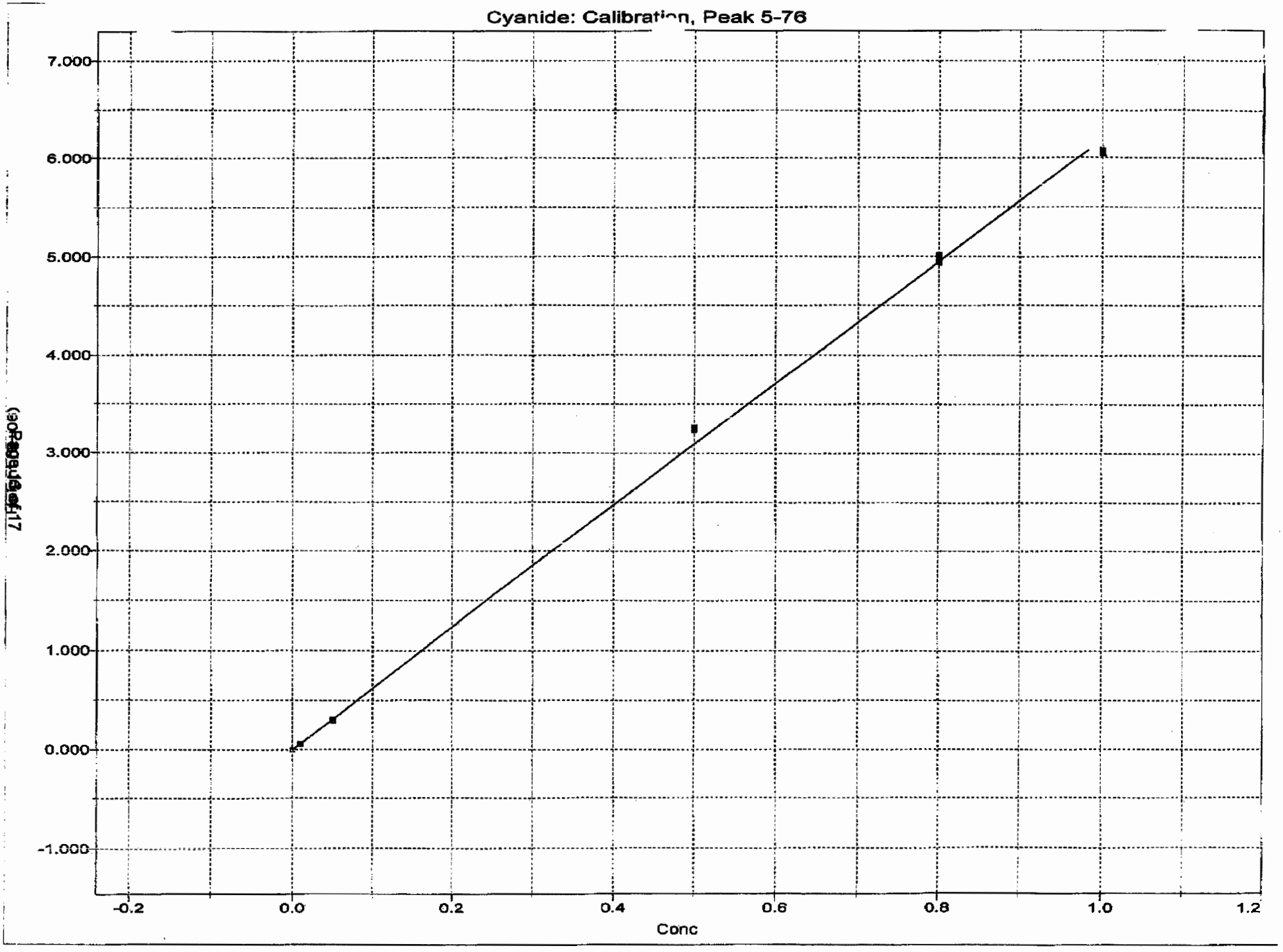
)(	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)	
.	2	Sync	SYNC	1	1	6038980	0.976643	
:	0	Carryover	CO	1	1	18010	0.003511	
3	0	Carryover	CO	1	1	2575	0.001016	
3	0	Baseline	RB	1	1	-1881	0.000296	
5	2	Cal 1.00 ppm	C	1	1	6044285	0.977500	
5	2	Cal 1.00 ppm	C	1	1	6066860	0.981149	
'	2	Cal 1.00 ppm	C	1	1	6074882	0.982445	
3	0	Baseline	RB	1	1	-2392	0.000214	
)	3	Cal 0.80 ppm	C	1	1	4942340	0.799399	
.0	3	Cal 0.80 ppm	C	1	1	4946887	0.800135	
.1	3	Cal 0.80 ppm	C	1	1	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	C	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	C	1	1	304102	0.049750	
3	0	Baseline	RB	1	1	-224	0.000564	
21	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	0	Baseline	RB	1	1	-308	0.000550	
25	1	Blank	BLNK	1	1	-1103	0.000422	
26	7	ICV 0.25 ppm	CCV	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	U	259	1	38284	1.758032	
30	9	130501028-001MS	U	259	1	3088314	129.433945	
31	10	130501028-001MSD	U	259	1	3102506	130.028030	
32	11	130501028-LCS	U	1	1	3260699	0.527606	
33	12	130501028-BL	U	1	1	3377	0.001146	
34	13	130422022-007	U	20	1	14952298	48.344933	additional 10x below
35	14	130510075-001	U	109	1	30035	0.594545	
36	15	130508054-006	U	1	1	7690	0.001843	
37	16	130509042-006	U	1	1	914	0.000748	
38	17	130513012-002	U	1	1	824775	0.133903	
3	0	Baseline	RB	1	1	-79	0.000587	
40	1	Blank	BLNK	1	1	-944	0.000448	
41	4	CCV 0.5 ppm	CCV	1	1	3311329	0.535790	
42	1	Blank	BLNK	1	1	-2419	0.000209	
3	0	Read Baseline	RB	1	1	-814	0.000469	
44	18	130430038-001 R	U	1	1	4148	0.001270	
45	19	130430038-001MS	U	1	1	3043535	0.492508	
46	20	130430038-001MSD	U	1	1	2971315	0.480835	
47	21	130430038-LCS	U	1	1	3261260	0.527697	
48	22	130430038-BL	U	1	1	-1539	0.000351	
49	23	130508054-006MS NW	U	1	1	3000574	0.485564	
50	24	130508054-006MSD	U	1	1	3198242	0.517512	
51	25	130510074-001 NW	U	1	1	-7577	-0.000625	
52	26	130510074-001MS	U	1	1	3073429	0.497339	
53	27	130510074-001MSD	U	1	1	3041355	0.492155	
8	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	
8	0	Read Baseline	RB	1	1	-899	0.000455	
5!	28	130510079-001 F	U	1.1	1	-2333	0.000245	
60	29	130510079-001MS	U	1.1	1	3130370	0.557196	
61	30	130510079-001MSD	U	1.1	1	2792482	0.497125	
62	31	130510079-LCS	U	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	130422022-007	U	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
	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
	2	
	0	
	0	
	0	BL
	2	
	2	
	2	
	0	BL
	3	
0	3	
1	3	
	0	BL
3	4	
4	4	
5	4	
	0	BL
7	5	
8	5	
9	5	
	0	BL
:	6	
2	6	
3	6	
	0	BL
5	1	
6	7	
7	1	
	0	BL
9	8	
0	9	
1	10	
2	11	
3	12	
4	13	HI
5	14	FL
6	15	FL
7	16	
8	17	
.	0	BL
0	1	
1	4	
2	1	
;	0	BL
4	18	
5	19	
6	20	
7	21	
8	22	
9	23	
0	24	
1	25	LO
2	26	
3	27	
3	0	BL
5	1	LO
6	4	
7	1	LO
3	0	BL

Peak	Cup	Flags
59	28	
60	29	
61	30	
62	31	
63	32	
64	33	
65	34	
66	35	
67	36	
68	37	
3	0	BL
70	1	
71	4	
72	1	LO
3	0	BL
74	38	


Channel 1: Cyanide
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
0
1000
2000
3000
4000
5000
6000
Time (sec)


Cyanide: Calibration, Peak 5-76
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Conc

Analyte: Calibration, Peak 5-76

File name: T:\DATA1\FLOW4\2013\EPA335.4\051413CM.RST
Date: May 14, 2013
Operator: 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 ppm	0.010000	58197.007812
Cal 0.01 ppm	0.010000	57780.523438
Cal 0.01 ppm	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 ID	Analyses Date	Sample Matrix	Analyst Initials	Temp - °C	Temp - °F
1303060001-001	3/8/2013	Liquid/5	MH		<50°F
1303120[illegible]-001	3/14/13	Liquid/5	MH		<50°F
1303220[illegible]-001	3/27/13	0:9 / 3	MH		178°F
1303272035-001	3/27/13	H_2O/4	MH		>200°F
-002	↓	↓	↓		↓
1303271025-001	3/28/2013	H_2O/4	MH		>200°F
1303272026-001	3/29/2013	↓	↓		>200°F
1303280[illegible]-001	3/29/2013	H_2O/4	MH		>200°F
1304101026-001	4/11/2013	H_2O/4	MH		>200°F
1304150[illegible]-001	4/15/2013	H_2O/4	MH		>200°F
1304160[illegible]-002	4/23/13	H_2O/4	MH		>200°F
1304260[illegible]-001	4/30/13	H_2O/4	MH		>200°F
-002	↓	↓	↓		>200°F
1304260[illegible]-002	5/7/13	Liquid/5	MH		>200°F
-003					150°F
-004					<140°F<150°F
-008					150°F
-009					177°F
-010	↓	↓	↓		530°F
1304300[illegible]-002	5/10/13	Liquid/5	MH		>200°F
1304300[illegible]-001	↓	H_2O/4	↓		>200°F
1305100[illegible]-001	5/15/13	Liquid/5	MH		147°F

*** SAFETY GLASSES REQUIRED.**

pH - SM4500H+B / Alkalinity SM2320B

Equivalent EPA Methods 150.1 & 310.1

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)	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				

Sample	Temp (°C)	pH	pH 4 Cal	pH 10 Cal	Slope	pH 7 Buffer	Sample Vol. (mL)	Titrant vol to pH (mL) A 8.3	B 4.5	C 4.2	Alkalinity (mg/L) Total	Carbonate	Bi-carbonate	Hydroxide	%
1305022-17-001	23.3	6.86	4.01	10.00	102.5	7.10									
-003	24.4	6.91													
-005	24.0	8.14													
1304300335-001	21.8	7.28													
1305-2026-003	24.0	7.93													

Analysis Date: 5-6-2013 Analyst: AST

Sulfide by SM 4500-S⁻ F

Quality Control Information

	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

1. 1 blank per batch, must be < 20 ug/L.
2. 1 LFB per batch must be +/- 30%.
3. 50 µL iodine reacts with 0.02 mg Sulfide

Spike Standard Number:

Sample	Sample Volume	Iodine amount (50 µL increments)	Concentration (mg/sample)	Concentration (mg/L)	Spike Amt	Date	% Recovery	Initials
1305020025-001 ~~(m=5.19)~~ AST 5/3	523.00	100	0.04	0.0765		5/3/13		AST
1304230044-001 ~~(m=5.49)~~ m=19.5	50mL	100	0.04	0.8 x 19.5 = 15.6				
13050z017-001 m=0.548	5mL (10x Dil)	350	0.14	28 ~~28~~ x 0.548 = 15.34				
-003 m=0.535	5mL 10x10	250	0.10	20 ~~20~~ x 0.535 = 10.70				
-005 m=0.497	5mL (10x Dil)	450	0.18	36 ~~36~~ x 0.497 = 17.89				
1304300038-001	427.97mL	850	0.34	0.7113				
1305010031-001 m=5.01	50mL	100	0.04	0.8 x 5.01 = 4.008				
033-001 m=5.04	50mL	50	0.02	0.4 x 5.04 = 2.02				
034-001 m=4.93	50mL	100	0.04	0.8 x 4.93 = 3.94				
035-001 m=4.98	50mL	50	0.02	0.4 x 4.98 = 1.99				
035-001MS	50mL	450	0.18	3.6 x 4.98 = 17.93	200µL		89.7%	
-LFB	1000mL	450	0.18	0.18	200µL		90%	
-LFBD		400	0.16	0.16			80%	

Comments [signature] 5/7/2013

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R10139**	RunNo: **10139**
Prep Date:	Analysis Date: **4/25/2013**	SeqNo: **288955** 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-b**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R10139**	RunNo: **10139**
Prep Date:	Analysis Date: **4/25/2013**	SeqNo: **288967** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	93.4	90	110			
Sulfate	9.5	0.50	10.00	0	95.2	90	110			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R10139**	RunNo: **10139**
Prep Date:	Analysis Date: **4/26/2013**	SeqNo: **289009** 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: **LCSW**	Batch ID: **R10139**	RunNo: **10139**
Prep Date:	Analysis Date: **4/26/2013**	SeqNo: **289010** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	93.5	90	110			
Sulfate	9.6	0.50	10.00	0	95.8	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R10158**	RunNo: **10158**
Prep Date:	Analysis Date: **4/26/2013**	SeqNo: **289475** Units: **%REC**

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 lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R10158**	RunNo: **10158**
Prep Date:	Analysis Date: **4/26/2013**	SeqNo: **289477** Units: **%REC**

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R10158**	RunNo: **10158**
Prep Date:	Analysis Date: **4/27/2013**	SeqNo: **289501** Units: **%REC**

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 lcs2**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R10158**	RunNo: **10158**
Prep Date:	Analysis Date: **4/27/2013**	SeqNo: **289503** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	8.8		10.00		87.9	70	130			
Surr: 4-Bromofluorobenzene	8.3		10.00		83.2	69.5	130			
Surr: Dibromofluoromethane	8.8		10.00		87.7	70	130			
Surr: Toluene-d8	8.4		10.00		84.0	70	130			

Sample ID **5ml-rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R10192**	RunNo: **10192**
Prep Date:	Analysis Date: **4/29/2013**	SeqNo: **290505** Units: **µg/L**

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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R10192**	RunNo: **10192**
Prep Date:	Analysis Date: **4/29/2013**	SeqNo: **290505** Units: **µg/L**

Analyte	Result	PQL	SPK 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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R10192**	RunNo: **10192**
Prep Date:	Analysis Date: **4/29/2013**	SeqNo: **290505** 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 lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R10192**	RunNo: **10192**
Prep Date:	Analysis Date: **4/29/2013**	SeqNo: **290512** 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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

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 lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R10192**	RunNo: **10192**
Prep Date:	Analysis Date: **4/29/2013**	SeqNo: **290512** 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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **7235**	RunNo: **10279**
Prep Date: **5/1/2013**	Analysis Date: **5/2/2013**	SeqNo: **293096** 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								

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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **7235**	RunNo: **10279**
Prep Date: **5/1/2013**	Analysis Date: **5/2/2013**	SeqNo: **293096** 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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

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 **lcs-7235**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **7235**	RunNo: **10279**
Prep Date: **5/1/2013**	Analysis Date: **5/2/2013**	SeqNo: **293097** 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 **lcsd-7235**	SampType: **LCSD**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSS02**	Batch ID: **7235**	RunNo: **10279**
Prep Date: **5/1/2013**	Analysis Date: **5/2/2013**	SeqNo: **293098** 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-Chlorophenol	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
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

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**
Prep Date: **4/26/2013**	Analysis Date: **4/26/2013**	SeqNo: **289732** Units: **mg/L**

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.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

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-7191**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **7191**	RunNo: **10315**
Prep Date: **4/29/2013**	Analysis Date: **5/3/2013**	SeqNo: **293896** 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								
Chromium	ND	0.0060								
Lead	ND	0.0050								
Selenium	ND	0.050								
Silver	ND	0.0050								

Sample ID **LCS-7191**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **7191**	RunNo: **10315**
Prep Date: **4/29/2013**	Analysis Date: **5/3/2013**	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			
Lead	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**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **7191**	RunNo: **10423**
Prep Date: **4/29/2013**	Analysis Date: **5/6/2013**	SeqNo: **294880** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								
Magnesium	ND	1.0								
Potassium	ND	1.0								
Sodium	ND	1.0								

Sample ID **LCS-7191**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **7191**	RunNo: **10423**
Prep Date: **4/29/2013**	Analysis Date: **5/6/2013**	SeqNo: **294881** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	97.2	80	120			
Magnesium	49	1.0	50.00	0	98.1	80	120			
Potassium	48	1.0	50.00	0	95.3	80	120			
Sodium	49	1.0	50.00	0	97.4	80	120			

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

QC SUMMARY REPORT

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-1**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R10197**	RunNo: **10197**							
Prep Date:	Analysis Date: **4/29/2013**	SeqNo: **290702**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
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)	80	20	80.00	0	99.6	90	110			

Sample ID **mb-2**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**							
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)	ND	20								

Sample ID **lcs-2**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R10197**	RunNo: **10197**							
Prep Date:	Analysis Date: **4/29/2013**	SeqNo: **290721**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	79	20	80.00	0	99.0	90	110			

Sample ID **mb-3**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R10197**	RunNo: **10197**							
Prep Date:	Analysis Date: **4/30/2013**	SeqNo: **290732**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-3**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R10197**	RunNo: **10197**							
Prep Date:	Analysis Date: **4/30/2013**	SeqNo: **290733**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	100	90	110			

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

QC SUMMARY REPORT

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	ND	20.0								

Sample ID **LCS-7222**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **7222**	RunNo: **10240**
Prep Date: **4/30/2013**	Analysis Date: **5/1/2013**	SeqNo: **292009** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1040	20.0	1000	0	104	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 Number: 1304A43 RcptNo: 1

Received by/date: AG 04/25/13

Logged By: Lindsay Mangin 4/25/2013 9:10:00 AM

Completed By: Lindsay Mangin 4/25/2013 2:05:25 PM

Reviewed By: 04/25/13

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?	UPS		

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 ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
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 ☐	

# of preserved bottles checked for pH: 2 (<2 or >12 unless noted)
Adjusted? NA
Checked by:

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:
Client Instructions:

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.5	Good	Yes			

Chain-of-Custody Record

Client: Western Refinery

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4135

email or Fax#:

QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: 4-24-13 Injection Well 2nd QTR

Project #:

Project Manager:

Sampler: MAIT & Bob

On Ice: ☒ Yes ☐ No

Sample Temperature: 3.2

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1302142	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TDS	Back up	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Eq. Alk, SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
4-24-13	10:15	H2O	Injection Well	3-VOA	HCl	-001										X						
				1-liter	amber	-001											X					
				1-500ml		-001												X				
				1-500ml		-001														X		
				1-250ml	H_2SO_4	-001					X											
				1-500ml	HNO_3	-001							X									
				1-500ml	NaOH	-001													X			
				1-500ml	Zn acetate	-001															X	
			Trip Blank			-002											X					

4-25-13

Date:	Time:	Relinquished by:	Received by:	Date	Time
4-24-13	3:00	Robert Knakow		04/25/13	0910
Date:	Time:	Relinquished by:	Received by:	Date	Time

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.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 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
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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#: **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.

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 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	E	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: SEMIVOLATILES						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

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 7-22-13
Lab ID: 1307A17-001 **Matrix:** AQUEOUS

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 8270C: SEMIVOLATILES						Analyst: **DAM**	
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 PM	8534
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)anthracene	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
Hexachlorobenzene	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

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

Qualifiers:

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

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 8270C: SEMIVOLATILES						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		µg/L	1	7/24/2013 12:05:54 PM	8534
Phenol	ND	50		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		µg/L	1	7/24/2013 12:05:54 PM	8534
2,4,5-Trichlorophenol	ND	50		µg/L	1	7/24/2013 12:05:54 PM	8534
2,4,6-Trichlorophenol	ND	50		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		µg/L	1	7/23/2013 6:57:35 PM	R12139
Ethylbenzene	ND	1.0		µg/L	1	7/23/2013 6:57:35 PM	R12139
Methyl tert-butyl ether (MTBE)	ND	1.0		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		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
Chloromethane	ND	3.0		µg/L	1	7/23/2013 6:57:35 PM	R12139

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
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

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**	
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		µg/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-Tetrachloroethane	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

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
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

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**	
pH	7.41	1.68	H	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 SOLIDS						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.

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Client Sample ID: TRIP BLANK
Project: 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	Qual	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	R12139
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
Naphthalene	ND	2.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
1-Methylnaphthalene	ND	4.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
2-Methylnaphthalene	ND	4.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
Acetone	ND	10		µg/L	1	7/23/2013 7:55:05 PM	R12139
Bromobenzene	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
Bromodichloromethane	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
Bromoform	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
Bromomethane	ND	3.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
2-Butanone	ND	10		µg/L	1	7/23/2013 7:55:05 PM	R12139
Carbon disulfide	ND	10		µg/L	1	7/23/2013 7:55:05 PM	R12139
Carbon Tetrachloride	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
Chlorobenzene	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
Chloroethane	ND	2.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
Chloroform	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
Chloromethane	ND	3.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
2-Chlorotoluene	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
4-Chlorotoluene	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
cis-1,2-DCE	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
Dibromochloromethane	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
Dibromomethane	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
1,2-Dichlorobenzene	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
1,3-Dichlorobenzene	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
1,4-Dichlorobenzene	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
Dichlorodifluoromethane	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
1,1-Dichloroethane	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
1,1-Dichloroethene	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
1,2-Dichloropropane	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
1,3-Dichloropropane	ND	1.0		µg/L	1	7/23/2013 7:55:05 PM	R12139
2,2-Dichloropropane	ND	2.0		µg/L	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.

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** TRIP BLANK
Project: 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	Qual	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.

Qualifiers:

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

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 #:**	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**	7/22/2013	**Date/Time Received**	7/24/2013 11:22 AM
Client Sample ID	1307A17-001E / INJECTION WELL				
Matrix	Water	**Sampling Time**	2:00 PM		
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	
pH	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
PQL Practical Quantitation Limit

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

WO#: **1307A17**

all Environmental Analysis Laboratory, Inc.

29-Jan-14

Client: Western Refining Southwest, Inc.
Project: Injection Well 7-22-13

Sample ID **MB-8646**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Metals**
Client ID: **PBW**	Batch ID: **8646**	RunNo: **12318**
Prep Date: **7/31/2013**	Analysis Date: **7/31/2013**	SeqNo: **350274** 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**	SampType: **LCS**	TestCode: **EPA Method 200.7: Metals**
Client ID: **LCSW**	Batch ID: **8646**	RunNo: **12318**
Prep Date: **7/31/2013**	Analysis Date: **7/31/2013**	SeqNo: **350275** 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			
Cadmium	0.47	0.0020	0.5000	0	93.5	85	115			
Calcium	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			

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1307A17**

29-Jan-14

Client: Western Refining Southwest, Inc.

Project: Injection Well 7-22-13

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R12176**	RunNo: **12176**
Prep Date:	Analysis Date: **7/24/2013**	SeqNo: **346320** 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: **LCSW**	Batch ID: **R12176**	RunNo: **12176**
Prep Date:	Analysis Date: **7/24/2013**	SeqNo: **346321** Units: **mg/L**

Analyte	Result	PQL	SPK 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 **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R12176**	RunNo: **12176**
Prep Date:	Analysis Date: **7/24/2013**	SeqNo: **346374** 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: **LCSW**	Batch ID: **R12176**	RunNo: **12176**
Prep Date:	Analysis Date: **7/24/2013**	SeqNo: **346375** Units: **mg/L**

Analyte	Result	PQL	SPK 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			

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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R12139**	RunNo: **12139**
Prep Date:	Analysis Date: **7/23/2013**	SeqNo: **345231** 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 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R12139**	RunNo: **12139**
Prep Date:	Analysis Date: **7/23/2013**	SeqNo: **345231** 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-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 lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R12139**	RunNo: **12139**
Prep Date:	Analysis Date: **7/23/2013**	SeqNo: **345233** 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 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1307A17**

29-Jan-14

Client: Western Refining Southwest, Inc.

Project: Injection Well 7-22-13

Sample ID **100ng lcs**	SampType: **LCS**			TestCode: **EPA Method 8260B: VOLATILES**					
Client ID: **LCSW**	Batch ID: **R12139**			RunNo: **12139**					
Prep Date:	Analysis Date: **7/23/2013**			SeqNo: **345233**	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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **8534**	RunNo: **12174**
Prep Date: **7/24/2013**	Analysis Date: **7/24/2013**	SeqNo: **346299** 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 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

WO#: **1307A17**

Hall Environmental Analysis Laboratory, Inc.

29-Jan-14

Client: Western Refining Southwest, Inc.
Project: Injection Well 7-22-13

Sample ID **mb-8534**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **8534**	RunNo: **12174**
Prep Date: **7/24/2013**	Analysis Date: **7/24/2013**	SeqNo: **346299** 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								
'-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	112			
Surr: 2-Fluorophenol	130		200.0		65.7	11.9	98.6			
Surr: 4-Terphenyl-d14	79		100.0		78.8	46	111			
Surr: Nitrobenzene-d5	81		100.0		81.4	34.9	112			
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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1307A17**

29-Jan-14

Client: Western Refining Southwest, Inc.

Project: Injection Well 7-22-13

Sample ID **lcs-8534**	SampType: **LCS**	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			
Pentachlorophenol	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 **lcsd-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	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
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

all Environmental Analysis Laboratory, Inc.

WO#: **1307A17**

29-Jan-14

Client: Western Refining Southwest, Inc.

Project: Injection Well 7-22-13

Sample ID **lcsd-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	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Phenol-d5	130		200.0		62.9	17.5	88.3	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 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

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:	**µmhos/cm**			

Analyte	Result	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.
- 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

QC SUMMARY REPORT

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
pH	7.41	1.68								H

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

QC SUMMARY REPORT

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**	RunNo: **12146**							
Prep Date:	Analysis Date: **7/23/2013**	SeqNo: **345597**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R12146**	RunNo: **12146**							
Prep Date:	Analysis Date: **7/23/2013**	SeqNo: **345598**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	101	90	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 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

WO#: **1307A17**

'all Environmental Analysis Laboratory, Inc.

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**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-8535**	SampType: **LCS**			TestCode: **SM2540C MOD: Total Dissolved Solids**					
Client ID: **LCSW**	Batch ID: **8535**			RunNo: **12190**					
Prep Date: **7/24/2013**	Analysis Date: **7/25/2013**			SeqNo: **346732**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	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 for VOA and TOC only.
- RL Reporting Detection Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 Number: **1307A17** RcptNo: **1**

Received by/date: LM 07/23/13

Logged By: **Ashley Gallegos** **7/23/2013 9:00:00 AM** AG

Completed By: **Ashley Gallegos** **7/23/2013 11:56:16 AM** AG

Reviewed By: JD 07/27/13

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?	UPS		

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 bottles checked for pH: 2,2
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ✔	No	(<2 or >12 unless noted)
13. Are matrices correctly identified on Chain of Custody?	Yes ✔	No	Adjusted? NO
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: 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	2.2	Good	Not Present			

Chain-of-Custody Record

Client: Western Refinery

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4135

email or Fax#:

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other _____

☐ EDD (Type) _____

Turn-Around Time:
☒ Standard ☐ Rush _____

Project Name:
Injection Well 7-22-13

Project #:

Project Manager:

Sampler: Matt & Bob

On Ice: [redacted] No:

Sample Temperature: 2 °C

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

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)	[redacted] TDS	[redacted] Back up	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Ecpth SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
7-22-13	2:00	H_2O	Injection Well	3-VOA	HCl	-001										X						
				1-Liter	Amber												X					
				1-500ml	—													X				
				1-500ml	—					X										X		
				1-250ml	H_2SO_4						X											
				1-500ml	HNO_3								X									
				1-500ml	NaOH														X			
				1-500ml	Zn Acetate																X	

Date:	Time:	Relinquished by:	Received by:	Date	Time
7-22-13	3:00	Robert Krakow			
Date:	Time:	Relinquished by:	Received by:	07/23	13:00

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.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 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

Analytical Report
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

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **JRR**	
Chloride	1300	50		mg/L	100	11/9/2013 3:06:30 AM	R14683
Sulfate	23	5.0		mg/L	10	11/9/2013 2:54:05 AM	R14683
EPA METHOD 7470: MERCURY						Analyst: **JML**	
Mercury	ND	0.00020		mg/L	1	11/18/2013 4:58:29 PM	10368
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **JLF**	
Arsenic	ND	0.020		mg/L	1	11/12/2013 5:28:52 PM	10290
Barium	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
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
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 5:44:14 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
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(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 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
4-Chloroaniline	ND	50		µg/L	1	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.

Qualifiers:

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

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

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **JDC**	
2-Chloronaphthalene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
2-Chlorophenol	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
4-Chlorophenyl phenyl ether	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Chrysene	ND	50		µg/L	1	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
Dibenz(a,h)anthracene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Dibenzofuran	ND	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	10311
1,3-Dichlorobenzene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
1,4-Dichlorobenzene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
3,3'-Dichlorobenzidine	ND	50		µg/L	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
2,4-Dichlorophenol	ND	100		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
4,6-Dinitro-2-methylphenol	ND	100		µg/L	1	11/14/2013 2:22:45 PM	10311
2,4-Dinitrophenol	ND	100		µg/L	1	11/14/2013 2:22:45 PM	10311
2,4-Dinitrotoluene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
2,6-Dinitrotoluene	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	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Hexachlorobenzene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Hexachlorobutadiene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Hexachlorocyclopentadiene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Hexachloroethane	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Indeno(1,2,3-cd)pyrene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Isophorone	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
1-Methylnaphthalene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
2-Methylnaphthalene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
2-Methylphenol	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
3+4-Methylphenol	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
N-Nitrosodi-n-propylamine	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
N-Nitrosodimethylamine	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
N-Nitrosodiphenylamine	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Naphthalene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
2-Nitroaniline	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
3-Nitroaniline	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
4-Nitroaniline	ND	50		µg/L	1	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.

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 11-7-13
Lab ID: 1311335-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **JDC**	
Nitrobenzene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
2-Nitrophenol	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
4-Nitrophenol	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Pentachlorophenol	ND	100		µg/L	1	11/14/2013 2:22:45 PM	10311
Phenanthrene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Phenol	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Pyrene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Pyridine	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
1,2,4-Trichlorobenzene	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
2,4,5-Trichlorophenol	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
2,4,6-Trichlorophenol	ND	50		µg/L	1	11/14/2013 2:22:45 PM	10311
Surr: 2-Fluorophenol	56 8	22.7-98		%REC	1	11/14/2013 2:22:45 PM	10311
Surr: Phenol-d5	45 3	23.4-74.9		%REC	1	11/14/2013 2:22:45 PM	10311
Surr: 2,4,6-Tribromophenol	83 0	23.3-111		%REC	1	11/14/2013 2:22:45 PM	10311
Surr: Nitrobenzene-d5	72 4	36.8-111		%REC	1	11/14/2013 2:22:45 PM	10311
Surr: 2-Fluorobiphenyl	75 7	38.3-110		%REC	1	11/14/2013 2:22:45 PM	10311
Surr: 4-Terphenyl-d14	75 6	52.1-116		%REC	1	11/14/2013 2:22:45 PM	10311
EPA METHOD 8260B: VOLATILES						Analyst: **cadg**	
Benzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Toluene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Ethylbenzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,2,4-Trimethylbenzene	1 0	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Naphthalene	ND	2.0		µg/L	1	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
Acetone	34	10		µg/L	1	11/12/2013 3:55:06 PM	R14754
Bromobenzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Bromodichloromethane	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Bromoform	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Bromomethane	ND	3.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
2-Butanone	ND	10		µg/L	1	11/12/2013 3:55:06 PM	R14754
Carbon disulfide	ND	10		µg/L	1	11/12/2013 3:55:06 PM	R14754
Carbon Tetrachloride	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Chlorobenzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Chloroethane	ND	2.0		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.

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 11-7-13
Lab ID: 1311335-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **cadg**	
Chloroform	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Chloromethane	ND	3.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
2-Chlorotoluene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
4-Chlorotoluene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
cis-1,2-DCE	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Dibromochloromethane	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Dibromomethane	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,2-Dichlorobenzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,3-Dichlorobenzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,4-Dichlorobenzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Dichlorodifluoromethane	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,1-Dichloroethane	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,1-Dichloroethene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,2-Dichloropropane	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,3-Dichloropropane	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
2,2-Dichloropropane	ND	2.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,1-Dichloropropene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Hexachlorobutadiene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
2-Hexanone	ND	10		µg/L	1	11/12/2013 3:55:06 PM	R14754
Isopropylbenzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
4-Isopropyltoluene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
4-Methyl-2-pentanone	ND	10		µg/L	1	11/12/2013 3:55:06 PM	R14754
Methylene Chloride	ND	3.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
n-Butylbenzene	ND	3.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
n-Propylbenzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
sec-Butylbenzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Styrene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
tert-Butylbenzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
trans-1,2-DCE	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,1,1-Trichloroethane	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,1,2-Trichloroethane	ND	1.0		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.

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 11-7-13
Lab ID: 1311335-001 **Matrix:** AQUEOUS

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **cadg**	
Trichloroethene (TCE)	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Trichlorofluoromethane	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
1,2,3-Trichloropropane	ND	2.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Vinyl chloride	ND	1.0		µg/L	1	11/12/2013 3:55:06 PM	R14754
Xylenes, Total	ND	1.5		µg/L	1	11/12/2013 3:55:06 PM	R14754
Surr: 1,2-Dichloroethane-d4	102	70-130		%REC	1	11/12/2013 3:55:06 PM	R14754
Surr: 4-Bromofluorobenzene	92.3	70-130		%REC	1	11/12/2013 3:55:06 PM	R14754
Surr: Dibromofluoromethane	103	70-130		%REC	1	11/12/2013 3:55:06 PM	R14754
Surr: Toluene-d8	95.7	70-130		%REC	1	11/12/2013 3:55:06 PM	R14754
SM2510B: SPECIFIC CONDUCTANCE						Analyst: **JML**	
Conductivity	4400	0.010		µmhos/cm	1	11/8/2013 9:27:49 PM	R14690
SM4500-H+B: PH						Analyst: **JML**	
pH	7.42	1.68	H	pH units	1	11/8/2013 9:27:49 PM	R14690
SM2320B: ALKALINITY						Analyst: **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						Analyst: **JML**	
Total Dissolved Solids	2940	200	*	mg/L	1	11/12/2013 4:13:00 PM	10275

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

Qualifiers:

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

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	Anatek Sample ID	Method/Prep Method
1311335-001E / Inj Well	131112008-001	SW846Ch7/EPA 1010/EPA 150.1

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	N	See Note
Method Blank(s) Valid?	Y	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 Standard(s) Response Requirements

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: John W. Coffey

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 #:**	131112008
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1311335
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	131112008-001	**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		
Matrix	Water	**Sample Location**			
Comments					

Parameter	Result	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	
pH	6.98	ph Units		11/13/2013	KFG	EPA 150.1	
Reactive sulfide	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
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 #:**	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 Result	Units	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	%RPD	AR %RPD	Prep Date	Analysis Date
Reactive sulfide	0.18	mg/L	0.2	90.0	11.8	0-25	11/19/2013	11/19/2013

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
131113057-003A	Reactive sulfide	ND	0.18	mg/L	0.2	90.0	70-130	11/19/2013	11/19/2013
131112008-001	Cyanide (reactive)	ND	0.345	mg/L	0.5	69.0	80-120	11/15/2013	11/18/2013

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep 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

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide (reactive)	ND	mg/L	1	11/15/2013	11/18/2013
Reactive sulfide	ND	mg/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 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:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; 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 WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 131112008
Order Date: 11/12/2013

Contact Name: ANDY FREEMAN
Project Name: 1311335

Comment:

Sample #: 131112008-001 **Customer Sample #:** 1311335-001E / INJ. WELL

Recv'd: ☑ **Collector:** **Date Collected:** 11/7/2013
Quantity: 3 **Matrix:** 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)***
pH	M	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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

131112 008 HALL Last Due 11/22/2013
1st SAMP 11/7/2013 1st RCVD 11/12/2013
1311335

SUB CONTRACTOR: Anatek Labs	COMPANY: Anatek Labs, Inc.	PHONE: (208) 883-2839	FAX: (208) 882-9246
ADDRESS: 1282 Alturas Dr		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Moscow, ID 83843			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1311335-001E	Inj. Well	various	Aqueous	11/7/2013 8:00:00 AM	3	RCI LEVEL 4

NWBS

SPECIAL INSTRUCTIONS / COMMENTS:

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.

Relinquished By:	Date: 11/8/2013	Time: 2:19 PM
Relinquished By:	Date:	Time:
Relinquished By:	Date:	Time:

TAT: Standard ☐ RUSH

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 2.4 °C
- ☑ LABELS & CHAINS AGREE
- ☑ NO HEADSPACE
- ☑ ICE / ICE-PACKS PRESENT
- ☑ CUSTODY SEALS PRESENT

PRESERVATIVES: NaOH Zinc Ace

NUMBER OF CONTAINERS: 3 SHIPPED VIA: F

DATE & TIME: 11/12/13 10:11 INSPECTED BY: BT

REPORT TRANSMITTAL DESIRED:

(extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY

_____ °C Attempt to Cool ? _____

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: M955-04 Exp:11/1/2014
Free Cyanide MS/MSD/LCS Soln: ~~M934-06~~ ~~Exp:7/30/2014~~
M962-04 exp: 11/15/14

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)
1	13103004-1	reactive soil	NaOH	50mL	26.6	26.6		
2	1ms	↓	↓	↓	↓	↓	1mL	
3	1msd	↓	↓	↓	↓	↓	↓	
4	1LCS	↓	↓	↓	1x	1x	↓	
5	BL	↓	↓	↓	↓	↓		
6	13113037-1	↓	↓	↓	25.2	25.2		
7	13112004-1	↓	↓	↓	26.9	26.9		
8	13112008-1	reactive wwt	↓	↓	1x	1x		
9	1ms	↓	↓	↓	↓	↓	1mL	
10	1msd	↓	↓	↓	↓	↓	↓	
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

* 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	A072-06
18 N H_2SO_4	A074-06
sulfamic acid	R068-19
0.025N NaOH	R014-16
51% $MgCl_2$	A075-01

Analytical Reagents:	Reagent #:
Barbituric Acid	R038-13
Sodium Phosphate	R029-16
Chloramine-t	R083-15
Pyridine	R079-22

Distillation Initials/Date Distilled: CMW 11/15/13

Analyst Initials/Date Analyzed: CMW 11/18/13

Anatek Labs, Inc
1282 Alturas Drive
Moscow, ID 83843

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	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)

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.

Standard Prep Date: 11/11/13

Analysts Initials/Date: MMJ 11/18/13

Pipettes: A04003282
2751528/2752498

N:\Calibration Standard Prep Forms\Cyanide EPA 335.4.doc

11 10 13

File name: T:\DATA1\FLOW4\2013\EPA335.4\111813CM.RST
Date: November 18, 2013
Operator: CRW

CMW 11-22-13

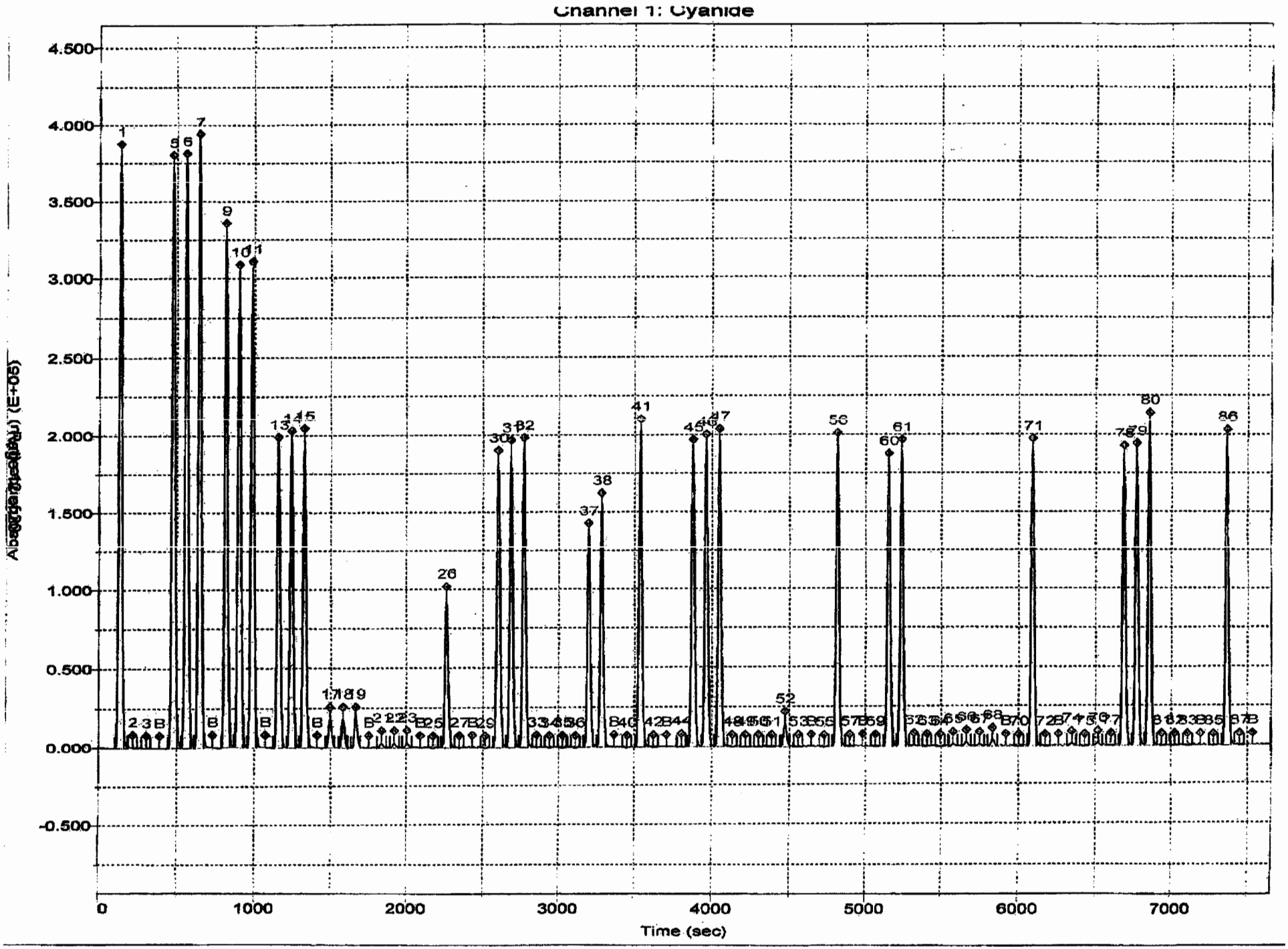
131118 FRACNR

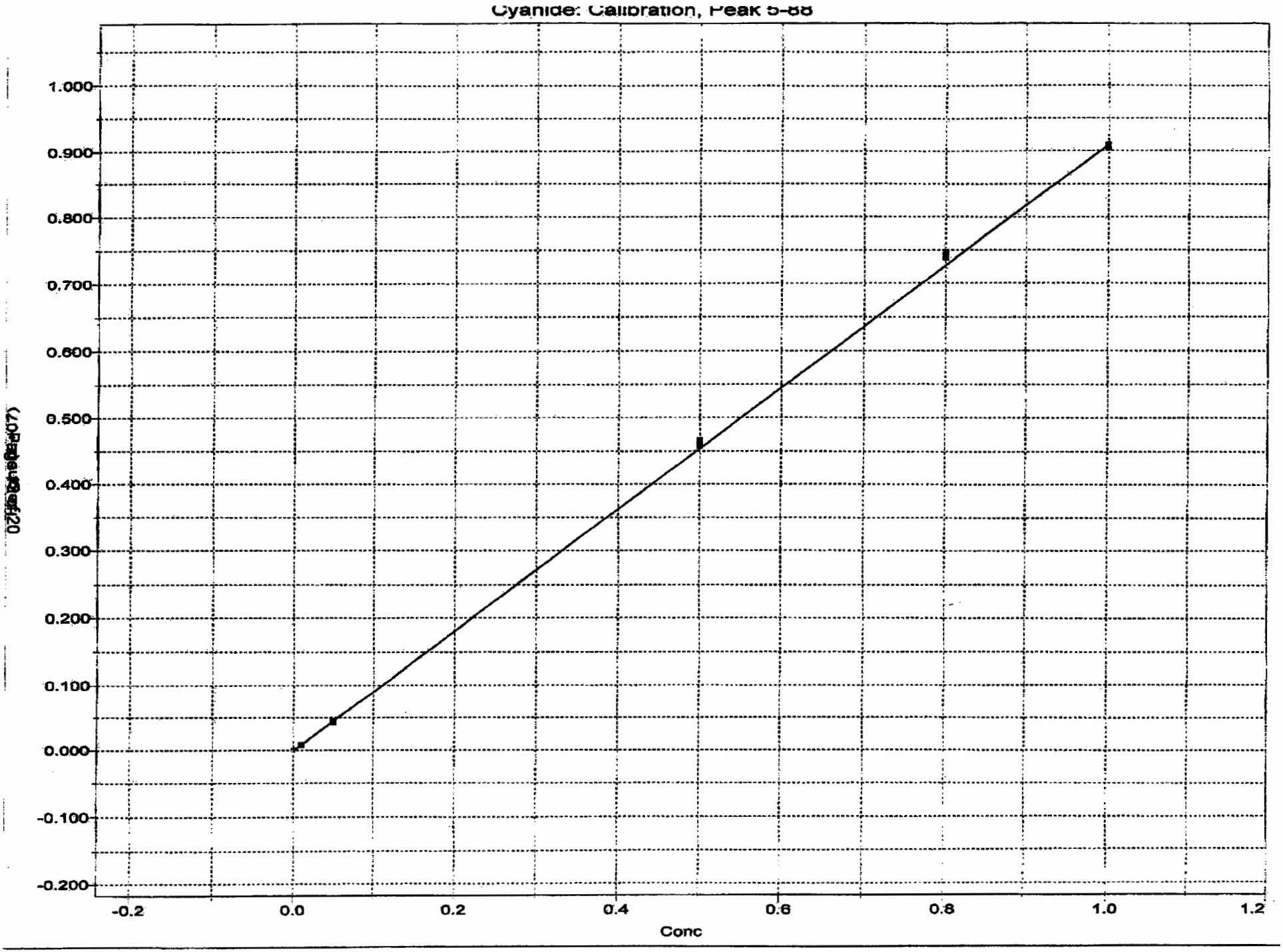
Bak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
	2	Sync	SYNC	1	1	8809582	0.969915
	0	Carryover	CO	1	1	27838	0.004500
	0	Carryover	CO	1	1	4519	0.001936
	0	Baseline	RB	1	1	424	0.001486
	2	Cal 1.00 ppm	C	1	1	9041663	0.995429
	2	Cal 1.00 ppm	C	1	1	9082788	0.999950
	2	Cal 1.00 ppm	C	1	1	9049468	0.996287
	0	Baseline	RB	1	1	891	0.001538
	3	Cal 0.80 ppm	C	1	1	7390174	0.813874
0	3	Cal 0.80 ppm	C	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	Cal 0.50 ppm	C	1	1	4580863	0.505034
4	4	Cal 0.50 ppm	C	1	1	4652897	0.512953
5	4	Cal 0.50 ppm	C	1	1	4608064	0.508024
	0	Baseline	RB	1	1	367	0.001480
7	5	Cal 0.05 ppm	C	1	1	434773	0.049236
8	5	Cal 0.05 ppm	C	1	1	430158	0.048729
9	5	Cal 0.05 ppm	C	1	1	431407	0.048866
	0	Baseline	RB	1	1	2587	0.001724
1	6	Cal 0.01 ppm	C	1	1	81992	0.010453
2	6	Cal 0.01 ppm	C	1	1	80201	0.010257
3	6	Cal 0.01 ppm	C	1	1	83388	0.010607
	0	Baseline	RB	1	1	4257	0.001908
5	1	Blank	BLNK	1	1	-5017	0.000888
6	7	ICV 0.25 ppm	CCV	1	1	2281102	0.252211
7	1	Blank	BLNK	1	1	-5495	0.000836
	0	Baseline	RB	1	1	1610	0.001617
9	8	131030034-001 RS	U	26.6	1	-10428	0.007799
0	9	131030034-001MS	U	26.6	1	4474163	13.121881
1	10	131030034-001MSD	U	26.6	1	4514032	13.238467
2	11	131030034-LCS	U	1	1	4451327	0.490793
3	12	131030034-BL	U	1	1	-9475	0.000398
4	13	131113037-001	U	25.2	1	-13107	-0.000031
5	14	131112004-001	U	26.9	1	-15878	-0.008228
6	15	131112008-001 RW	U	1	1	-18794	-0.000626
7	16	131112008-001MS	U	1	1	3125892	0.345083
8	17	131112008-001MSD	U	1	1	3486792	0.384758
	0	Baseline	RB	1	1	2581	0.001723
0	1	Blank	BLNK	1	1	-12540	0.000061
1	4	CCV 0.5 ppm	CCV	1	1	4584808	0.505467
2	1	Blank	BLNK	1	1	-11130	0.000216
	0	Read Baseline	RB	1	1	2821	0.001750
4	18	131113061-001 S	U	31.2	1	2018	0.051840
5	19	131113061-001MS	U	31.2	1	4418416	15.199870
6	20	131113061-001MSD	U	31.2	1	4405366	15.155108
7	21	131113061-LCS	U	1	1	4432130	0.488683
8	22	131113061-BL	U	1	1	-4365	0.000960
9	23	131113061-002	U	31.3	1	4063	0.059041
0	24	131113061-003	U	29.2	1	3261	0.052506
1	25	131113061-004	U	29.8	1	-1440	0.038182
2	26	131107032-001	U	28.3	1	351001	1.132756
3	27	131115038-001 RW	U	100	1	857	0.153390
	0	Baseline	RB	1	1	1741	0.001631
5	1	Blank	BLNK	1	1	-5795	0.000803
6	4	CCV 0.5 ppm	CCV	1	1	4516450	0.497953
7	1	Blank	BLNK	1	1	-8287	0.000529
	0	Read Baseline	RB	1	1	2906	0.001759
9	28	131108025-001 WW	U	1	1	-2946	0.001116
0	29	131108025-001MS	U	1	1	4309850	0.475240
1	30	131108025-001MSD	U	1	1	4395466	0.484652
2	31	131108025-002	U	1	1	13070	0.002877
3	32	131108025-003	U	1	1	4141	0.001895
4	33	131108025-004	U	1	1	-957	0.001334
5	34	131107069-003	U	1	1	34835	0.005269
6	35	131107069-004	U	1	1	67639	0.008875

ak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
	36	131107069-005	U	1	1	33117	0.005080
	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
	1	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	U	1	1	-2636	0.001150
	40	131107069-002	U	1	1	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	131107066-006MSD	U	1.1	1	4393686	0.532902
	44	131107066-LCS	U	1.1	1	4819286	0.584369
	45	131107066-BL	U	1.1	1	-3057	0.001214
	46	R	U	1	1	3734	0.001850
	47	R	U	1	1	1624	0.001618
	0	Baseline	RB	1	1	1053	0.001555
	1	Blank	BLNK	1	1	-5131	0.000876
	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

ak	Cup	Flags
	2	
	0	
	0	
	0	BL
	2	
	2	
	2	
	0	BL
	3	
	3	
	3	
	0	BL
	4	
	4	
	4	
	0	BL
	5	
	5	
	5	
	0	BL
	6	
	6	OL
	6	
	0	BL
	1	
	7	
	1	
	0	BL
	8	
	9	
	10	
	11	
	12	
	13	LO
	14	LO
	15	LO
	16	
	17	
	0	BL
	1	
	4	
	1	
	0	BL
	18	

eak	Cup	Flags
5	19	
6	20	
7	21	
8	22	
9	23	
0	24	
1	25	
2	26	
3	27	
	0	BL
5	1	
6	4	
7	1	
	0	BL
9	28	
0	29	
1	30	
2	31	
3	32	
4	33	
5	34	
6	35	
7	36	
8	37	
	0	BL
0	1	
1	4	
2	1	
	0	BL
4	38	
5	39	
6	40	
7	41	
8	42	
9	43	
0	44	
1	45	
2	46	
3	47	
	0	BL
5	1	
6	4	
7	1	
	0	BL


Channel 1: Cyanide
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
-0.500
0
1000
2000
3000
4000
5000
6000
7000
Time (sec)


Cyanide: Calibration, Peak 5-65
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
-0.100
-0.200
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Conc

ile name: T:\DATA1\FLOW4\2013\EPA335.4\111813CM.RST
ate: November 18, 2013
perator: CRW

Name	Conc	Area
Cal 1.00 ppm	1.000000	9041663.000000
Cal 1.00 ppm	1.000000	9082788.000000
Cal 1.00 ppm	1.000000	9049468.000000
Cal 0.80 ppm	0.800000	7390174.000000
Cal 0.80 ppm	0.800000	7411172.500000
Cal 0.80 ppm	0.800000	7462133.500000
Cal 0.50 ppm	0.500000	4580863.000000
Cal 0.50 ppm	0.500000	4652897.000000
Cal 0.50 ppm	0.500000	4608064.500000
Cal 0.05 ppm	0.050000	434773.187500
Cal 0.05 ppm	0.050000	430157.875000
Cal 0.05 ppm	0.050000	431407.125000
Cal 0.01 ppm	0.010000	81992.390625
Cal 0.01 ppm	0.010000	80201.210938
Cal 0.01 ppm	0.010000	83387.726562

Calib Coef:
y=bx+a
a: (intercept) -1.3095e+04
b: 9.0963e+06

Corr Coef: 0.999823

Carryover: 0.31%

No Drift Peaks

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
1310 1060-001	10/16/13	H_2O/4			>200°F
1310 0709-001	10/17/13	H_2O/4			>200°F
1310 0910-001		Liquid/5			102°F
1310 1058-001		H_2O/4			>200°F
1310 1506-001					>200°F
1310 2303-001	11/03/13	H_2O/4			>200°F
-002					>200°F
-003					>200°F
-004					>200°F
1311 2907-001					>200°F
1311 0701-001	11/14/2013	H_2O/4			>200°F
1311 2003-002		Liquid/5			>200°F
1311 2008-001		H_2O/4			>200°F
1311 2001-001	12/03/2013	Liquid/5			123°F
-002					182°F
1311 2028-001	12/04/2013	Oil/3			>200°F
-002					>200°F
-003					>200°F
-004					>200°F
-005					>200°F
-006					>200°F
1311 26056-002		Water/4			>200°F
1311 26078-001					>200°F
1311 27038-001					>200°F
-002					>200°F

*** SAFETY GLASSES REQUIRED.**

pH - SM4500H+B / Alkalinity SM2320B

Equivalent EPA Methods 150.1 & 310.1

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)	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				

Sample	Temp (°C)	pH	pH 4 Cal	pH 10 Cal	Slope	pH 7 Buffer	Sample Vol. (mL)	Titrant vol to pH (mL) A 8.3	B 4.5	C 4.2	Alkalinity (mg/L) Total	Carbonate	Bi-carbonate	Hydroxide	%
130606246-001	14.7	7.08	4.00	10.07	102.9	7.09									
~~131112003-002~~		~~7.01~~	~~4.00~~	~~10.00~~	~~101.1~~	~~7.01~~									
131112003-002	20.1	5.82	4.00	10.00	101.1	7.01	25mL								
131112008-001	15.3	6.98													
131112003-001	15.2	8.71													
131112004-001	21.9	8.94					5g in 25mL								
131113037-001	21.1	8.89					5g in 25mL								

Page 16 of 20

Analysis Date: 6-10-13 11/13/2013

Analyst: AST

Title: Sulfide by SM 4500 S2F

Reagent	ID	Expires
Iodine 0.025N	R069-16	Daily
HCl 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)	Iodine 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*			
LFB	1000	400	0.16	**0.160**	*0.10*		200	80 %
LFBD	1000	450	0.18	**0.180**	*0.10*		200	90%
ICV (LLQ)	1000	250	0.10	**0.100**	*0.10*		100	100%
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%
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*			

- Calculated by hand AJT 11-20

Analyst Initials: AJT **Date:** 11-19-13 **Comments:** MS is PTSA

GR 11-20-13

Title: Sulfide by SM 4500 S2F

Reagent	ID	Expires
Iodine 0.025N	R069-16	Daily
HCl 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)	Iodine Amount (50 uL increments)	Conc. (mg/sample)	Conc. (mg/L)	PQL (mg/L)	Multiplier (soils)	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*			
131119032-001	50	600	0.24	**4.800**	*2.00*			
131115038-001	5	1300	0.52	**104.000**	*20.00*			

- Soils calculated by hand AST 11-20

Analyst Initials: AST **Date:** 11-19-13 **Comments:**

Title: Sulfide by SM 4500 S2F

Reagent	ID	Expires
Iodine 0.025N	R069-16	Daily
HCl 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

ICV standard #: M898-03

Sample	Sample Volume (mL)	Iodine Amount (50 uL increments)	Conc. (mg/sample)	Conc. (mg/L)	PQL (mg/L)	Multiplier (soils)	Spike Amt (uL)	%Rec
BLANK	1000mL	50	0.02	0.02	0.1			
LFB	|	400	0.16	~~0.01~~	|		200 uL	80 %
LFBD	|	450	0.18	0.18	|		⊥	90%
ICV (LLQ)	⊥	250	0.10	0.10	⊥		100 uL	100 %
13111200 4-1	50mL	50	~~450~~ 0.02	2.69	13.5	26.9		
4-1MS	⊥	450	0.18	24.2	⊥	⊥	200 uL	80 %
13 1113037-1	50mL	50	0.02	252 ~~10.08~~ 0.40 x 25.2	12.6 ~~[illegible]~~	25.2		
13111200 8-1	464.64	2700	1.08	2.32	0.45			
13111305 7-3	193.46	50	0.02	0.1034	0.516			
57-3MS	⊥	500	0.20 ~~0.18~~	1.034	⊥		200 uL	90%
13111604 4-1	478.02	50	0.02	0.04184 ~~0.04314~~	0.209			
13111604 5-1	463.66	50	0.02	0.04314	0.216 ~~0.215~~			
13111504 7 1	495.11	50	0.02	0.04039	.202			
13111503 8-1	1mL	150	0.06	~~0.40~~ 60	100			
13111506 1-1	25mL	400	0.16	6.4	4.0			

Analyst Initials: AJT **Date:** 11.19.13 **Comments:** MS is PTSA

N:\Bench Sheets\Sulfide SM4500-S2F.xls

Title: Sulfide by SM 4500 S2F

Reagent	ID	Expires
Iodine 0.025N	R069-16	Daily
HCl 6N	R066-09	Daily
Starch Indicater 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)	Iodine Amount (50 uL increments)	Conc. (mg/sample)	Conc. (mg/L)	PQL (mg/L)	Multiplier (soils)	Spike Amt (uL)	%Rec
1311150S2-1	25mL	750	0.30	12	4.0			
1311150S3-1	500.2	3800	0.88	1.759	0.199			
1311190S9-1	263.18 ~~249.74~~	50	0.02	0.07599	0.379			
9-2	243.68	50	0.02	0.08207	0.410			
9-3	266.01	50	0.02	0.07519	0.375			
9-4	249.74	50	0.02	0.08008	0.400			
1311190I0-1	50mL	50	0.02					
1311190S2-1	50mL	600	0.24					
1311150S6-1	5mL	1300	0.52	104	20			

Analyst Initials: AST **Date:** 11-19-13 **Comments:**

N:\Bench Sheets\Sulfide SM4500-S2F.xls

Pass

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1311335**

06-Dec-13

Client: Western Refining Southwest, Inc.

Project: Injection Well 11-7-13

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R14683**	RunNo: **14683**
Prep Date:	Analysis Date: **11/8/2013**	SeqNo: **422656** 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 **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R14683**	RunNo: **14683**
Prep Date:	Analysis Date: **11/8/2013**	SeqNo: **422710** 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								

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

QC SUMMARY REPORT

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
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 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

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-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		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

QC SUMMARY REPORT

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**	SeqNo: **427181** 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	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								
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

QC SUMMARY REPORT

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**	SeqNo: **427181** 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	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

QC SUMMARY REPORT

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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **10290**	RunNo: **14747**
Prep Date: **11/12/2013**	Analysis Date: **11/12/2013**	SeqNo: **424481** 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

QC SUMMARY REPORT

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: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R14690**	RunNo: **14690**							
Prep Date:	Analysis Date: **11/8/2013**	SeqNo: **422856**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	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

QC SUMMARY REPORT

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**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **10275**	RunNo: **14748**
Prep Date: **11/11/2013**	Analysis Date: **11/12/2013**	SeqNo: **424374** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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 Number: 1311335 RcptNo: 1

Received by/date: MG 11/08/13
Logged By: Ashley Gallegos 11/8/2013 10:00:00 AM
Completed By: Ashley Gallegos 11/8/2013 2:15:08 PM
Reviewed By: mg 11/08/13

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

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 ☑
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
13. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
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 ☐

# of preserved bottles checked for pH: 1 2 (<2 or >12 unless noted)
Adjusted? NA
Checked by:

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:
Client Instructions:

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.0	Good	Yes			

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4135

email or Fax#:

QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name:
Injection Well 11-7-13

Project #:

Project Manager:

Sampler: Matt & Bob

On Ice: ☐ No

Sample Temperature: 1.0

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1311	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TDS	Back up	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F,Cl,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability	Reactivity, Corrosivity	Ec, pH, SO4, Alk, Cl	Sulfates	Air Bubbles (Y or N)
11-7-13	8:00	H2O	Inj. Well	5-VOA	HCl	001										X						
				1-liter	Amber												X					
				1-500ml	—					X								X				
				1-500ml	—															X		
				1-250ml	H2SO4						X											
				1-500ml	HNO3						-		X									
				1-500ml	NaOH													X				
				1-500ml	Zn Acetate															X		

Date:	Time:	Relinquished by:	Received by:	Date	Time
11-7-13	1510	Robert Krakow	Christine Walker	11/7/13	1510
11/8/13	645	Christine Walker	Michelle Gee	11/08/13	1000

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.

APPENDIX C

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

7/25/13
Date

Approved By:

Carolyn Swanson
Quality Assurance/Quality Control Officer

7/25/2013
Date

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Approved By:

7.25.13

John Caldwell Date
Semi-Volatiles Technical Director

Approved By:

7.25.13

Rene Aguilera Date
Volatiles Technical Director

Approved By:

7/25/13

Ian Cameron Date
Inorganics Technical Director

Approved By:

7/26/13

Chandler Hardison Date
Microbiology Technical Director

Table of Contents

This Page was intentionally left blank.

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 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 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.

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 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.

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 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(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).

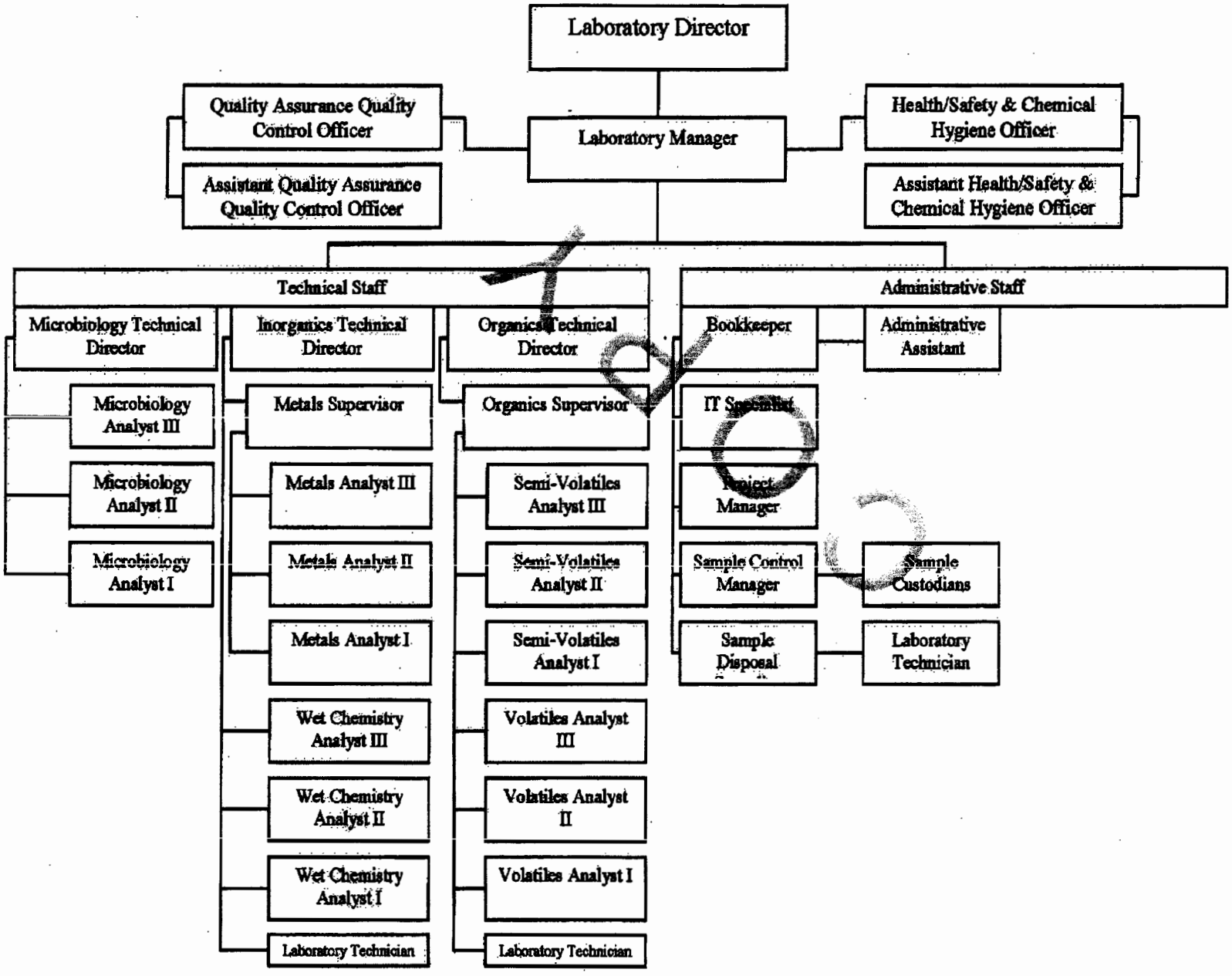
At least once per year an ADOCP must be completed. This is achieved by the acceptable performance of a blind sample (typically by using a PT sample, but can be a single blind (to the analyst) sample, by performing another IDOC, or by summarizing the data of four consecutive laboratory control samples 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.

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.


Laboratory Director
Quality Assurance Quality Control Officer
Assistant Quality Assurance Quality Control Officer
Laboratory Manager
Health/Safety & Chemical Hygiene Officer
Assistant Health/Safety & Chemical Hygiene Officer
Technical Staff
Administrative Staff
Microbiology Technical Director
Inorganics Technical Director
Organics Technical Director
Bookkeeper
Administrative Assistant
Microbiology Analyst III
Microbiology Analyst II
Microbiology Analyst I
Metals Supervisor
Metals Analyst III
Metals Analyst II
Metals Analyst I
Wet Chemistry Analyst III
Wet Chemistry Analyst II
Wet Chemistry Analyst I
Laboratory Technician
Organics Supervisor
Semi-Volatiles Analyst III
Semi-Volatiles Analyst II
Semi-Volatiles Analyst I
Volatiles Analyst III
Volatiles Analyst II
Volatiles Analyst I
Laboratory Technician
IT Specialist
Project Manager
Sample Control Manager
Sample Disposal
Sample Custodians
Laboratory Technician

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 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"
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"
1664A	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"
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"
8015D	NPW	"Nonhalogenated Volatile Organics by Gas Chromatography"
	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"
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 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 1MΩ 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 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.
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 re-extraction 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.

$$RPD = \frac{2 \times (\text{Sample Result} - \text{Duplicate Result})}{(\text{Sample Result} + \text{Duplicate Result})} \times 100$$

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

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.

$$\text{Average} = (\Sigma x_i) / n$$

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^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.

$$\text{Standard deviation} = s = [\Sigma (x_i - \text{average})^2 / (n - 1)]^{1/2}$$

Percent Recovery (LCS and LCSD)

$$\text{Percent Recovery} = \frac{\text{(Spike Sample Result)}}{\text{(Spike Added)}} \times 100$$

Percent Recovery (MS, MSD)

$$\text{Percent Recovery} = \frac{\text{(Spike Sample Result – Sample Result)}}{\text{(Spike Added)}} \times 100$$

Control Limits

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

$$\text{Upper Control Limit} = x + 3s$$
$$\text{Lower Control Limit} = x - 3s$$

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:

$$\text{RPD} = \frac{2 \times \text{(Sample Result – Duplicate Result)}}{\text{(Sample Result + Duplicate Result)}} \times 100$$

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:

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

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 x s) is ±0.0652.

Total Nitrogen

Total nitrogen is calculated as follows:

Total Nitrogen = TKN + NO_2 + NO_3

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(°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

$RSD = s / RF_{AVE}$

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
Σ = the sum of all the individual values

2. Linear Regression

$y=mx+b$

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)

$CC (r) =\{ \Sigma((x_i-x_{ave})*(y_i-y_{ave})) \} / \{ SQRT((\Sigma(x_i-x_{ave})^2)*(\Sigma(y_i-y_{ave})^2)) \}$

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
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

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

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*(Cx/Cis)^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
$w = S^{-2} / (\Sigma S^{-2}/n)$
$S_{(xx)} = (\Sigma x^2w) - [(\Sigma xw)^2 / n]$
$S_{(xy)} = (\Sigma xyw) - [(\Sigma xw)*(\Sigma yw) / n]$
$S_{(xx2)} = (\Sigma x^3w) - [(\Sigma xw)*(\Sigma x^2w) / n]$
$S_{(x2y)} = (\Sigma x^2yw) - [(\Sigma x^2w)*(\Sigma yw) / n]$
$S_{(x2x2)} = (\Sigma x^4w) - [(\Sigma x^2w)^2 / n]$
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]

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

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 A_{is} and C_{is} 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)

$$\text{Concentration for Extracted Samples} = \frac{(\text{On-Column Conc})(\text{Dilution})(\text{Final Volume})}{(\text{Initial Amount})(\text{Injection Volume})}$$

$$\text{Concentration for Purged Samples} = \frac{(\text{On-Column Conc})(\text{Purged Amount})(\text{Dilution})}{(\text{Purged Amount})}$$

Dry Weight Concentration

$$\text{Dry Weight Concentration} = \frac{\text{Final Concentration Wet Weight} * 100}{\%\ \text{Solids}}$$

Percent Difference

$$\%\ \text{Difference} = \frac{\text{Absolute(Continuing Calibration RRF - Average RRF)}}{\text{Average RRF}} * 100$$

Percent Drift

$$\%\ \text{Drift} = \frac{\text{Absolute(Calculated Concentration - Theoretical Concentration)}}{\text{Theoretical Concentration}} * 100$$

Dilution Factor

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

Relative Retention Time

RRT =RT of Compound / RT of ISTD

Breakdown Percent

$$\text{Breakdown} = \frac{\text{Area of DDD + Area of DDE}}{\text{Average (DDT, DDE and DDD)}}$$

-or-

$$\frac{\text{Area of Endrin Ketone + Area of Endrin Aldehyde}}{\text{Average (Endrin, Endrin Ketone, Endrin Aldehyde)}}$$

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 un-necessary 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.

14.0 References (Analytical Protocols Utilized at HEAL)

1. Analytical Chemistry of PCB's. Erickson, Mitchell D., CRC Press, Inc. 1992.

2. Diagnosis & Improvement of Saline & Alkali Soils, Agriculture Handbook No. 60, USDA, 1954

3. Environmental Perspective on the Emerging Oil Shale Industry, EPA Oil & Shale Research Group.

4. Field and Laboratory Methods Applicable to Overburdens and Mine Soils, USEPA, EPA-600/2-78-054, March 1978

5. Handbook of Chemistry and Physics, 62nd Edition, CRC Press, Inc. 1981-1982.

6. Handbook on Reference Methods for Soil Testing, The Council on Soil Testing & Plant Analysis, 1980 and 1992

7. Laboratory Procedures for Analyses of Oilfield Waste. Department of Natural Resources, Office of Conservation, Injection and Mining Division, Louisiana, August 1988

8. Langelier index calculation. http://www.corrosion-doctors.org/NaturalWaters/Langelier.htm.

9. Manual for the Certification of Laboratories Analyzing Drinking Water, Criteria and procedures Quality Assurance Fifth Edition, U.S. Environmental Protection Agency, January 2005.

10. Manual of Operating Procedures for the Analysis of Selected Soil, Water, Plant Tissue and Wastes Chemical and physical Parameter. Soil, Water, and Plant Analysis Laboratory, Dept. of Soil and Water Science, The University of Arizona, August 1989

11. The Merck Index, Eleventh Edition, Merck & Co., Inc. 1989.

12. Methods for Chemical Analysis of Water and Wastes, USEPA, EPA-600/4-79-020, March 1979 and as amended December, 1982 (EPA-600/4-82-055)

13. Methods for the Determination of Metals in Environmental Samples, USEPA, EPA-600/4-91-010, June 1991

14. Methods of Soil Analysis: Parts 1 & 2, 2nd Edition, Agronomy Society of America, Monograph 9

15. Polycyclic Aromatic Hydrocarbons in Water Systems, CRC Press, Inc.

16. Procedures for Collecting Soil Samples and Methods of Analysis for Soil Survey. USDA Soil Conservation Service, SSIR No. 1

17. Quality Systems for Analytical Services, Revision 2.2, U.S. Department of Energy, October 2006.

18. Sampling Procedures and Chemical Methods in Use at the U.S. Salinity Laboratory for Characterizing Salt-Affected Soils and Water. USDA Salinity Laboratory.

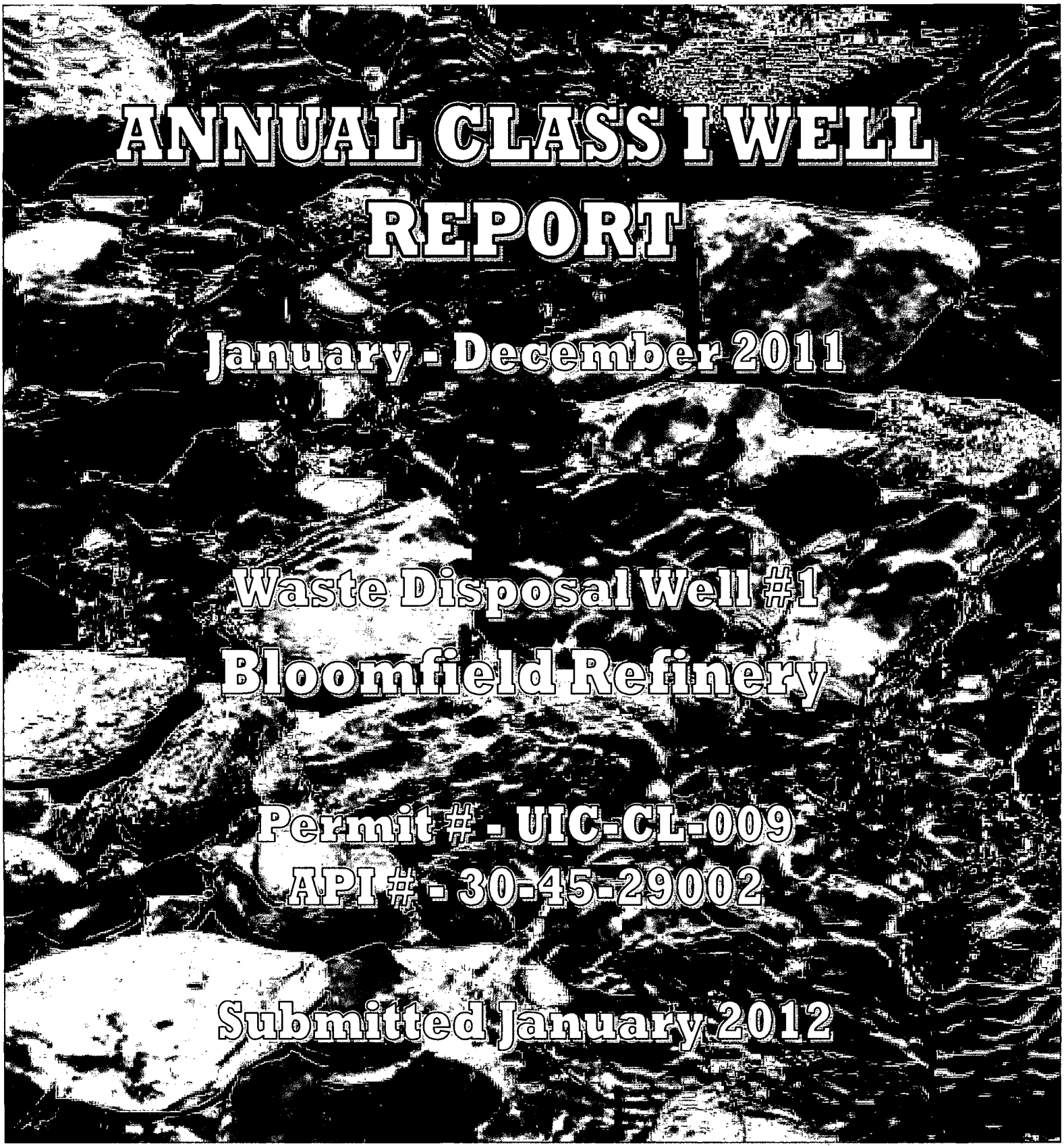
19. Soil Survey Laboratory Methods Manual. Soil Survey Laboratory Staff. Soil Survey Investigations Report No. 42, version 2.0, August 1992.

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

21. Standard Methods for the Examination of Water and Wastewater: AOHA, AWWA, and WPCG; 20th Edition, 1999.

22. Technical Notes on Drinking Water Methods, U.S. Environmental Protection Agency, October 1994.

23. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, USEPA SW-846, 3rd Edition, Updates I, II, IIA, IIB, III, December, 1996.



Western Refining Southwest, Inc.

Western Refining™

Western Refining

WNR LISTED NYSE

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) 632-4171.

Sincerely,

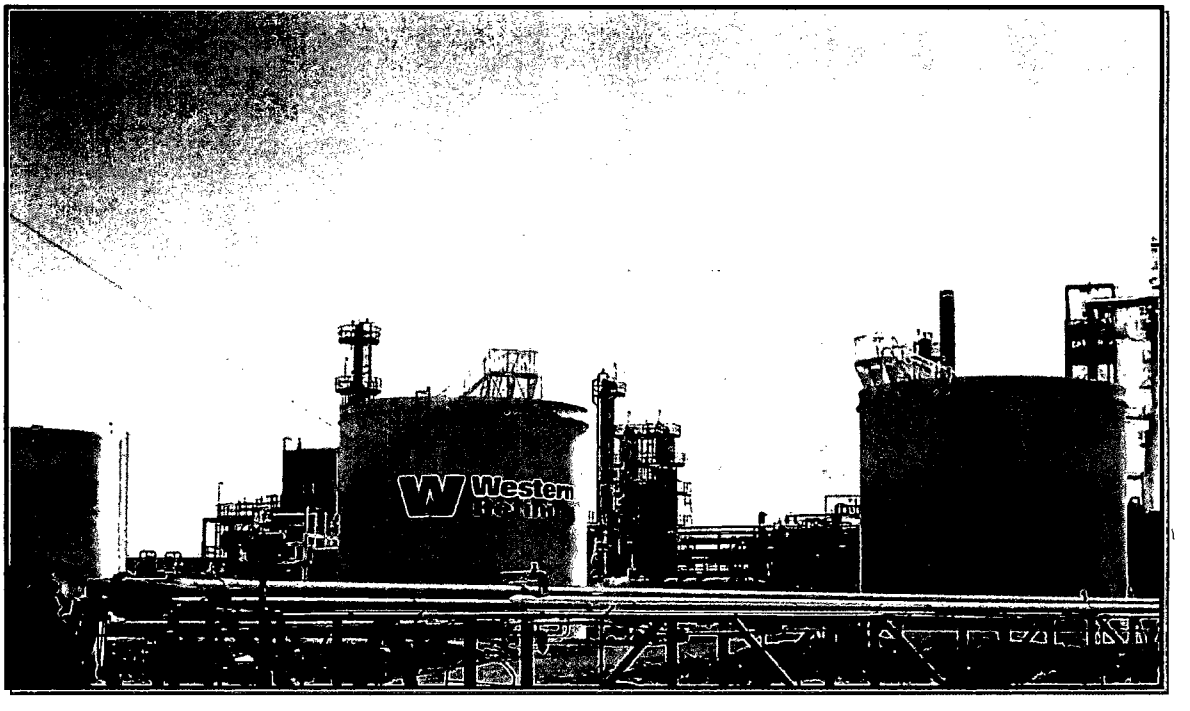
James R. Schmaltz
Health, Safety, Environmental, and Regulatory Director
Western Refining Southwest, Inc. - Bloomfield Refinery

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

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

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.

1.0 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.

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 2011 on WDW #1 located at the Bloomfield Refinery:

- 01/19/11 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
- 10/19/11 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.

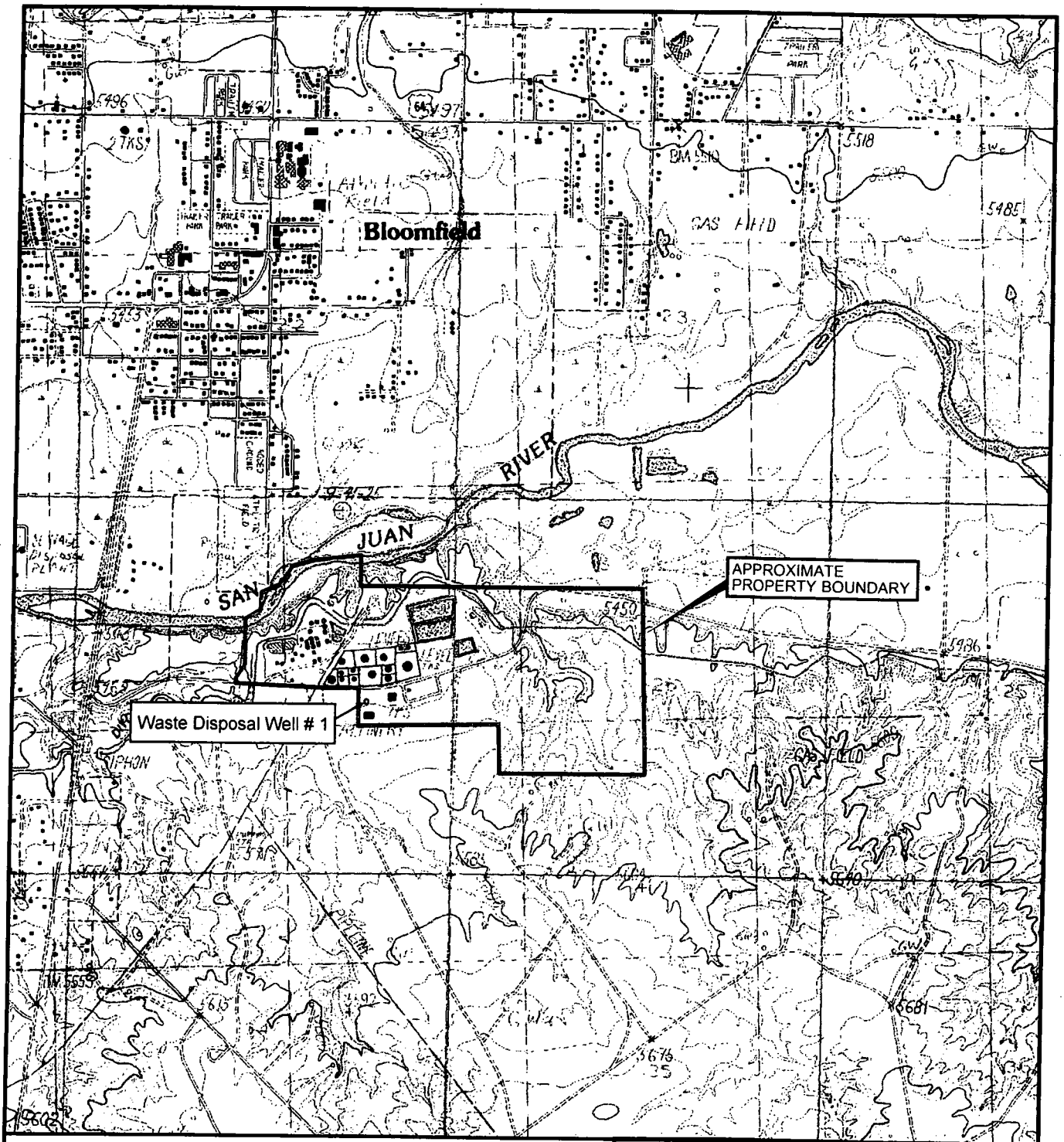
8.0 REFERENCES

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



Map Source: USGS 7.5 Min. Quad Sheet BLOOMFIELD, NM., 1985.

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 01/06/10 | FILE: WestRef-A25

FIGURE 1
SITE LOCATION MAP
BLOOMFIELD REFINERY

N

0 2000
SCALE IN FEET

QUADRANGLE LOCATION

WESTERN REFINING DISPOSAL WELL #1

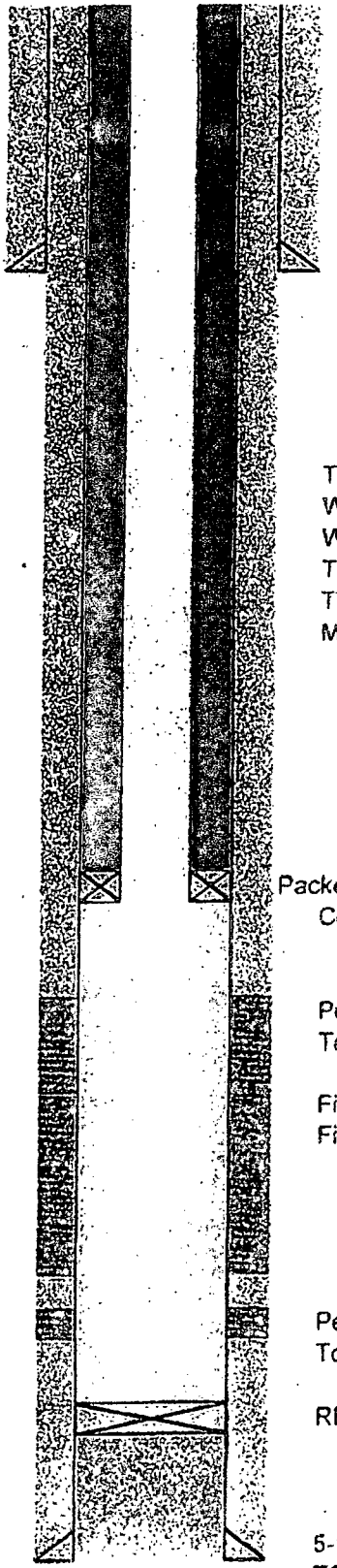
SW SECTION 26, T29N, R11W

NO.: 30-045-29002

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

FIGURE 2
DISPOSAL WELL #1 WELL SCHEMATIC
Western Refining Inc.
Bloomfield, NM

Date:	4/26/2006	Approved By:	rls	Job No.:	70F5830
Drawn By:	rls	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'

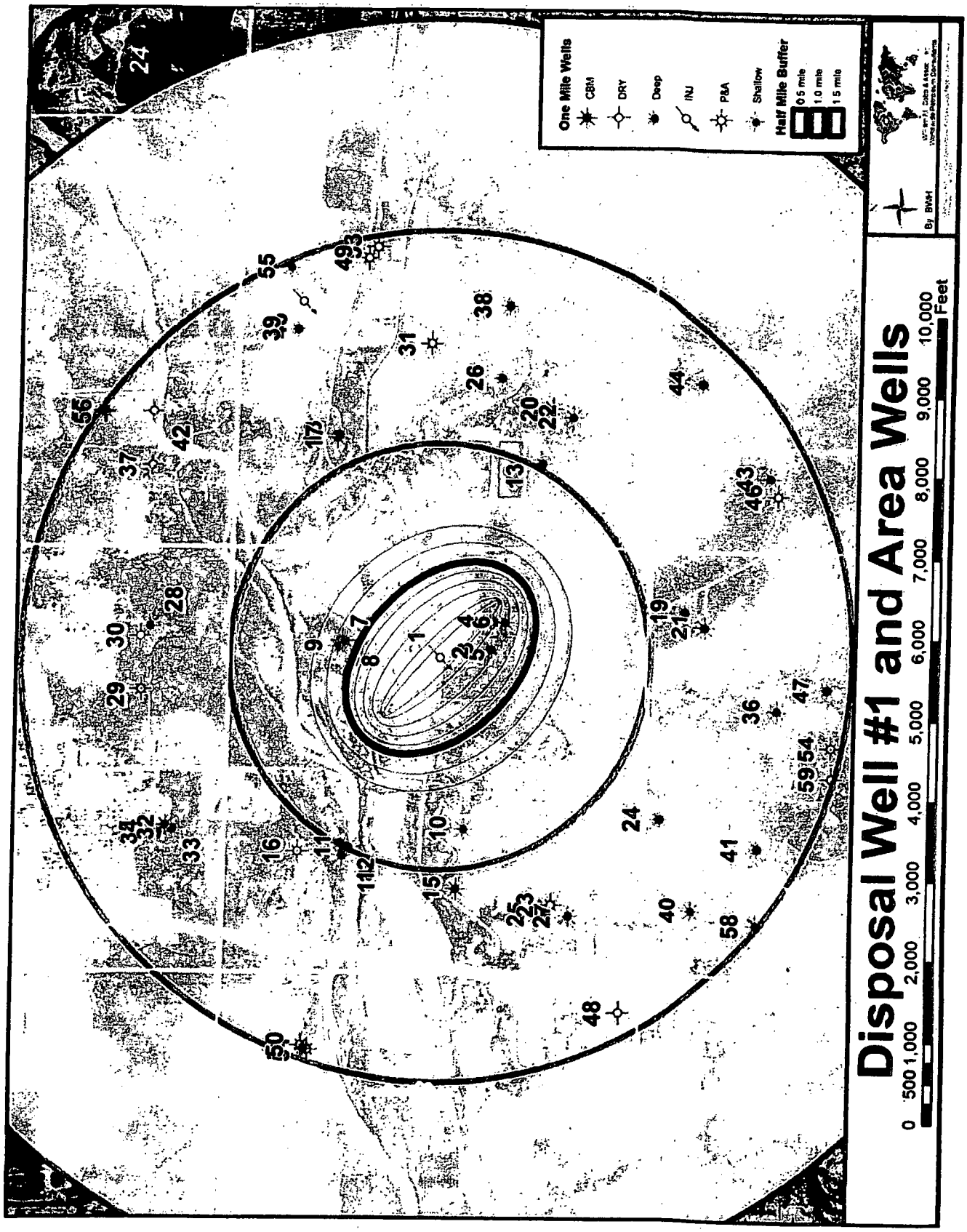
Fill was cleaned out of well on 4/20/06
Fill was orginally tagged at 3325'

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


Disposal Well #1 and Area Wells
One Mile Wells
CBM
DRY
Deep
INJ
P&A
Shallow
Half Mile Buffer
0.5 mile
1.0 mile
1.5 mile
0 500 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000
Feet
By: BWM

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

PERIOD 2011	AMOUNT OF WATER FROM RIVER (GALLONS)	AMOUNT TO SOLAR EVAP PONDS (GALLONS)	TOTALIZER AMOUNT INJECTED (GALLONS)	DOWN-TIME (HRS)	INJECTION PRESSURE			ANNULAR PRESSURE			ON-LINE FLOW RATES		
					MAX (PSIA)	MIN (PSIA)	AVG (PSIA)	MAX (PSIA)	MIN (PSIA)	AVG (PSIA)	MAX (GPM)	MIN (GPM)	AVG (GPM)
JAN	3,038,000	0	1,344,152	0	1055	889	943	179	142	164	47	18	30
FEB	482,000	0	1,236,937	0	1078	891	937	188	155	170	51	18	30.2
MAR	1,578,000	0	1,127,624	8	1118	889.0	992.7	202	116	152	45.0	18	25
APR	1,845,000	0	1,420,829	0	1109	892	966	190	145	163	54	18	32
MAY	2,250,000	0	1,658,138	0	1120	926	1044	209	150	180	47	25	38
JUN	1,351,000	2,448,862	1,056,598	217.5	1115	917	1042	210	163	166	47	22	34
JUL	2,684,000	3,052,200	1,823,541	0	1111	976	1045	236	117	165	49	30	40
AUG	1,991,000	1,745,829	1,569,856	45.75	1120	935	1048	153	101	125	53	22	38
SEP	1,478,000	2,823,969	2,823,969	13	1113	1012	1074	140	114	120	51	37	45
OCT	789,000	1,607,062	1,828,580	319	1062	910	1006	143	114	119.5	97	35	66.5
NOV	2,011,000	84,960	3,260,845	50	1057	931	1019	200	117	133.5	97	52	80.9
DEC	779,000	803,606	1,260,585	445	1037	935	1014	200	62	152.9	83	43	76.4

The total amount injected in 2011 is 20,411,654 gallons.

CERTIFICATION: DATE:

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	P&A Date	ULSTR	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	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	CBM	No
7	0.23	JACQUE	2	30-045-34409	1483	1689	1689		H-27-29N-11W	HOLCOMB O&G	FRUITLAND COAL	CBM	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

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total 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	CBM	No
34	0.79	COOK	1	30-045-07940	6052	6226	6226		N-22-29N-11W	MANANA GAS INC	DAKOTA	Deep	Yes
35	0.79	COOK	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

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	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	CBM	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			Frtlnd		-34-29N-11W	Pre-Ongard	FRUITLAND SAND	DRY	No

Status	Total Wells	Pen Inj. Zone	
		Yes	No
P&A	15	3	12
Dry	4	0	4
INJ	2	2	0
CBM	7	2	5
Shallow	17	3	14
Deep	14	14	0
Total	59	24	35

APPENDIX A

Robinson, Kelly

From: Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]
Sent: Friday, September 09, 2011 5:07 PM
To: Robinson, Kelly
Cc: Kuehling, Monica, EMNRD; Roberts, Kelly G, EMNRD; Schmaltz, Randy
Subject: 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.
#11 County Road 4990
Bloomfield, NM87413

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

Robinson, Kelly

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/
"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: 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

Robinson, Kelly

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/
"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 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 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

Robinson, Kelly

From: Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]
Sent: Thursday, July 21, 2011 12:31 PM
To: Robinson, Kelly
Cc: Varela, Monica G., EMNRD
Subject: 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
"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: 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
Environmental Supervisor

Western Refining Southwest, Inc.
111 County Road 4990

Bloomfield, NM87413

office: (505) 632-4166
cell: (505) 801-5616
fax: (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: 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: 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,

Robinson, Kelly

From: Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]
Sent: 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/
"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 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.

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 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 scheduled to commence on Monday, September 19th. With this said, it is anticipated that the memory gauges would be

Robinson, Kelly

From: Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]
Sent: Thursday, September 22, 2011 2:47 PM
To: Robinson, Kelly
Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Schmaltz, Randy
Subject: RE: UICI-009 Revised Notification_Bloomfield Refinery Injection Well Stimulation Activities
Attachments: 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/
"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: 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.
#1 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
District I – (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II – (575) 748-1283
811 S. First St., Artesia, NM 88210
District III – (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV – (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised August 1, 2011

WELL API NO.
30-045-29002-00

5. Indicate Type of Lease
STATE ☐ FEE ☒

6. State Oil & Gas Lease No.
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.)

7. Lease Name or Unit Agreement Name
Disposal

1. Type of Well: Oil Well ☐ Gas Well ☒ Other – (Disposal Well)

8. Well Number: #001

2. Name of Operator San Juan Refining Co. / Western Refining Southwest, Inc. – Bloomfield Refinery

9. OGRID Number: 037218

3. Address of Operator
50 Road 4990, Bloomfield, NM, 87413

10. Pool name or Wildcat:
Blanco/Mesa Verde

4. Well Location
Unit Letter I : 2442 feet from the south line and 1250 feet from the east line
Section 27 Township 29 Range 11 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: Well Stimulation / Acidize Well	☒			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 Refinery requests permission to perform well stimulation/acidization procedures on the Class I Injection Well referenced above. 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 above is true and complete to the best of my knowledge and belief.

SIGNATURE Kelly Robinson TITLE Environmental Supervisor DATE 9/21/2011

Type or print name Kelly Robinson E-mail address: kelly.robinson@wnr.com PHONE: 505-632-4166

For State Use Only

APPROVED BY: TITLE Environmental Engineer DATE 9/22/2011
Conditions of Approval (if any):

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 1-¼-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.
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
Coil Tubing: Basic Energy Services

WESTERN REFINING DISPOSAL WELL #1

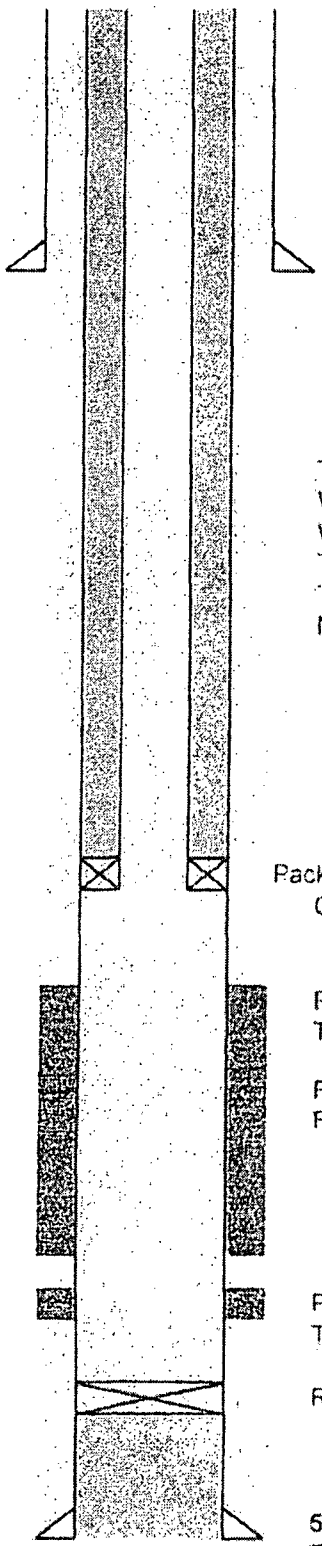
NW, SW SECTION 26, T29N, R11W

NO.: 30-045-29002

SUBSURFACE — HOUSTON, TX; SOUTH BEND, IN; BATON ROUGE, LA

FIGURE 1
DISPOSAL WELL #1 WELL SCHEMATIC
Western Refining Inc.
Bloomfield, NM

Date:	4/26/2006	Approved By:	rls	Job No.:	70FS830
Drawn By:	rls	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"

Robinson, Kelly

From: Robinson, Kelly
Sent: 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.

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

Robinson, Kelly

From: Robinson, Kelly
Sent: Thursday, October 06, 2011 10:17 AM
To: 'Powell, Brandon, EMNRD'; Kuehling, Monica, EMNRD
Cc: '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

Robinson, Kelly

From: Robinson, Kelly
Sent: Thursday, October 06, 2011 3:48 PM
To: 'Powell, Brandon, EMNRD'; Kuehling, Monica, EMNRD
Subject: 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
(f) 505-632-4024
(e) kelly.robinson@wnr.com

Robinson, Kelly

From: Chavez, Carl J, EMNRD [CarlJ.Chavez@state.nm.us]
Sent: 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/
"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: 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
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 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/
"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 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.

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 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 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

Robinson, Kelly

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/
"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, 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 1st 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 of Test 6-15-11 Operator Western API #30-0 _____

Property Name SWD Well No. 1 Location: Unit ___ Section 27 Township 29 Range 11

Well Status(Shut-In or Producing) Initial PSI: Tubing 90 Intermediate N/A Casing 200 Bradenhead 0

OPEN BRADENHEAD AND INTERMEDIATE TO ATMOSPHERE INDIVIDUALLY FOR 15 MINUTES EACH

PRESSURE

Testing	Bradenhead			INTERM	
	BH	Int	Csg	Int	Csg
TIME					
5 min					
10 min					
15 min					
20 min					
25 min					
30 min					

FLOW CHARACTERISTICS

	BRADENHEAD	INTERMEDIATE
Steady Flow		
Surges		
Down to Nothing		
Nothing	✓	
Gas		
Gas & Water		
Water		

If bradenhead flowed water, check all of the descriptions that apply below:

CLEAR_____ FRESH_____ SALTY_____ SULFUR_____ BLACK_____

5 MINUTE SHUT-IN PRESSURE BRADENHEAD 0 INTERMEDIATE N/A

REMARKS: Nothing When opened.

By Kelly Roberson

Witness Monica Kuehling

Environmental Supervisor
(Position)

E-mail address _____

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 Name Swd Well # 1 Location: Unit ___ Sec 21 Twn 29 Rge 11

Land Type:
State _____
Federal _____
Private _____
Indian _____

Well Type:
Water Injection ___
Salt Water Disposal ✓
Gas Injection _____
Producing Oil/Gas _____
Pressure obervation _____

Temporarily Abandoned Well (Y/N): _____ TA Expires: _____

Casing Pres. 0 Tbg. SI Pres. _____ Max. Inj. Pres. _____
Radenhead Pres. 0 Tbg. Inj. Pres. _____
Tubing Pres. 950
Int. Casing Pres. N/A

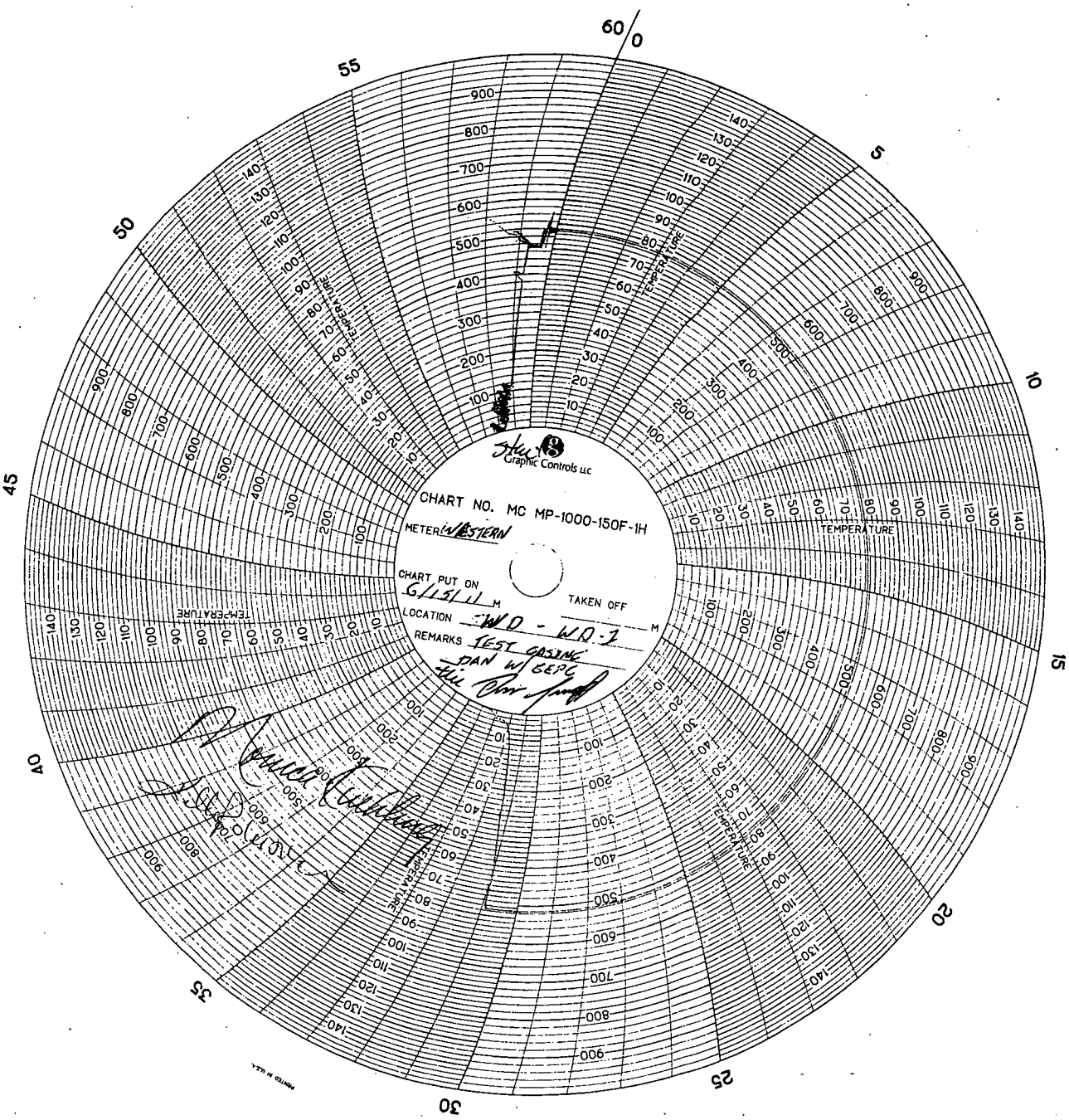
Pressured annulus up to 515 psi. for 30 mins. Test passed/failed

REMARKS:
Packer Set. 3221
Top Perf 3276

By Kelly Roberts (Operator Representative) Witness Monica Kuehling (NMOCD)

Environmental Supervisor
(Position)

Revised 02-11-02


Graphic Controls LLC
CHART NO. MC MP-1000-150F-1H
METER WESTERN
CHART PUT ON 6/15/11 M
TAKEN OFF M
LOCATION WD - WQ-1
REMARKS TEST GASLINE
PAN W/ GEPE
TEMPERATURE
PRINTED IN U.S.A.

Submit 1 Copy To Appropriate District Office
District I – (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II – (575) 748-1283
811 S. First St., Artesia, NM 88210
District III – (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV – (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised August 1, 2011

WELL API NO.
30-045-29002-00

5. Indicate Type of Lease
STATE ☐ FEE ☒

6. State Oil & Gas Lease No.
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.)

7. Lease Name or Unit Agreement Name
Disposal

1. Type of Well: Oil Well ☐ Gas Well ☒ Other – (Disposal Well)

8. Well Number: #001

2. Name of Operator San Juan Refining Co. / Western Refining Southwest, Inc. – Bloomfield Refinery

9. OGRID Number: 037218

3. Address of Operator
50 Road 4990, Bloomfield, NM, 87413

10. Pool name or Wildcat:
Blanco/Mesa Verde

4. Well Location
Unit Letter I : 2442 feet from the south line and 1250 feet from the east line
Section 27 Township 29 Range 11 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: Well Stimulation / Acidize Well ☒		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 Refinery requests permission to perform well stimulation/acidization procedures on the Class I Injection Well referenced above. 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 above is true and complete to the best of my knowledge and belief.

SIGNATURE *Kelly Robinson* TITLE Environmental Supervisor DATE 9/9/2011

Type or print name Kelly Robinson E-mail address: kelly.robinson@wnr.com PHONE: 505-632-4166

For State Use Only

APPROVED BY: *[signature]* TITLE *Environmental Engineer* DATE *9/9/2011*
Conditions of Approval (if any):

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 Sanjel coil tubing unit & Halliburton to well head and conduct press test on pumps and lines.
2. RIH with 1-¼-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.
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
Coil Tubing: Sanjel

WESTERN REFINING DISPOSAL WELL #1

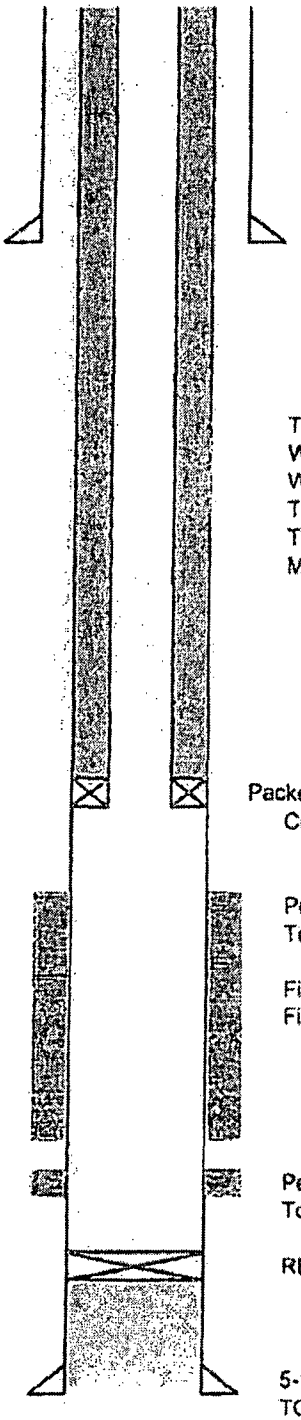
NW, SW SECTION 26, T29N, R11W

NO.: 30-045-29002

SUBSURFACE — HOUSTON, TX; SOUTH BEND, IN; BATON ROUGE, LA

FIGURE 1
DISPOSAL WELL #1 WELL SCHEMATIC
Western Refining Inc.
Bloomfield, NM

Date:	4/25/2006	Approved By:	rls	Job No.:	705833
Drawn By:	rls	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"

Submit 1 Copy To Appropriate District Office
District I - (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II - (575) 748-1283
811 S. First St., Artesia, NM 88210
District III - (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV - (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised August 1, 2011

WELL API NO. 30-045-29002-00	
5. Indicate Type of Lease STATE ☐ FEE ☒	
6. State Oil & Gas Lease No. 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.)	7. Lease Name or Unit Agreement Name Disposal
1. Type of Well: Oil Well ☐ Gas Well ☒ Other – (Disposal Well)	8. Well Number: #001
2. Name of Operator San Juan Refining Co. / Western Refining Southwest, Inc. – Bloomfield Refinery	9. OGRID Number: 037218
3. Address of Operator # 50 Road 4990, Bloomfield, NM, 87413	10. Pool name or Wildcat: Blanco/Mesa Verde
4. Well Location Unit Letter I : 2442 feet from the south line and 1250 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 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: Annual Fall-Off Test ☒		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 Refinery requests permission to perform the annual Fall-Off Test on the Class I injection well referenced above. The injection build-up period will begin following the Acid Stimulation work, which is schedule to being on Monday, September 29th. Following a minimum of 24 hours of stable injection down-hole, the bottom hole pressure memory gauges will be lowered into the well (two memory gauges) and allowed to stabilize. Pending OCD approval, Western anticipates installing the memory gauges on Friday, September 23, 2011. The gauges will be allowed to stabilize and the well will be shut-in on Monday, September 26th. The well will be shut in for a minimum of 72 hours.

A more detailed outline of the proposed procedure is attached.

Spud Date: | Rig Release Date:

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Kelly Robinson TITLE Environmental Supervisor DATE 9/16/2011

Type or print name Kelly Robinson E-mail address: kelly.robinson@wnr.com PHONE: 505-632-4166

For State Use Only

APPROVED BY: Carl J. Chavez TITLE Environmental Engineer DATE 9/16/2011

Conditions of Approval (if any):

1) Test to be run after scale removal & well acid stimulation.
2) Test to be consistent w/ attached 8/20/2010 E-mail msg. to operator & approved Fall-off Test Plan.

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 Discharge Permit #	Well Classification	API Number
WDW #1	UIC-CL1-009 GW-130	Class I Non-Hazardous	30-045-29002

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.

Injection Zone Formation	Waste Disposal Well #1 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 blocked-in 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.
3. 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.
7. 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 out
Formation	Cliff House / Menefee

Injected Brine Waste Water Table 2

Chemical Date	Refinery Waste Water March 10, 1998	Refinery Waste Water 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 Date	Formation Water 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

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

Order No.: 1101665

Dear Cindy Hurtado:

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

Hall Environmental Analysis Laboratory, Inc.

Date: *03-Feb-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1101665	**Collection Date:**	1/19/2011 10:45:00 AM
Project:	Injection Well 1st QTR 2011	**Date Received:**	1/20/2011
Lab ID:	1101665-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SRM**
Chloride	390	25		mg/L	50	1/25/2011 9:16:25 PM
Sulfate	97	2.5		mg/L	5	1/22/2011 7:32:03 PM
EPA METHOD 7470: MERCURY						Analyst: **ELS**
Mercury	ND	0.00020		mg/L	1	1/27/2011 11:13:34 AM
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **RAGS**
Arsenic	ND	0.020		mg/L	1	1/26/2011 8:43:55 AM
Barium	0.29	0.020		mg/L	1	1/26/2011 8:43:55 AM
Cadmium	ND	0.0020		mg/L	1	1/26/2011 8:43:55 AM
Calcium	86	1.0		mg/L	1	1/26/2011 8:43:55 AM
Chromium	ND	0.0060		mg/L	1	1/26/2011 8:43:55 AM
Lead	ND	0.0050		mg/L	1	1/26/2011 8:43:55 AM
Magnesium	21	1.0		mg/L	1	1/26/2011 8:43:55 AM
Potassium	6.0	1.0		mg/L	1	1/26/2011 8:43:55 AM
Selenium	ND	0.050		mg/L	1	1/26/2011 8:43:55 AM
Silver	ND	0.0050		mg/L	1	1/26/2011 8:43:55 AM
Sodium	330	5.0		mg/L	5	1/26/2011 11:34:42 AM
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **MAW**
Acenaphthene	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Acenaphthylene	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Aniline	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Anthracene	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Azobenzene	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Benz(a)anthracene	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Benzo(a)pyrene	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Benzo(b)fluoranthene	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Benzo(g,h,i)perylene	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Benzo(k)fluoranthene	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Benzoic acid	39	20		µg/L	1	1/25/2011 5:19:39 PM
Benzyl alcohol	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Bis(2-chloroethyl)ether	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Bis(2-ethylhexyl)phthalate	13	10		µg/L	1	1/25/2011 5:19:39 PM
4-Bromophenyl phenyl ether	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Butyl benzyl phthalate	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Carbazole	ND	10		µg/L	1	1/25/2011 5:19:39 PM
4-Chloro-3-methylphenol	ND	10		µg/L	1	1/25/2011 5:19:39 PM
4-Chloroaniline	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

Hall Environmental Analysis Laboratory, Inc.

Date: *03-Feb-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1101665	**Collection Date:**	1/19/2011 10:45:00 AM
Project:	Injection Well 1st QTR 2011	**Date Received:**	1/20/2011
Lab ID:	1101665-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **MAW**
2-Chloronaphthalene	ND	10		µg/L	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-Methylphenol	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
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *03-Feb-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1101665	**Collection Date:**	1/19/2011 10:45:00 AM
Project:	Injection Well 1st QTR 2011	**Date Received:**	1/20/2011
Lab ID:	1101665-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **MAW**
Pentachlorophenol	ND	20		µg/L	1	1/25/2011 5:19:39 PM
Phenanthrene	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Phenol	19	10		µg/L	1	1/25/2011 5:19:39 PM
Pyrene	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Pyridine	ND	10		µg/L	1	1/25/2011 5:19:39 PM
1,2,4-Trichlorobenzene	ND	10		µg/L	1	1/25/2011 5:19:39 PM
2,4,5-Trichlorophenol	ND	10		µg/L	1	1/25/2011 5:19:39 PM
2,4,6-Trichlorophenol	ND	10		µg/L	1	1/25/2011 5:19:39 PM
Surr: 2,4,6-Tribromophenol	72.4	17.5-104		%REC	1	1/25/2011 5:19:39 PM
Surr: 2-Fluorobiphenyl	82.6	30.9-98.9		%REC	1	1/25/2011 5:19:39 PM
Surr: 2-Fluorophenol	45.3	12.4-90.1		%REC	1	1/25/2011 5:19:39 PM
Surr: 4-Terphenyl-d14	65.3	43.5-91.9		%REC	1	1/25/2011 5:19:39 PM
Surr: Nitrobenzene-d5	79.6	26.2-108		%REC	1	1/25/2011 5:19:39 PM
Surr: Phenol-d5	29.1	11.8-73.1		%REC	1	1/25/2011 5:19:39 PM
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
Benzene	ND	1.0		µg/L	1	1/22/2011 6:35:16 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 6:35:16 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-Chlorotoluene	ND	1.0		µg/L	1	1/22/2011 6:35:16 AM

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *03-Feb-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1101665	**Collection Date:**	1/19/2011 10:45:00 AM
Project:	Injection Well 1st QTR 2011	**Date Received:**	1/20/2011
Lab ID:	1101665-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**
cis-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-Dichloropropene	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		µg/L	1	1/22/2011 6:35:16 AM
n-Propylbenzene	ND	1.0		µg/L	1	1/22/2011 6:35:16 AM
sec-Butylbenzene	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-Trichlorobenzene	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 6:35:16 AM
Trichlorofluoromethane	ND	1.0		µg/L	1	1/22/2011 6:35:16 AM
1,2,3-Trichloropropane	ND	2.0		µg/L	1	1/22/2011 6:35:16 AM
Vinyl 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
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *03-Feb-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1101665	**Collection Date:**	1/19/2011 10:45:00 AM
Project:	Injection Well 1st QTR 2011	**Date Received:**	1/20/2011
Lab ID:	1101665-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						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**
pH	7.29	0.100		pH units	1	1/25/2011 12:40:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	1300	20.0		mg/L	1	1/26/2011 9:36:00 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

Hall Environmental Analysis Laboratory, Inc.

Date: *03-Feb-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	TRIP BLANK
Lab Order:	1101665	**Collection Date:**	
Project:	Injection Well 1st QTR 2011	**Date Received:**	1/20/2011
Lab ID:	1101665-02	**Matrix:**	TRIP BLANK

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: RAA
Benzene	ND	1.0		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		µg/L	1	1/22/2011 7:01:34 AM
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,2,4-Trimethylbenzene	ND	1.0		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		µg/L	1	1/22/2011 7:01:34 AM
Chlorobenzene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
Chloroethane	ND	2.0		µg/L	1	1/22/2011 7:01:34 AM
Chloroform	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
Chloromethane	ND	3.0		µg/L	1	1/22/2011 7:01:34 AM
2-Chlorotoluene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
4-Chlorotoluene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
cis-1,2-DCE	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	1/22/2011 7:01:34 AM
Dibromochloromethane	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
Dibromomethane	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,2-Dichlorobenzene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,3-Dichlorobenzene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,4-Dichlorobenzene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
Dichlorodifluoromethane	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,1-Dichloroethane	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,1-Dichloroethene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,2-Dichloropropane	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
1,3-Dichloropropane	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
2,2-Dichloropropane	ND	2.0		µg/L	1	1/22/2011 7:01:34 AM
1,1-Dichloropropene	ND	1.0		µg/L	1	1/22/2011 7:01:34 AM
Hexachlorobutadiene	ND	1.0		µg/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

Hall Environmental Analysis Laboratory, Inc.

Date: *03-Feb-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	TRIP BLANK
Lab Order:	1101665	**Collection Date:**	
Project:	Injection Well 1st QTR 2011	**Date Received:**	1/20/2011
Lab ID:	1101665-02	**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-Isopropyltoluene	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		µg/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/L	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-Trichloroethane	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
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

ESC
L·A·B S·C·I·E·N·C·E·S
YOUR LAB OF CHOICE

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

January 28, 2011

Date Received : January 22, 2011
Description : 1101665

Sample ID : INJECTION WELL

Collected By :
Collection Date : 01/19/11 10:45

ESC Sample # : L498524-01

Site ID :

Project # : 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.

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

Analyte	Result	Units	PQL	SPK Val	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions											
Sample ID: MB		*MBLK*				Batch ID:	R43288	Analysis Date:	1/22/2011 1:11:11 AM		
Chloride	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		*MBLK*				Batch ID:	R43288	Analysis Date:	1/22/2011 11:17:47 AM		
Chloride	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		*MBLK*				Batch ID:	R43352	Analysis Date:	1/25/2011 11:36:07 AM		
Sulfate	ND	mg/L	0.50								
Sample ID: MB		*MBLK*				Batch ID:	R43352	Analysis Date:	1/25/2011 11:19:57 PM		
Chloride	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: LCS		*LCS*				Batch ID:	R43288	Analysis Date:	1/22/2011 1:22:25 AM		
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 11:29:01 AM		
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*				Batch ID:	R43352	Analysis Date:	1/25/2011 11:47:22 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 11:31:11 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		
Alkalinity, 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*				Batch ID:	R43323	Analysis Date:	1/25/2011 11:23:00 AM		
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:	R43323	Analysis Date:	1/25/2011 11:28:00 AM		
Alkalinity, Total (As CaCO3)	80.08	mg/L Ca	20	80	0	100	96.5	104			
Sample ID: 1101665-01BMS		*MS*				Batch ID:	R43323	Analysis Date:	1/25/2011 1:19:00 PM		
Alkalinity, Total (As CaCO3)	353.8	mg/L Ca	20	80	285.5	85.3	32.8	119			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b4		*MBLK*				**Batch ID: R43304**		**Analysis Date: 1/21/2011 12:55:40 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	3.0								
2-Butanone	ND	µg/L	10								
[illegible]on disulfide	ND	µg/L	10								
[illegible]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-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	µg/L	10								
Isopropylbenzene	ND	µg/L	1.0								
[illegible]propyltoluene	ND	µg/L	1.0								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b4		*MBLK*									
				Batch ID: R43304		Analysis Date: 1/21/2011 12:55:40 PM					
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-Trichloropropane	ND	µg/L	2.0								
Vinyl chloride	ND	µg/L	1.0								
Xylenes, Total	ND	µg/L	1.5								
Sample ID: b9		*MBLK*									
				Batch ID: R43304		Analysis Date: 1/22/2011 12:03:48 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	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								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b9		*MBLK*									
				Batch ID:	**R43304**	**Analysis Date:**		1/22/2011 12:03:48 AM			
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-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								
[redacted]ichloropropene	ND	µg/L	1.0								
[redacted]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-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-Trichloropropane	ND	µg/L	2.0								
Vinyl chloride	ND	µg/L	1.0								
Xylenes, Total	ND	µg/L	1.5								
[redacted]le ID: b13		*MBLK*									
				Batch ID:	**R43304**	**Analysis Date:**		1/22/2011 10:56:32 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

Client: Western Refining Southwest, Inc.
Project: Injection Well 1st QTR 2011 **Work Order:** 1101665

Analyte	Result	Units	PQL	SPK Val	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b13		*MBLK*					Batch ID: R43304		Analysis Date: 1/22/2011 10:56:32 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	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-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:

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

Analyte	Result	Units	PQL	SPK Val	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b13		*MBLK*				Batch ID:	R43304	Analysis Date:	1/22/2011 10:56:32 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								
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								
[redacted]orofluoromethane	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 lcs		*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 lcs2		*LCS*				Batch ID:	R43304	Analysis Date:	1/22/2011 12:56:19 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			
Trichloroethene (TCE)	20.02	µg/L	1.0	20	0	100	78.3	102			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-25369		*MBLK*									
				Batch ID:	**25369**	**Analysis Date:**		1/25/2011 3:52:27 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	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	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								
Fluorene	ND	µg/L	10								
Hexachlorobenzene	ND	µg/L	10								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-25369		*MBLK*				**Batch ID: 25369**		**Analysis Date:**	1/25/2011 3:52:27 PM		
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	20								
Nitrobenzene	ND	µg/L	10								
2-Nitrophenol	ND	µg/L	10								
[illegible]rophenol	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-25369		*LCS*				**Batch ID: 25369**		**Analysis Date:**	1/25/2011 4:21:38 PM		
Acenaphthene	44.26	µg/L	10	100	0	44.3	31	99.4			
4-Chloro-3-methylphenol	84.46	µg/L	10	200	0	42.2	34.3	111			
2-Chlorophenol	76.22	µg/L	10	200	0	38.1	24.1	98.7			
1,4-Dichlorobenzene	36.10	µg/L	10	100	0	36.1	20.6	85.6			
2,4-Dinitrotoluene	37.96	µg/L	10	100	0	38.0	26.6	126			
N-Nitrosodi-n-propylamine	38.32	µg/L	10	100	0	38.3	29.2	94.4			
4-Nitrophenol	55.14	µg/L	10	200	0	27.6	9.87	86			
Pentachlorophenol	93.44	µg/L	20	200	0	46.7	20	97.8			
Phenol	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			
1,2,4-Trichlorobenzene	40.72	µg/L	10	100	0	40.7	25.2	92.3			
Sample ID: lcsd-25369		*LCSD*				**Batch ID: 25369**		**Analysis Date:**	1/25/2011 4:50:41 PM		
Acenaphthene	45.20	µg/L	10	100	0	45.2	31	99.4	2.10	30	
4-Chloro-3-methylphenol	87.78	µg/L	10	200	0	43.9	34.3	111	3.86	30.8	
2-Chlorophenol	92.46	µg/L	10	200	0	46.2	24.1	98.7	19.3	31	
[illegible]Dichlorobenzene	38.32	µg/L	10	100	0	38.3	20.6	85.6	5.97	37	
[illegible]Dinitrotoluene	44.00	µg/L	10	100	0	44.0	26.6	126	14.7	34.5	

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: lcsd-25369		*LCSD*				Batch ID:	25369	Analysis Date:		1/25/2011 4:50:41 PM	
N-Nitrosodi-n-propylamine	42.46	µg/L	10	100	0	42.5	29.2	94.4	10.3	30.8	
4-Nitrophenol	59.42	µg/L	10	200	0	29.7	9.87	86	7.47	61.1	
Pentachlorophenol	96.82	µg/L	20	200	0	48.4	20	97.8	3.55	64.8	
Phenol	58.76	µg/L	10	200	0	29.4	17.5	60.5	5.49	31.4	
Pyrene	59.08	µg/L	10	100	0	59.1	46.8	92.2	13.2	29.8	
1,2,4-Trichlorobenzene	39.92	µg/L	10	100	0	39.9	25.2	92.3	1.98	30.9	
Method: EPA Method 7470: Mercury											
Sample ID: MB-25427		*MBLK*				Batch ID:	25427	Analysis Date:		1/27/2011 10:48:28 AM	
Mercury	ND	mg/L	0.00020								
Sample ID: LCS-25427		*LCS*				Batch ID:	25427	Analysis Date:		1/27/2011 10:50:12 AM	
Mercury	0.005109	mg/L	0.00020	0.005	0	102	80	120			
Sample ID: LCS-25427		*LCS*				Batch ID:	25427	Analysis Date:		1/27/2011 10:51:57 AM	
Mercury	0.005114	mg/L	0.00020	0.005	0	102	80	120			
Method: EPA 6010B: Total Recoverable Metals											
Sample ID: MB-25356		*MBLK*				Batch ID:	25356	Analysis Date:		1/26/2011 8:38:10 AM	
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								
Sample ID: MB-25356		*MBLK*				Batch ID:	25356	Analysis Date:		1/26/2011 11:06:34 AM	
Sodium	ND	mg/L	1.0								
Sample ID: LCS-25356		*LCS*				Batch ID:	25356	Analysis Date:		1/26/2011 8:41:12 AM	
Arsenic	0.5694	mg/L	0.020	0.5	0	114	80	120			
Barium	0.4957	mg/L	0.020	0.5	0	99.1	80	120			
Cadmium	0.5312	mg/L	0.0020	0.5	0	106	80	120			
Calcium	53.20	mg/L	1.0	50	0	106	80	120			
Chromium	0.5292	mg/L	0.0060	0.5	0	106	80	120			
Lead	0.5321	mg/L	0.0050	0.5	0	106	80	120			
Magnesium	53.35	mg/L	1.0	50	0	107	80	120			
Potassium	55.66	mg/L	1.0	50	0	111	80	120			
Selenium	0.5858	mg/L	0.050	0.5	0	117	80	120			
Silver	0.5104	mg/L	0.0050	0.5	0	102	80	120			
Sample ID: LCS-25356		*LCS*				Batch ID:	25356	Analysis Date:		1/26/2011 11:09:57 AM	
Sodium	51.06	mg/L	1.0	50	0	102	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SM2540C MOD: Total Dissolved Solids											
Sample ID: MB-25352		*MBLK*				Batch ID:	**25352**	Analysis Date:	1/26/2011 9:36:00 AM		
Total Dissolved Solids	ND	mg/L	20.0								
Sample ID: LCS-25352		*LCS*				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			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name WESTERN REFINING SOUT

Date Received: 1/20/2011

Work Order Number 1101665

Received by: AMG

Checklist completed by: Signature 1/21/11 Date

Sample ID labels checked by: Initials

Matrix: Carrier name: UPS

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 ✔	
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		
Water - VOA vials have zero headspace? No VOA vials submitted		Yes ✔	No	
Water - Preservation labels on bottle and cap match?	Yes ✔	No	N/A	
Water - pH acceptable upon receipt?	Yes ✔	No	N/A	
Container/Temp Blank temperature?	1.1°	<6° C Acceptable If given sufficient time to cool.		

Number of preserved bottles checked for pH: (<2) >12 unless noted below

COMMENTS:

Client contacted Date contacted: Person contacted

Contacted by: Regarding:

Comments:

Corrective Action

Chain-of-Custody Record

Client: Western Refining

Mailing Address: 50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4161

email or Fax#: 505-632-3911

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other _____

☐ EDD (Type) _____

Turn-Around Time:
☒ Standard ☐ Rush _____

Project Name:
Injection Well 1st QTR 2011

Project #:

Project Manager:

Sampler: Bob

On Ice: ☒ Yes ☐ No

Sample Temperature: 1

HEAL No. 1101065

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	
~~1-19-11~~ 1-19-11	10:45	H_2O	Injection Well	3-VOA	HCl	-1
				1-liter	Amber	
				1-500ml	—	
				1-500ml	—	
				1-500ml	H_2SO_4	
				1-500ml	HNO_3	
				1-500ml	NaOH	
				1-500ml	Zn Acetate	
			Trip Blank MG 1/2/11			

Date	Time	Relinquished by:	Received by:	Date	Time
1-19-11	3:00	Robert Knakow			
				1/20/11	1025
Date:	Time:	Relinquished by:	Received by:	Date:	Time:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	[redacted] TDS	[redacted] BACK UP	8310 (PNA or PAH)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Ec, pH, SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
									X						
										X					
											X				
			X										X		
				X											
						X									
												X			
														X	
									X, MG 1/2/11						

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.

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

Order No.: 1104184

Dear Kelly Robinson:

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

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Hall Environmental Analysis Laboratory, Inc.

Date: *20-Apr-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1104184	**Collection Date:**	4/4/2011 12:45:00 PM
Project:	Injection Well 2nd QTR 4-11	**Date Received:**	4/5/2011
Lab ID:	1104184-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						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: SEMIVOLATILES						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
Aniline	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	1	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
Benzyl alcohol	ND	10		µg/L	1	4/14/2011 6:58:21 PM
Bis(2-chloroethoxy)methane	ND	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

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

Hall Environmental Analysis Laboratory, Inc.

Date: *20-Apr-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1104184	**Collection Date:**	4/4/2011 12:45:00 PM
Project:	Injection Well 2nd QTR 4-11	**Date Received:**	4/5/2011
Lab ID:	1104184-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: JDC
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
Hexachlorocyclopentadiene	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
4-Nitroaniline	ND	20		µg/L	1	4/14/2011 6:58:21 PM
Nitrobenzene	ND	10		µg/L	1	4/14/2011 6:58:21 PM
2-Nitrophenol	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

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *20-Apr-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1104184	**Collection Date:**	4/4/2011 12:45:00 PM
Project:	Injection Well 2nd QTR 4-11	**Date Received:**	4/5/2011
Lab ID:	1104184-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						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	5	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	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
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *20-Apr-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1104184	**Collection Date:**	4/4/2011 12:45:00 PM
Project:	Injection Well 2nd QTR 4-11	**Date Received:**	4/5/2011
Lab ID:	1104184-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **BDH**
cis-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	5	4/11/2011 5:31:08 PM
Dibromochloromethane	ND	5.0		µg/L	5	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		µg/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-Dichloroethene	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		µg/L	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	50		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-Isopropyltoluene	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/L	5	4/11/2011 5:31:08 PM
n-Butylbenzene	ND	5.0		µg/L	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
Vinyl 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		%REC	5	4/11/2011 5:31:08 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *20-Apr-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1104184	**Collection Date:**	4/4/2011 12:45:00 PM
Project:	Injection Well 2nd QTR 4-11	**Date Received:**	4/5/2011
Lab ID:	1104184-01	**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	5	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**
pH	7.16	0.100		pH units	1	4/6/2011 8:57:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	2090	40.0		mg/L	1	4/11/2011 2:00:00 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

Hall Environmental Analysis Laboratory, Inc.

Date: *20-Apr-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	TRIP BLANK
Lab Order:	1104184	**Collection Date:**	
Project:	Injection Well 2nd QTR 4-11	**Date Received:**	4/5/2011
Lab ID:	1104184-02	**Matrix:**	TRIP BLANK

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: BDH
Benzene	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM
Toluene	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM
Ethylbenzene	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM
Naphthalene	ND	2.0		µg/L	1	4/10/2011 4:19:47 AM
1-Methylnaphthalene	ND	4.0		µg/L	1	4/10/2011 4:19:47 AM
2-Methylnaphthalene	ND	4.0		µg/L	1	4/10/2011 4:19:47 AM
Acetone	ND	10		µg/L	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/L	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		µg/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/L	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
1,2-Dichlorobenzene	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM
1,3-Dichlorobenzene	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM
1,4-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
1,1-Dichloroethane	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM
1,1-Dichloroethene	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM
1,2-Dichloropropane	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM
1,3-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
Hexachlorobutadiene	ND	1.0		µg/L	1	4/10/2011 4:19:47 AM

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *20-Apr-11*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	TRIP BLANK
Lab Order:	1104184	**Collection Date:**	
Project:	Injection Well 2nd QTR 4-11	**Date Received:**	4/5/2011
Lab ID:	1104184-02	**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-Tetrachloroethane	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)	ND	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
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

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 #:**	110407046
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1104184
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	110407046-001	**Sampling Date**	4/4/2011	**Date/Time Received**	4/7/2011 12:30 PM
Client Sample ID	1104184-01E / INJECTION WELL	**Sampling Time**	12:45 PM	**Extraction Date**	
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	
pH	6.78	ph Units		4/14/2011	CRW	EPA 150.1	
Reactive sulfide	1.20	mg/kg	1	4/18/2011	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.

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions											
Sample ID: MB		*MBLK*				Batch ID:	R44698	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:	R44654	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:	R44698	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*				Batch ID:	R44654	Analysis Date:		4/9/2011 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											
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			

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b12		*MBLK*				**Batch ID: R44651**		**Analysis Date: 4/9/2011 11:24:39 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	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-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:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b12		*MBLK*				Batch ID: R44851		Analysis Date: 4/9/2011 11:24:39 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								
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: 5mL rb		*MBLK*				Batch ID: R44868		Analysis Date: 4/11/2011 8:22:37 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	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								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 5mL rb		*MBLK*				**Batch ID: R44668**		**Analysis Date: 4/11/2011 8:22:37 AM**			
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-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								
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-Trichloropropane	ND	µg/L	2.0								
Vinyl chloride	ND	µg/L	1.0								
Xylenes, Total	ND	µg/L	1.5								
Sample ID: b24		*MBLK*				**Batch ID: R44651**		**Analysis Date: 4/10/2011 11:35:56 AM**			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b24		*MBLK*				**Batch ID: R44651**		**Analysis Date: 4/10/2011 11:35:56 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	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-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:

- 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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b24		*MBLK*				Batch ID:	R44651	Analysis Date:	4/10/2011 11:35:56 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								
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: 100ng lcs-2		*LCS*				Batch ID:	R44651	Analysis Date:	4/9/2011 10:56:28 AM		
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			
Trichloroethene (TCE)	19.05	µg/L	1.0	20	0	95.3	78.3	102			
Sample ID: 100ng lcs		*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	102	88.3	121			
Chlorobenzene	19.84	µg/L	1.0	20	0	99.2	91.9	110			
1,1-Dichloroethene	25.11	µg/L	1.0	20	0	126	91.5	134			
Trichloroethene (TCE)	19.73	µg/L	1.0	20	0	98.6	78.3	102			
Sample ID: 100ng lcs-3		*LCS*				Batch ID:	R44651	Analysis Date:	4/10/2011 11:07:47 AM		
Benzene	21.72	µg/L	1.0	20	0	109	85.2	121			
Toluene	21.16	µg/L	1.0	20	0.1342	105	88.3	121			
Chlorobenzene	20.07	µg/L	1.0	20	0.244	99.1	91.9	110			
1,1-Dichloroethene	23.97	µg/L	1.0	20	0	120	91.5	134			
Trichloroethene (TCE)	19.32	µg/L	1.0	20	0	96.6	78.3	102			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-26338		*MBLK*				**Batch ID: 26338**		**Analysis Date: 4/14/2011 5:59:47 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	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	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								
Fluorene	ND	µg/L	10								
Hexachlorobenzene	ND	µg/L	10								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-26338		*MBLK*				**Batch ID: 26338**		**Analysis Date: 4/14/2011 5:59:47 PM**			
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	20								
Nitrobenzene	ND	µg/L	10								
2-Nitrophenol	ND	µg/L	10								
4-Nitrophenol	ND	µg/L	10								
[redacted]achlorophenol	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-26338		*LCS*				**Batch ID: 26338**		**Analysis Date: 4/14/2011 6:29:07 PM**			
Acenaphthene	67.42	µg/L	10	100	0	67.4	31	99.4			
4-Chloro-3-methylphenol	70.28	µg/L	10	100	0	70.3	34.3	111			
2-Chlorophenol	65.46	µg/L	10	100	0	65.5	24.1	98.7			
1,4-Dichlorobenzene	49.96	µg/L	10	100	0	50.0	20.6	85.6			
2,4-Dinitrotoluene	68.66	µg/L	10	100	0	68.7	26.6	126			
N-Nitrosodi-n-propylamine	65.98	µg/L	10	100	0	66.0	29.2	94.4			
4-Nitrophenol	36.42	µg/L	10	100	6.26	30.2	9.87	86			
Pentachlorophenol	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			
Pyrene	61.02	µg/L	10	100	0	61.0	46.8	92.2			
1,2,4-Trichlorobenzene	57.02	µg/L	10	100	0	57.0	25.2	92.3			
Method: EPA Method 7470: Mercury											
Sample ID: MB-26430		*MBLK*				**Batch ID: 26430**		**Analysis Date: 4/15/2011 2:39:54 PM**			
Mercury	ND	mg/L	0.00020								
Sample ID: LCS-26430		*LCS*				**Batch ID: 26430**		**Analysis Date: 4/15/2011 2:41:38 PM**			
[redacted]ury	0.005134	mg/L	0.00020	0.005	3E-05	102	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA 6010B: Total Recoverable Metals											
Sample ID: MB-26363		*MBLK*				**Batch ID: 26363**		**Analysis Date:**	4/13/2011 1:52:02 PM		
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-26363		*LCS*				**Batch ID: 26363**		**Analysis Date:**	4/13/2011 1:54:59 PM		
Arsenic	0.5247	mg/L	0.020	0.5	0	105	80	120			
Barium	0.4764	mg/L	0.020	0.5	0	95.3	80	120			
Cadmium	0.4981	mg/L	0.0020	0.5	0.0003	99.6	80	120			
Calcium	52.24	mg/L	1.0	50	0.0715	104	80	120			
Chromium	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			
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		*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			
Method: SM2540C MOD: Total Dissolved Solids											
Sample ID: MB-26320		*MBLK*				**Batch ID: 26320**		**Analysis Date:**	4/11/2011 2:00:00 PM		
Total Dissolved Solids	ND	mg/L	20.0								
Sample ID: LCS-26320		*LCS*				**Batch ID: 26320**		**Analysis Date:**	4/11/2011 2:00:00 PM		
Total Dissolved Solids	995.0	mg/L	20.0	1000	0	99.5	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name WESTERN REFINING SOUT

Date Received: 4/5/2011

Work Order Number 1104184

Received by: LNM

Checklist completed by: Signature 04/05/11 Date

Sample ID labels checked by: AT Initials

Matrix: Carrier name: UPS

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 ☑	
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 ☐		
Water - VOA vials have zero headspace? No VOA vials submitted ☐		Yes ☑	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☑	No ☐	N/A ☐	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐	
Container/Temp Blank temperature?	4.8°	<6° C Acceptable If given sufficient time to cool.		

Number of preserved bottles checked for pH: AT 4/5/11

2 3 2

(<2 >12 unless noted below.)

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4161

email or Fax#: 505-632-3911

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other _____

☐ EDD (Type) _____

Turn-Around Time:
☒ Standard ☐ Rush _____

Project Name:
Injection Well 2nd QTR 4-11

Project #:

Project Manager:

Sampler: Bob

On Ice: ☒ Yes ☐ No

Sample Temperature: 4.3

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1104
4-4-11	12:45	H_2O	Injection Well	3-VOA	HCl	-1
	12:45			1-Liter	Amber	-1
				1-500ml	—	-1
				1-500ml	—	-1
				1-250ml	H_2SO_4	-1
				1-500ml	HNO_3	-1
				1-500ml	NaOH	-1
				1-500ml	ZN Acetate	-1
			Trip Blank			-2

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	[redacted] TDS	[redacted] Backup	8310 (PNA or PAH)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Ec, pH, SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
									X						
										X					
											X				
			X										X		
				X											
						X									
												X			
														X	

Remarks:

Date	Time	Relinquished by:	Received by:	Date	Time
4-4-11	3:00	Robert Graham			
				4/5/11	1350
Date	Time	Relinquished by:	Received by:	Date	Time

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

Order No.: 1107575

Dear Kelly Robinson:

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

Hall Environmental Analysis Laboratory, Inc.

Date: *27-Jul-11*
Analytical Report

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1107575	**Collection Date:**	7/14/2011 2:10:00 PM
Project:	Injection Well 3rd Qtr	**Date Received:**	7/15/2011
Lab ID:	1107575-01	**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
Sulfate	62	2.5		mg/L	5	7/16/2011 11:50:38 AM
EPA METHOD 7470: MERCURY						Analyst: **MBR**
Mercury	0.00023	0.00020		mg/L	1	7/19/2011 2:59:05 PM
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **ELS**
Arsenic	ND	0.020		mg/L	1	7/21/2011 8:37:50 AM
Barium	0.21	0.020		mg/L	1	7/22/2011 1:45:51 PM
Cadmium	ND	0.0020		mg/L	1	7/21/2011 8:37:50 AM
Calcium	61	1.0		mg/L	1	7/22/2011 1:45:51 PM
Chromium	0.014	0.0060		mg/L	1	7/21/2011 8:37:50 AM
Lead	ND	0.0050		mg/L	1	7/21/2011 8:37:50 AM
Magnesium	12	1.0		mg/L	1	7/21/2011 8:37:50 AM
Potassium	4.5	1.0		mg/L	1	7/21/2011 8:37:50 AM
Selenium	ND	0.050		mg/L	1	7/21/2011 8:37:50 AM
Silver	ND	0.0050		mg/L	1	7/21/2011 8:37:50 AM
Sodium	140	5.0		mg/L	5	7/22/2011 1:47:52 PM
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **JDC**
Acenaphthene	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Acenaphthylene	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Aniline	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Anthracene	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Azobenzene	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Benz(a)anthracene	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Benzo(a)pyrene	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Benzo(b)fluoranthene	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Benzo(g,h,i)perylene	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Benzo(k)fluoranthene	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Benzoic acid	26	20		µg/L	1	7/20/2011 1:26:20 PM
Benzyl alcohol	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Bis(2-chloroethyl)ether	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Bis(2-chloroisopropyl)ether	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Bis(2-ethylhexyl)phthalate	ND	10		µg/L	1	7/20/2011 1:26:20 PM
4-Bromophenyl phenyl ether	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Butyl benzyl phthalate	ND	10		µg/L	1	7/20/2011 1:26:20 PM
Carbazole	ND	10		µg/L	1	7/20/2011 1:26:20 PM
4-Chloro-3-methylphenol	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

Hall Environmental Analysis Laboratory, Inc.

Date: *27-Jul-11*
Analytical Report

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1107575	**Collection Date:**	7/14/2011 2:10:00 PM
Project:	Injection Well 3rd Qtr	**Date Received:**	7/15/2011
Lab ID:	1107575-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: JDC
4-Chloroaniline	ND	10		µg/L	1	7/20/2011 1:26:20 PM
2-Chloronaphthalene	ND	10		µg/L	1	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		µg/L	1	7/20/2011 1:26:20 PM
Chrysene	ND	10		µg/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		µg/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		µg/L	1	7/20/2011 1:26:20 PM
1,4-Dichlorobenzene	ND	10		µg/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		µg/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		µg/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		µg/L	1	7/20/2011 1:26:20 PM
Isophorone	ND	10		µg/L	1	7/20/2011 1:26:20 PM
2-Methylnaphthalene	ND	10		µg/L	1	7/20/2011 1:26:20 PM
2-Methylphenol	14	10		µg/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		µg/L	1	7/20/2011 1:26:20 PM
Naphthalene	ND	10		µg/L	1	7/20/2011 1:26:20 PM
2-Nitroaniline	ND	10		µg/L	1	7/20/2011 1:26:20 PM
3-Nitroaniline	ND	10		µg/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

Hall Environmental Analysis Laboratory, Inc.

Date: *27-Jul-11*
Analytical Report

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1107575	**Collection Date:**	7/14/2011 2:10:00 PM
Project:	Injection Well 3rd Qtr	**Date Received:**	7/15/2011
Lab ID:	1107575-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						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		µg/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-Fluorobiphenyl	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		µg/L	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	1	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

Hall Environmental Analysis Laboratory, Inc.

Date: *27-Jul-11*
Analytical Report

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1107575	**Collection Date:**	7/14/2011 2:10:00 PM
Project:	Injection Well 3rd Qtr	**Date Received:**	7/15/2011
Lab ID:	1107575-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **MMS**
Chloromethane	ND	3.0		µg/L	1	7/19/2011 1:39:48 AM
2-Chlorotoluene	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
Isopropylbenzene	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		µg/L	1	7/19/2011 1:39:48 AM
Trichlorofluoromethane	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

Hall Environmental Analysis Laboratory, Inc.

Date: *27-Jul-11*

Analytical Report

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1107575	**Collection Date:**	7/14/2011 2:10:00 PM
Project:	Injection Well 3rd Qtr	**Date Received:**	7/15/2011
Lab ID:	1107575-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						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**
pH	7.06	0.100	H	pH units	1	7/15/2011 7:35:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						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

Hall Environmental Analysis Laboratory, Inc.

Date: *27-Jul-11*
Analytical Report

CLIENT:	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**
Benzene	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		µg/L	1	7/19/2011 2:08:01 AM
2-Chlorotoluene	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		µg/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

Hall Environmental Analysis Laboratory, Inc.

Date: *27-Jul-11*
Analytical Report

CLIENT:	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**
Hexachlorobutadiene	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
2-Hexanone	ND	10		µg/L	1	7/19/2011 2:08:01 AM
Isopropylbenzene	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
4-Isopropyltoluene	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
4-Methyl-2-pentanone	ND	10		µg/L	1	7/19/2011 2:08:01 AM
Methylene Chloride	ND	3.0		µg/L	1	7/19/2011 2:08:01 AM
n-Butylbenzene	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
n-Propylbenzene	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
sec-Butylbenzene	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
Styrene	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
tert-Butylbenzene	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	7/19/2011 2:08:01 AM
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
trans-1,2-DCE	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
1,1,1-Trichloroethane	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
1,1,2-Trichloroethane	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
Trichloroethene (TCE)	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
Trichlorofluoromethane	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
1,2,3-Trichloropropane	ND	2.0		µg/L	1	7/19/2011 2:08:01 AM
Vinyl chloride	ND	1.0		µg/L	1	7/19/2011 2:08:01 AM
Xylenes, Total	ND	1.5		µg/L	1	7/19/2011 2:08:01 AM
Surr: 1,2-Dichloroethane-d4	107	65.8-138		%REC	1	7/19/2011 2:08:01 AM
Surr: 4-Bromofluorobenzene	104	72.7-128		%REC	1	7/19/2011 2:08:01 AM
Surr: Dibromofluoromethane	110	69-135		%REC	1	7/19/2011 2:08:01 AM
Surr: Toluene-d8	105	86.1-134		%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
- 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

ESC
LAB SCIENCES
YOUR LAB OF CHOICE

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

July 22, 2011

Anne Thorne
Hall Environmental Analysis Laborat
4901 Hawkins NE
Albuquerque, NM 87109

Date Received : July 16, 2011
Description :

Sample ID : INJECTION WELL

Collected By :
Collection Date : 07/14/11 14:10

ESC Sample # : L526363-01

Site ID :

Project # : 1107575

Parameter	Result	Det. Limit	Units	Method	Date	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	07/21/11	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.

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions											
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	mg/L	0.50	10	0	104	90	110			
Method: SM 2320B: Alkalinity											
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*				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			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b1		*MBLK*				Batch ID: **R46597**		Analysis Date: 7/18/2011 7:36:21 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	3.0								
2-Butanone	ND	µg/L	10								
Carbon disulfide	ND	µg/L	10								
Carbon Tetrachloride	ND	µg/L	1.0								
[redacted]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-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-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								
4-Methyl-2-pentanone	ND	µg/L	10								

[redacted]lifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b1		*MBLK*				Batch ID: **R46597**		Analysis Date: 7/18/2011 7:36:21 PM			
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 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	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								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 5ml rb		*MBLK*				Batch ID: **R46633**		Analysis Date: 7/19/2011 10:00:20 AM			
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	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								
[redacted]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-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								
Xylenes, Total	ND	µg/L	1.5								
Sample ID: 100ng lcs		*LCS*				Batch ID: **R46597**		Analysis Date: 7/18/2011 8:57:07 PM			
Benzene	19.56	µg/L	1.0	20	0	97.8	81.1	130			
Toluene	20.65	µg/L	1.0	20	0	103	82.3	122			
Chlorobenzene	20.53	µg/L	1.0	20	0	103	70	130			
1,1-Dichloroethene	19.37	µg/L	1.0	20	0	96.8	83.1	126			
Trichloroethene (TCE)	20.11	µg/L	1.0	20	0	101	67.4	137			

[redacted]ifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 100ng lcs		*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	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-27628		*MBLK*					Batch ID: **27628**		Analysis Date: 7/19/2011 12:09:09 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								
[redacted]azole	ND	µg/L	10								
[redacted]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								
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	µg/L	10								
Fluorene	ND	µg/L	10								
Hexachlorobenzene	ND	µg/L	10								

[redacted]lifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: *mb-27628*		*MBLK*				Batch ID:	**27628**	Analysis Date:	7/19/2011 12:09:09 PM		
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	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	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-27628		*LCS*				Batch ID:	**27628**	Analysis 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			
4-Nitrophenol	74.30	µg/L	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	89.3			
Pyrene	85.04	µg/L	10	100	0	85.0	38.3	99.3			
1,2,4-Trichlorobenzene	78.98	µg/L	10	100	0	79.0	25	97.3			
Sample ID: lcsd-27628		*LCSD*				Batch ID:	**27628**	Analysis Date:	7/19/2011 1:09:27 PM		
Acenaphthene	93.88	µg/L	10	100	0	93.9	31.7	107	3.49	20	
4-Chloro-3-methylphenol	155.4	µg/L	10	200	0	77.7	24.4	123	2.25	20	
2-Chlorophenol	127.0	µg/L	10	200	0	63.5	24.7	104	12.9	20	
1,4-Dichlorobenzene	73.80	µg/L	10	100	0	73.8	20.3	95	0.244	20	
2,4-Dinitrotoluene	92.78	µg/L	10	100	0	92.8	22.4	106	1.61	20	

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: lcsd-27628		*LCSD*				**Batch ID: 27628**		**Analysis Date:**	7/19/2011 1:09:27 PM		
N-Nitrosodi-n-propylamine	76.12	µg/L	10	100	0	76.1	25.3	107	0.655	20	
4-Nitrophenol	43.30	µg/L	10	200	5.96	18.7	11.6	110	52.7	20	R
Pentachlorophenol	78.76	µg/L	20	200	0	39.4	19.6	113	35.1	20	R
Phenol	88.54	µg/L	10	200	0	44.3	16.1	69.3	10.7	20	
Pyrene	85.18	µg/L	10	100	0	85.2	38.3	99.3	0.164	20	
1,2,4-Trichlorobenzene	69.42	µg/L	10	100	0	69.4	25	97.3	12.9	20	
Method: EPA Method 7470: Mercury											
Sample ID: MB-27649		*MBLK*				**Batch ID: 27649**		**Analysis Date:**	7/19/2011 2:43:07 PM		
Mercury	ND	mg/L	0.00020								
Sample ID: LCS-27649		*LCS*				**Batch ID: 27649**		**Analysis Date:**	7/19/2011 2:44:51 PM		
Mercury	0.005013	mg/L	0.00020	0.005	2E-05	99.9	80	120			
Method: EPA 6010B: Total Recoverable Metals											
Sample ID: MB-27683		*MBLK*				**Batch ID: 27683**		**Analysis Date:**	7/21/2011 7:24:04 AM		
Arsenic	ND	mg/L	0.020								
Barium	ND	mg/L	0.020								
Cadmium	ND	mg/L	0.0020								
Calcium	ND	mg/L	1.0								
[redacted]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								
Sample ID: LCS-27683		*LCS*				**Batch ID: 27683**		**Analysis Date:**	7/21/2011 7:26:11 AM		
Arsenic	0.5225	mg/L	0.020	0.5	0	104	80	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			
Method: SM2540C MOD: Total Dissolved Solids											
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			

[redacted]ifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name WESTERN REFINING SOUT | Date Received: 7/15/2011

Work Order Number 1107575 | Received by: LNM

Checklist completed by: Signature 7/15/11 Date | Sample ID labels checked by: Initials

Matrix: | Carrier name: UPS

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 ☑	
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 ☐		
Water - VOA vials have zero headspace? No VOA vials submitted ☐		Yes ☑	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☑	No ☐	N/A ☐	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐	
Container/Temp Blank temperature?	5.4°	<6° C Acceptable If given sufficient time to cool.		

Number of preserved bottles checked for pH: 2,2

(<2 or >12 unless noted below.)

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Chain-of-Custody Record

Client: Western Refining

Mailing Address: 50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4135

email or Fax#: 505-632-3911

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Injection Well 3rd QTR

Project #:

Project Manager:

Sampler: Bob + Terry

On Ice: ☒ Yes ☐ No

Sample Temperature: 5.1

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1107516
7-14-11	2:10	H_2O	Injection Well	3-VOA	HCl	-1
				1-Liter	Amber	
				1-500ml	—	
				1-500ml	—	
				1-250ml	H_2SO_4	
				1-500ml	HNO_3	
				1-500ml	NaOH	
				1-500ml	ZN Acetate	

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TDS	Back up	8310 (PNA or PAH)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Ec, pH, SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
									X						
										X					
											X				
				X											
					X										
						X									
												X			
														X	

Date:	Time:	Relinquished by:	Received by:	Date	Time
7-14-11	3:00	Robert Graham			
Date:	Time:	Relinquished by:	Received by:	Date	Time
				7/15/11	1000

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.

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

Order No.: 1110646

Dear Kelly Robinson:

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

Hall Environmental Analysis Laboratory, Inc.

Date: *11-Nov-11*

CLIENT: Western Refining Southwest, Inc.
Project: Injection Well 4th Qtr
Lab Order: 1110646

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Batch ID	Test Name	Collection Date
1110646-01A	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	

Hall Environmental Analysis Laboratory, Inc.

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
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 METALS						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		µg/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		µg/L	1	10/21/2011 12:42:40 PM
Benzo(g,h,i)perylene	ND	10		µg/L	1	10/21/2011 12:42:40 PM
Benzo(k)fluoranthene	ND	10		µg/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/L	1	10/21/2011 12:42:40 PM
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	10/21/2011 12:42:40 PM
Bis(2-chloroethyl)ether	ND	10		µg/L	1	10/21/2011 12:42:40 PM
Bis(2-chloroisopropyl)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	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

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
EPA METHOD 8270C: SEMIVOLATILES						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		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		µg/L	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-Nitroaniline	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
B	Analyte detected in the associated Method Blank
E	Estimated value
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
MCL	Maximum Contaminant Level
NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit
S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

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
EPA METHOD 8270C: SEMIVOLATILES						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-Trichlorophenol	ND	10		µg/L	1	10/21/2011 12:42:40 PM
2,4,6-Trichlorophenol	ND	10		µg/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		%REC	1	10/21/2011 12:42:40 PM
Surr: Phenol-d5	32.5	11.3-73.2		%REC	1	10/21/2011 12:42:40 PM
EPA METHOD 8260B: VOLATILES						Analyst: **NSB**
Benzene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
Toluene	ND	1.0		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		µg/L	1	10/20/2011 11:21:18 AM
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
Naphthalene	ND	2.0		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		µg/L	1	10/20/2011 11:21:18 AM
Acetone	180	100		µg/L	10	10/20/2011 3:08:33 PM
Bromobenzene	ND	1.0		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		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		µg/L	1	10/20/2011 11:21:18 AM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

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
EPA METHOD 8260B: VOLATILES						Analyst: **NSB**
Chloroform	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
Chloromethane	ND	3.0		µg/L	1	10/20/2011 11:21:18 AM
2-Chlorotoluene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
4-Chlorotoluene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
cis-1,2-DCE	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/20/2011 11:21:18 AM
Dibromochloromethane	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
Dibromomethane	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,4-Dichlorobenzene	ND	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
1,2-Dichloropropane	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,3-Dichloropropane	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
2,2-Dichloropropane	ND	2.0		µg/L	1	10/20/2011 11:21:18 AM
1,1-Dichloropropene	ND	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		µg/L	1	10/20/2011 11:21:18 AM
Isopropylbenzene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
4-Isopropyltoluene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
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
n-Butylbenzene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
n-Propylbenzene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
sec-Butylbenzene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
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
Tetrachloroethene (PCE)	ND	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
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

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
EPA METHOD 8260B: VOLATILES						Analyst: **NSB**
Trichlorofluoromethane	ND	1.0		µg/L	1	10/20/2011 11:21:18 AM
1,2,3-Trichloropropane	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
Surr: 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**
pH	7.81	0.100	H	pH units	1	10/17/2011 7:16:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	1190	20.0		mg/L	1	10/18/2011 1:19:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *11-Nov-11*

Analytical Report

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Trip Blank
Lab Order:	1110646	**Collection Date:**	
Project:	Injection Well 4th Qtr	**Date Received:**	10/12/2011
Lab ID:	1110646-02	**Matrix:**	TRIP BLANK

Analyses	Result	PQL	Qual	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
Ethylbenzene	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		µg/L	1	10/20/2011 12:46:07 PM
Bromomethane	ND	3.0		µg/L	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 12:46:07 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-Chlorotoluene	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
cis-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		µg/L	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

Hall Environmental Analysis Laboratory, Inc.

Date: *11-Nov-11*

Analytical Report

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Trip Blank
Lab Order:	1110646	**Collection Date:**	
Project:	Injection Well 4th Qtr	**Date Received:**	10/12/2011
Lab ID:	1110646-02	**Matrix:**	TRIP BLANK

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **NSB**
Hexachlorobutadiene	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
2-Hexanone	ND	10		µg/L	1	10/20/2011 12:46:07 PM
Isopropylbenzene	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
4-Isopropyltoluene	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
4-Methyl-2-pentanone	ND	10		µg/L	1	10/20/2011 12:46:07 PM
Methylene Chloride	ND	3.0		µg/L	1	10/20/2011 12:46:07 PM
n-Butylbenzene	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
n-Propylbenzene	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
sec-Butylbenzene	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
Styrene	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
tert-Butylbenzene	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	10/20/2011 12:46:07 PM
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
trans-1,2-DCE	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
Trichlorofluoromethane	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/20/2011 12:46:07 PM
Vinyl chloride	ND	1.0		µg/L	1	10/20/2011 12:46:07 PM
Xylenes, Total	ND	1.5		µg/L	1	10/20/2011 12:46:07 PM
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 PM
Surr: Dibromofluoromethane	98.7	70-130		%REC	1	10/20/2011 12:46:07 PM
Surr: Toluene-d8	97.9	70-130		%REC	1	10/20/2011 12:46:07 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

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 #: 111014024
Project Name: 1110646

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	°F		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 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):E87893; 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; CA:Cert2632; ID:WA00169; WA:C595; MT:Cert0095

Friday, November 04, 2011

QA/QC SUMMARY REPORT

Client: Western Refining Southwest, Inc.
Project: Injection Well 4th Qtr **Work Order:** 1110646

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions											
Sample ID: MB		*MBLK*				Batch ID:	R48414	Analysis Date:	10/13/2011 10:55:38 AM		
Chloride	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		*MBLK*				Batch ID:	R48414	Analysis Date:	10/14/2011 5:12:33 AM		
Chloride	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		*MBLK*				Batch ID:	R48584	Analysis Date:	10/21/2011 5:31:40 PM		
Chloride	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		*MBLK*				Batch ID:	R48584	Analysis Date:	10/22/2011 9:11:50 AM		
Chloride	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: LCS		*LCS*				Batch ID:	R48414	Analysis Date:	10/13/2011 11:13:02 AM		
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*				Batch ID:	R48414	Analysis Date:	10/14/2011 5:29:58 AM		
Chloride	4.812	mg/L	0.50	5	0	96.2	90	110			
Sulfate	9.696	mg/L	0.50	10	0	97.0	90	110			
Sample ID: LCS		*LCS*				Batch ID:	R48584	Analysis Date:	10/21/2011 5:49:04 PM		
Chloride	4.786	mg/L	0.50	5	0	95.7	90	110			
Sulfate	9.736	mg/L	0.50	10	0	97.4	90	110			
Sample ID: LCS		*LCS*				Batch ID:	R48584	Analysis Date:	10/22/2011 9:29:15 AM		
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: Alkalinity											
Sample ID: MB-1		*MBLK*				Batch ID:	R48438	Analysis Date:	10/17/2011 10:01:00 AM		
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:	R48438	Analysis Date:	10/17/2011 5:37:00 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:	R48438	Analysis Date:	10/17/2011 10:08:00 AM		
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 Date:	10/17/2011 5:43:00 PM		
Alkalinity, Total (As CaCO3)	81.48	mg/L Ca	20	80	6.32	94.0	90	110			

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 4th Qtr
Work Order: 1110646

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 1110646-01a msd		*MSD*				Batch ID:	R48569	Analysis Date:		10/20/2011 12:17:44 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	Analysis Date:		10/20/2011 9:28:33 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	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-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								

Qualifiers:

B	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: Western Refining Southwest, Inc.
Project: Injection Well 4th Qtr
Work Order: 1110646

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b2		*MBLK*					Batch ID: **R48569**		Analysis Date:	10/20/2011 9:28:33 AM	
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 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								
[redacted]1-Trichloroethane	ND	µg/L	1.0								
[redacted]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: b8		*MBLK*					Batch ID: **R48569**		Analysis Date:	10/20/2011 10:15:43 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								
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								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
[redacted]	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: Western Refining Southwest, Inc.
Project: Injection Well 4th Qtr
Work Order: 1110646

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b8		*MBLK*		Batch ID:	R48569	Analysis Date:	10/20/2011 10:15:43 PM				
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-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								
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								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: Western Refining Southwest, Inc.
Project: Injection Well 4th Qtr **Work Order:** 1110646

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b8		*MBLK*				Batch ID:	R48569	Analysis Date:	10/20/2011 10:15:43 PM		
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: 100ng lcs		*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	0	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	0	92.3	81.1	130			
Toluene	20.78	µg/L	1.0	20	0	104	82.3	122			
Chlorobenzene	19.52	µg/L	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			
Toluene	18.75	µg/L	1.0	20	0	93.7	68.2	130			
Chlorobenzene	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			
Trichloroethene (TCE)	17.07	µg/L	1.0	20	0	85.3	61.3	127			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: Western Refining Southwest, Inc.
Project: Injection Well 4th Qtr **Work Order:** 1110646

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-28933		*MBLK*				Batch ID: **28933**		Analysis Date: **10/21/2011 11:14:08 AM**			
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	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	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								
Fluorene	ND	µg/L	10								
Hexachlorobenzene	ND	µg/L	10								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: Western Refining Southwest, Inc.
Project: Injection Well 4th Qtr **Work Order:** 1110646

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-28933		*MBLK*				Batch ID:	28933	Analysis Date:	10/21/2011 11:14:08 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								
1-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	20								
Nitrobenzene	ND	µg/L	10								
2-Nitrophenol	ND	µg/L	10								
4-Nitrophenol	ND	µg/L	10								
Pentachlorophenol	ND	µg/L	20								
[redacted]nanthrene	ND	µg/L	10								
[redacted]ol	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-28933		*LCS*				Batch ID:	28933	Analysis Date:	10/21/2011 11:43:34 AM		
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			
Pyrene	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	30.6	104			
Sample ID: lcsd-28933		*LCSD*				Batch ID:	28933	Analysis Date:	10/21/2011 12:13:07 PM		
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	

Qualifiers:

[redacted] Estimated value
[redacted] 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 4th Qtr **Work Order:** 1110646

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: lcsd-28933		*LCSD*				Batch ID:	**28933**	Analysis Date:		10/21/2011 12:13:07 PM	
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	
4-Nitrophenol	74.94	µg/L	10	200	0	37.5	21.7	68.6	14.2	20	
Pentachlorophenol	87.60	µg/L	20	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: Mercury											
Sample ID: MB-29034		*MBLK*				Batch ID:	**29034**	Analysis Date:		10/24/2011 3:48:26 PM	
Mercury	ND	mg/L	0.00020								
Sample ID: LCS-29034		*LCS*				Batch ID:	**29034**	Analysis Date:		10/24/2011 3:50:12 PM	
Mercury	0.004293	mg/L	0.00020	0.005	6E-05	84.6	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: Western Refining Southwest, Inc.
Project: Injection Well 4th Qtr **Work Order:** 1110646

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA 6010B: Total Recoverable Metals											
Sample ID: 1110646-01EMSD		*MSD*				**Batch ID:**	**28889**	**Analysis Date:**		10/21/2011 9:41:36 AM	
Arsenic	0.5551	mg/L	0.020	0.5	0	111	75	125	0.386	20	
Barium	0.6957	mg/L	0.020	0.5	0.1909	101	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	
Lead	0.5106	mg/L	0.0050	0.5	0	102	75	125	0.409	20	
Magnesium	73.76	mg/L	1.0	50	23.74	100	75	125	1.04	20	
Potassium	55.49	mg/L	1.0	50	6.838	97.3	75	125	0.700	20	
Selenium	0.4910	mg/L	0.050	0.5	0	98.2	75	125	1.70	20	
Silver	0.08806	mg/L	0.0050	0.1	0	88.1	75	125	0.0529	20	
Sample ID: 1110646-01EMSD		*MSD*				**Batch ID:**	**28889**	**Analysis Date:**		10/21/2011 9:47:51 AM	
Calcium	205.2	mg/L	5.0	50	146.5	117	75	125	3.56	20	
Sodium	276.7	mg/L	5.0	50	226.2	101	75	125	3.04	20	
Sample ID: MB-28889		*MBLK*				**Batch ID:**	**28889**	**Analysis Date:**		10/17/2011 8:32:28 AM	
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-28889		*LCS*				**Batch ID:**	**28889**	**Analysis Date:**		10/17/2011 8:34:26 AM	
Arsenic	0.5059	mg/L	0.020	0.5	0	101	80	120			
Barium	0.4964	mg/L	0.020	0.5	0	99.3	80	120			
Cadmium	0.4971	mg/L	0.0020	0.5	0	99.4	80	120			
Calcium	49.78	mg/L	1.0	50	0	99.6	80	120			
Chromium	0.4936	mg/L	0.0060	0.5	0	98.7	80	120			
Lead	0.4993	mg/L	0.0050	0.5	0	99.9	80	120			
Magnesium	50.09	mg/L	1.0	50	0	100	80	120			
Potassium	48.14	mg/L	1.0	50	0	96.3	80	120			
Selenium	0.4867	mg/L	0.050	0.5	0	97.3	80	120			
Silver	0.08537	mg/L	0.0050	0.1	0	85.4	80	120			
Sodium	48.86	mg/L	1.0	50	0	97.7	80	120			
Sample ID: 1110646-01EMS		*MS*				**Batch ID:**	**28889**	**Analysis Date:**		10/21/2011 9:39:32 AM	
Arsenic	0.5530	mg/L	0.020	0.5	0	111	75	125			
Barium	0.6949	mg/L	0.020	0.5	0.1909	101	75	125			
Cadmium	0.4999	mg/L	0.0020	0.5	0	100	75	125			
Chromium	0.5147	mg/L	0.0060	0.5	0	103	75	125			
Lead	0.5127	mg/L	0.0050	0.5	0	103	75	125			
Magnesium	73.00	mg/L	1.0	50	23.74	98.5	75	125			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: Western Refining Southwest, Inc.
Project: Injection Well 4th Qtr

Work Order: 1110646

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA 6010B: Total Recoverable Metals											
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 AM	
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: Total Dissolved Solids											
Sample ID: 1110646-01DMSD		*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			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name WESTERN REFINING SOUT | Date Received: 10/12/2011

Work Order Number 1110646 | Received by: AMG

Sample ID labels checked by: _____ Initials

Checklist completed by: _____ 10/12/11
Signature | Date

Matrix: | Carrier name: UPS

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 ☑	
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 ☐		
Water - VOA vials have zero headspace?	No VOA vials submitted ☐	Yes ☑	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☑	No ☐	N/A ☐	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐	

Number of preserved bottles checked for pH: 2 2

<2 >12 unless noted below.

Container/Temp Blank temperature? 1.3° <6° C Acceptable
If given sufficient time to cool.

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Chain-of-Custody Record

Client: Western Refining

Mailing Address: 50 Road 4990
Bloomfield, NM 87413
Phone #: 505-632-4135
email or Fax#: 505-632-3911
QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other ____
☐ EDD (Type) ____

Turn-Around Time:
☒ Standard ☐ Rush ____ 10-11-11
Project Name:
Injection Well 4th QTR
Project #:
Project Manager:
Sampler: Terry
On Ice: ☒ Yes ☐ No
Sample Temperature: [illegible]

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. [illegible]	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	~~TPH (Method 418.1)~~ TDS	~~EDB (Method 504.1)~~ Backup	8310 (PNA or PAH)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability / Corrosivity	Reactivity	Ec, PH, SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
10-11-11	9:30	H_2O	Injection Well	3-VOA	HCL	-1										X						
				1-Liter	Amber	-1											X					
				1-500ml	—	-1												X				
				1-500ml	—	-1				X										X		
				1-250ml	H_2SO_4	-1					X											
				1-500ml	HNO_3	-1							X									
				1-500ml	NaOH	-1													X			
				1-500ml	ZN Acetate	-1															X	
			Trip Blank			-2																

Date	Time	Relinquished by	Received by	Date	Time
10-11-11	12:00	Robert Krakow	[signature]	10/12/11	11:15

Remarks:

If ne samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. erves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytica

APPENDIX C

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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
Quality Assurance/Quality Control Officer

6/29/2011
Date

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Approved By:

6.29.11

B. Derek Harmon Date
Organic Manager/Technical Director

Approved By:

6/29/11

Ian Cameron Date
Inorganic Manager/Technical Director

Approved By:

06/29/11

Michael Williams Date
Microbiology Technical Director

Table of Contents

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 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 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 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 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. A 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 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).

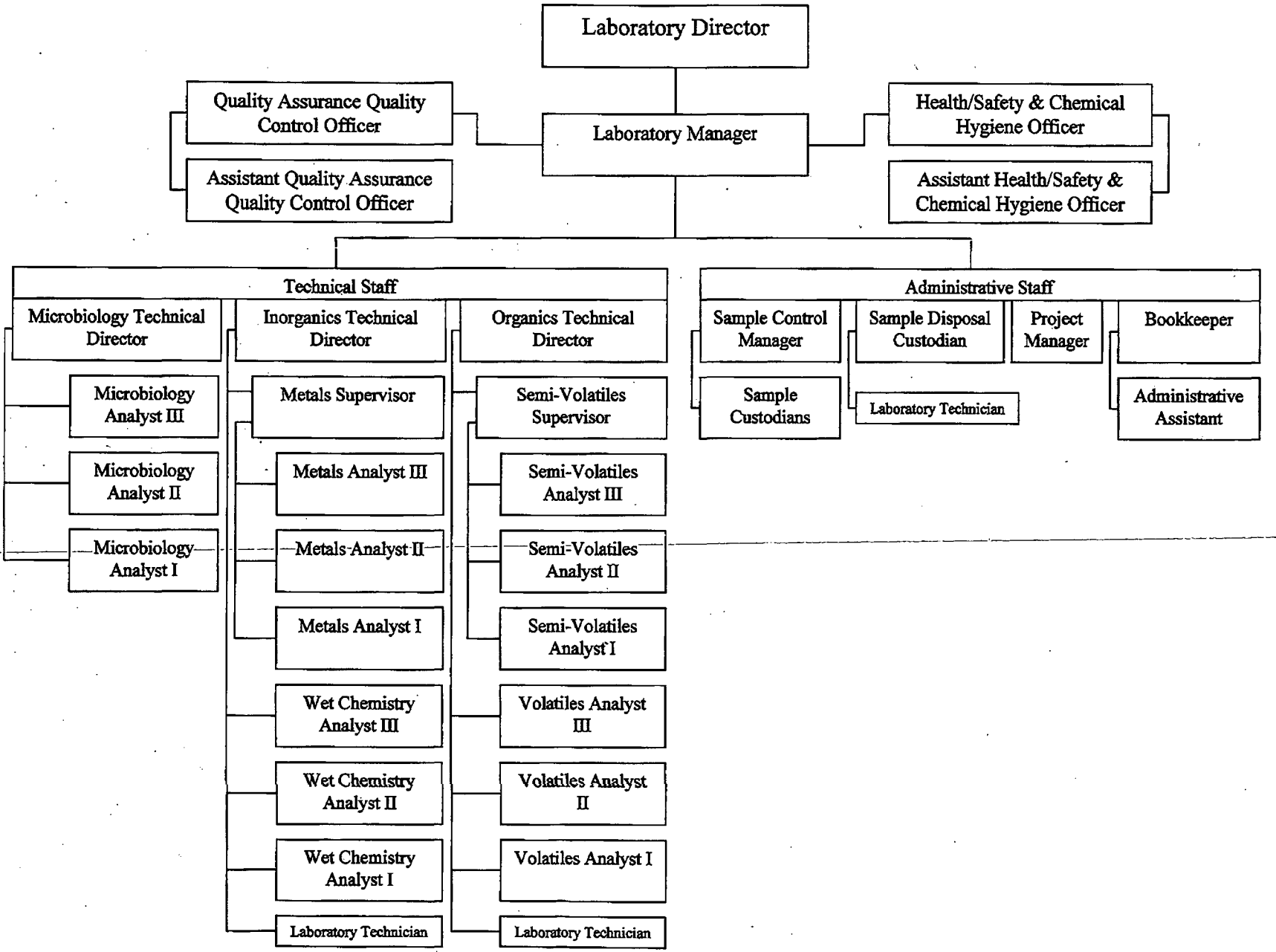
At least once per year an ADOCP must be completed. This is achieved by the acceptable performance of a blind sample (typically by using a PT sample, but can be a single blind (to the analyst) sample), by performing another IDOC, or by summarizing the data of four consecutive laboratory control samples 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.


Laboratory Director
Quality Assurance Quality Control Officer
Assistant Quality Assurance Quality Control Officer
Laboratory Manager
Health/Safety & Chemical Hygiene Officer
Assistant Health/Safety & Chemical Hygiene Officer
Technical Staff
Microbiology Technical Director
Inorganics Technical Director
Organics Technical Director
Microbiology Analyst III
Microbiology Analyst II
Microbiology Analyst I
Metals Supervisor
Metals Analyst III
Metals Analyst II
Metals Analyst I
Wet Chemistry Analyst III
Wet Chemistry Analyst II
Wet Chemistry Analyst I
Laboratory Technician
Semi-Volatiles Supervisor
Semi-Volatiles Analyst III
Semi-Volatiles Analyst II
Semi-Volatiles Analyst I
Volatiles Analyst III
Volatiles Analyst II
Volatiles Analyst I
Laboratory Technician
Administrative Staff
Sample Control Manager
Sample Custodians
Sample Disposal Custodian
Laboratory Technician
Project Manager
Bookkeeper
Administrative Assistant

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, *u*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 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"
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"

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)
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-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 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.

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 re-extraction 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.

$$RPD = 2 \frac{x\ (Sample\ Result - Duplicate\ Result)}{(Sample\ Result + Duplicate\ Result)} X\ 100$$

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:

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

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.

$$\text{Average} = (\Sigma x_I) / n$$

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^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.

$$\text{Standard deviation} = s = [\Sigma (x_I - \text{average})^2 / (n - 1)]^{1/2}$$

Percent Recovery (LCS and LCSD)

$$\text{Percent Recovery} = \frac{(\text{Spike Sample Result})}{(\text{Spike Added})} \times 100$$

Percent Recovery (MS, MSD)

$$\text{Percent Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{(\text{Spike Added})} \times 100$$

Control Limits

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

$$\text{Upper Control Limit} = x + 3s$$
$$\text{Lower Control Limit} = x - 3s$$

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:

$$RPD = \frac{2 \times (\text{Sample Result} - \text{Duplicate Result})}{(\text{Sample Result} + \text{Duplicate Result})} \times 100$$

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:

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

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 x s) is 0.0652.

Total Nitrogen

Total nitrogen is calculated as follows:

Total Nitrogen = TKN + NO_2 + NO_3

Calibration Calculations

1. Response Factor or Calibration Factor:

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

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

$$RSD = s / RF_{AVE}$$

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
Σ = the sum of all the individual values

2. Linear Regression

$$y=mx+b$$

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)

$$CC (r) =\{ \Sigma((x_i-x_{ave})*(y_i-y_{ave})) \} / \{ SQRT((\Sigma(x_i-x_{ave})^2)*(\Sigma(y_i-y_{ave})^2)) \}$$

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
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

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

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:
n = number of replicate x,y pairs
x = x values
y = y values
$w = S^{-2} / (\Sigma S^{-2}/n)$
$S_{(xx)} = (\Sigma x^2w) - [(\Sigma xw)^2 / n]$

$S_{(xy)} = (\Sigma xyw) - [(\Sigma xw)*(\Sigma yw) / n]$
$S_{(xx2)} = (\Sigma x^3w) - [(\Sigma xw)*(\Sigma x^2w) / n]$
$S_{(x2y)} = (\Sigma x^2yw) - [(\Sigma x^2w)*(\Sigma yw) / n]$
$S_{(x2x2)} = (\Sigma x^4w) - [(\Sigma x^2w)^2 / n]$
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
A_{is} = 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(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)

$$\text{Concentration for Extracted Samples} = \frac{(\text{On-Column Conc})(\text{Dilution})(\text{Final Volume})}{(\text{Initial Amount})(\text{Injection Volume})}$$

$$\text{Concentration for Purged Samples} = \frac{(\text{On-Column Conc})(\text{Purged Amount})(\text{Dilution})}{(\text{Purged Amount})}$$

Dry Weight Concentration

$$\text{Dry Weight Concentration} = \frac{\text{Final Concentration Wet Weight}}{\text{Total Solids}}$$

Percent Difference

$$\% \text{ Difference} = \frac{\text{Absolute(Continuing Calibration RRF - Average RRF)}}{\text{Average RRF}} * 100$$

Percent Drift

$$\% \text{ Drift} = \frac{\text{Absolute(Calculated Concentration - Theoretical Concentration)}}{\text{Theoretical Concentration}} * 100$$

Dilution Factor

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

Relative Retention Time

RRT =RT of Compound / RT of ISTD

Breakdown Percent

$$\text{Breakdown} = \frac{\text{Area of DDD + Area of DDE}}{\text{Average (DDT, DDE and DDD)}}$$

-or-

$$\frac{\text{Area of Endrin Ketone + Area of Endrin Aldehyde}}{\text{Average (Endrin, Endrin Ketone, Endrin Aldehyde)}}$$

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 un-necessary 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.

14.0 References (Analytical Protocols Utilized at HEAL)

1. Analytical Chemistry of PCB's. Erickson, Mitchell D., CRC Press, Inc. 1992.

2. Diagnosis & Improvement of Saline & Alkali Soils, Agriculture Handbook No. 60, USDA, 1954

3. Environmental Perspective on the Emerging Oil Shale Industry, EPA Oil & Shale Research Group.

4. Field and Laboratory Methods Applicable to Overburdens and Mine Soils, USEPA, EPA-600/2-78-054, March 1978

5. Handbook of Chemistry and Physics, 62nd Edition, CRC Press, Inc. 1981-1982.

6. Handbook on Reference Methods for Soil Testing, The Council on Soil Testing & Plant Analysis, 1980 and 1992

7. Laboratory Procedures for Analyses of Oilfield Waste. Department of Natural Resources, Office of Conservation, Injection and Mining Division, Louisiana, August 1988

8. Manual for the Certification of Laboratories Analyzing Drinking Water, Criteria and procedures Quality Assurance Fifth Edition, U.S. Environmental Protection Agency, January 2005.

9. Manual of Operating Procedures for the Analysis of Selected Soil, Water, Plant Tissue and Wastes Chemical and physical Parameter. Soil, Water, and Plant Analysis Laboratory, Dept. of Soil and Water Science, The University of Arizona, August 1989

10. The Merck Index, Eleventh Edition, Merck & Co., Inc. 1989.

11. Methods for Chemical Analysis of Water and Wastes, USEPA, EPA-600/4-79-020, March 1979 and as amended December, 1982 (EPA-600/4-82-055)

12. Methods for the Determination of Metals in Environmental Samples, USEPA, EPA-600/4-91-010, June 1991

13. Methods of Soil Analysis: Parts 1 & 2, 2nd Edition, Agronomy Society of America, Monograph 9

14. Polycyclic Aromatic Hydrocarbons in Water Systems, CRC Press, Inc.

15. Procedures for Collecting Soil Samples and Methods of Analysis for Soil Survey. USDA Soil Conservation Service, SSIR No. 1

16. Quality Systems for Analytical Services, Revision 2.2, U.S. Department of Energy, October 2006.

17. Sampling Procedures and Chemical Methods in Use at the U.S. Salinity Laboratory for Characterizing Salt-Affected Soils and Water. USDA Salinity Laboratory.

18. Soil Survey Laboratory Methods Manual. Soil Survey Laboratory Staff. Soil Survey Investigations Report No. 42, version 2.0, August 1992.

19. 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

20. Standard Methods for the Examination of Water and Wastewater: AOHA, AWWA, and WPCG; 20th Edition, 1999.

21. Technical Notes on Drinking Water Methods, U.S. Environmental Protection Agency, October 1994.

22. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, USEPA SW-846, 3rd Edition, Updates I, II, IIA, IIB, III, December, 1996.

New Mexico Energy, Minerals and Natural Resources Department

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.

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

New Mexico Energy, Minerals and Natural Resources Department

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
P.O. Box 2307
Santa Fe, NM 87504-2307
Also via email: ekendrick@montand.com

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;

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 CarlJ.Chavez@state.nm.us 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 <u>without</u> specifying the maximum surface injection pressure and will still meet the requirements of 20.6.2.3108(C) and (F) NMAC.

<u>SUBSTANTIVE PERMIT ISSUES:</u>

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, WRSW was causing existing fractures to increase or actively inducing new fractures 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 indicates that this part is being or may be violated ....
>
> (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 indicate that this Part are being or may be violated, 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

EC:
Carl Chavez, carl.chavez@state.nm.us
William Jones, William.v.jones@state.nm.us
Gail MacQuesten, Gail.macquesten@state.nm.us
Glenn von Gonten, glenn.vongonten@state.nm.us
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: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

Western Refining

WNR LISTED NYSE

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

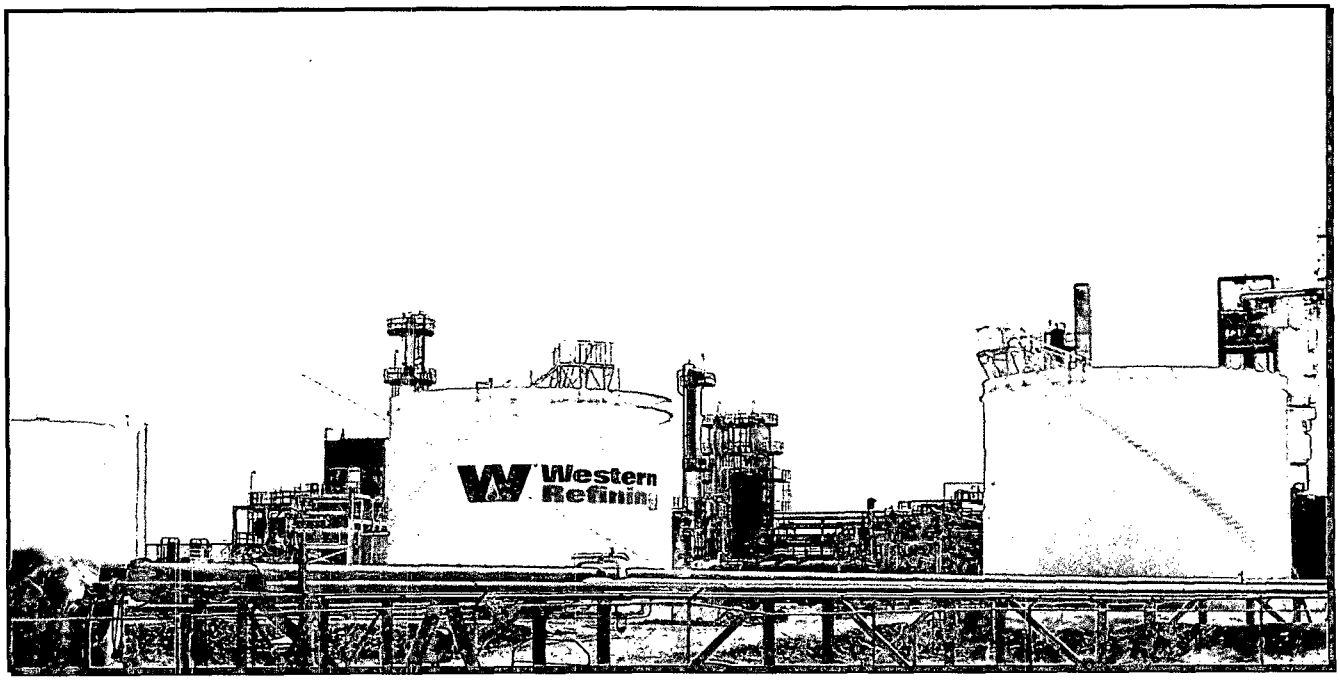
ANNUAL CLASS I WELL REPORT

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

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.

V. R. McDaniel
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.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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 1st Quarterly Sampling Event
- 04/22/10 2nd Quarterly Sampling Event
- 05/19/10 Mechanical Integrity Test (See Form C-103 in Appendix A)
- 07/21/10 3rd Quarterly Sampling Event
- 08/29/10 Pressure Fall-Off Test (See Form C-103 in Appendix A)
- 10/25/10 4th 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

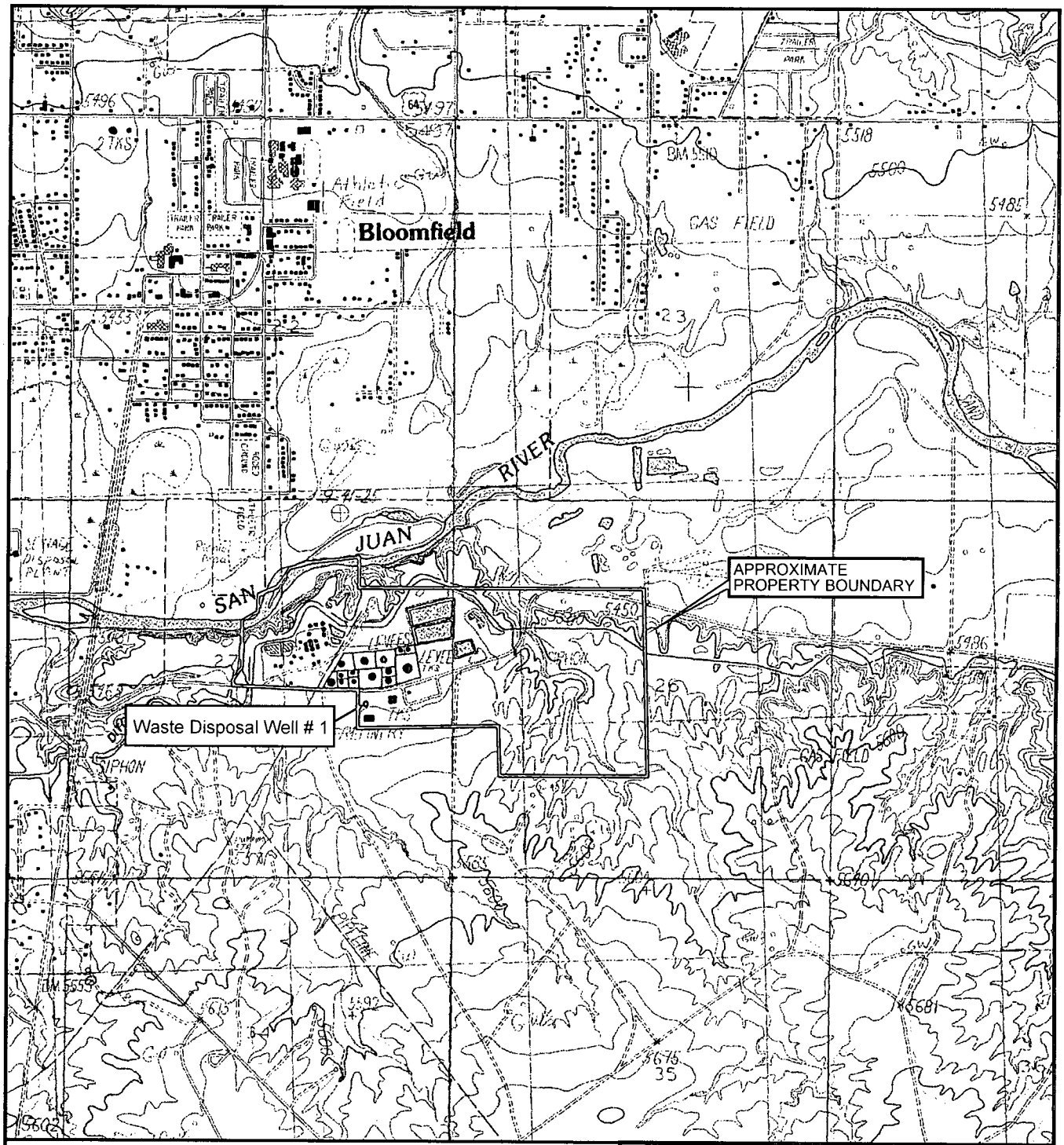
In 2011, Western will continue the routine operating, monitoring, maintenance and testing programs which include quarterly chemical analysis of injection fluids, annual MIT, Bradenhead testing, and the annual pressure Falloff Test. Western will continue to utilize the maximum operating injection pressure 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.



Map Source: USGS 7.5 Min. Quad Sheet BLOOMFIELD, NM., 1985.

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef-A25

FIGURE 1
SITE LOCATION MAP
BLOOMFIELD REFINERY

N

0 2000
SCALE IN FEET

NEW MEXICO
QUADRANGLE LOCATION

WESTERN REFINING DISPOSAL WELL #1

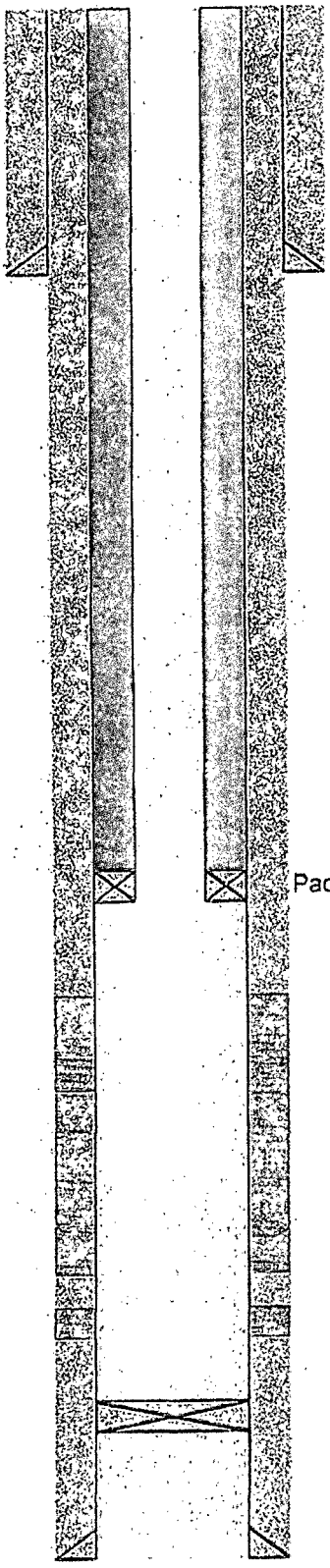
V, SW SECTION 26, T29N, R11W

NO.: 30-045-29002

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

FIGURE 2
DISPOSAL WELL #1 WELL SCHEMATIC
Western Refining Inc.
Bloomfield, NM

Date:	4/26/2006	Approved By:	rla	Job No.:	70F5830
Drawn By:	rla	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'

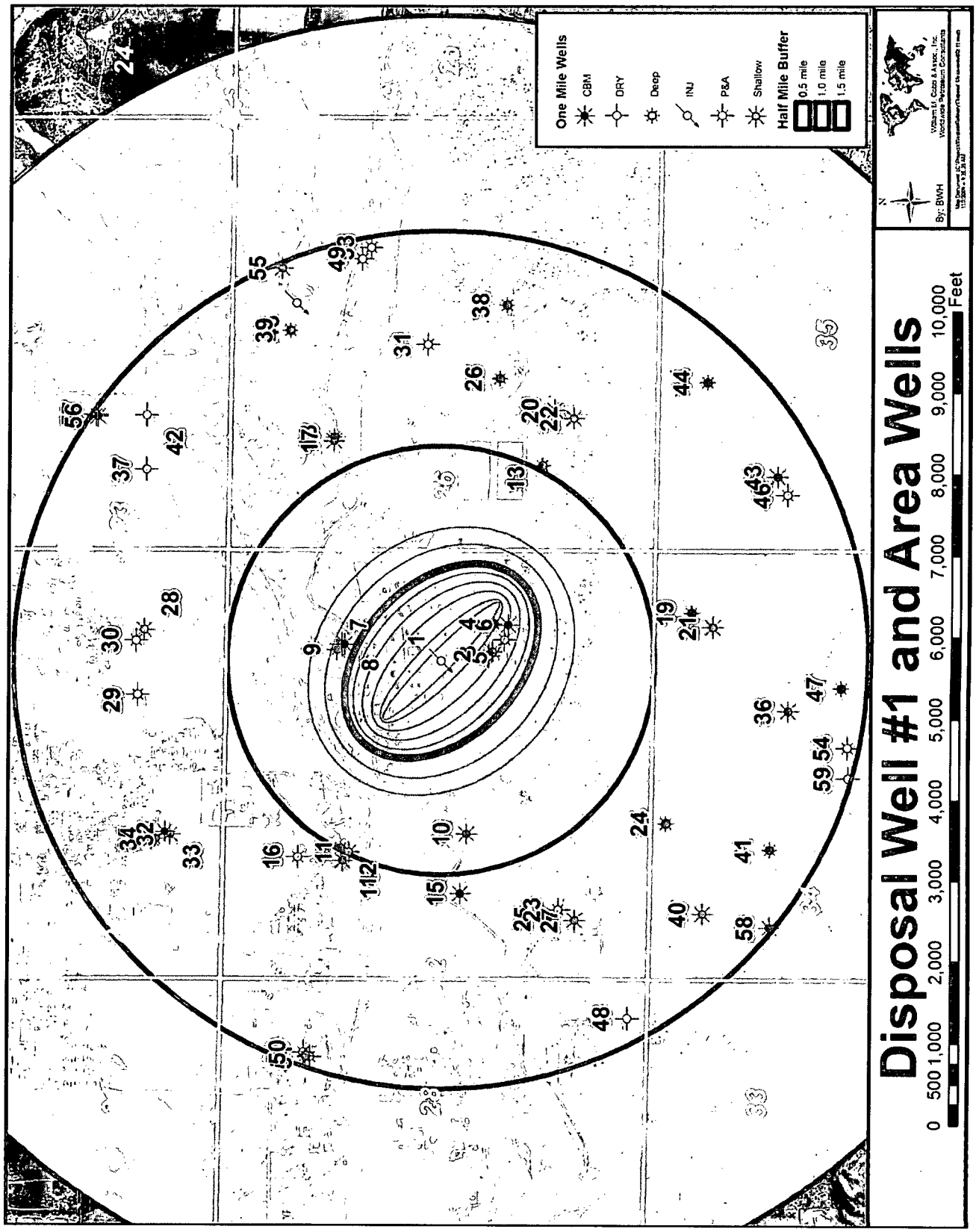
Fill was cleaned out of well on 4/20/06
Fill was orginally tagged at 3325'

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


Disposal Well #1 and Area Wells
0 500 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000 Feet
One Mile Wells
CBM
DRY
Deep
INJ
P&A
Shallow
Half Mile Buffer
0.5 mile
1.0 mile
1.5 mile
By: BWH

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

PERIOD 2010	AMOUNT OF WATER FROM RIVER (GALLONS)	AMOUNT TO SOLAR EVAP PONDS (GALLONS)	TOTALIZER AMOUNT INJECTED (GALLONS)	DOWN-TIME (HRS)	INJECTION PRESSURE MAX (PSIA)	INJECTION PRESSURE MIN (PSIA)	INJECTION PRESSURE AVG (PSIA)	ANNULAR PRESSURE MAX (PSIA)	ANNULAR PRESSURE MIN (PSIA)	ANNULAR PRESSURE AVG (PSIA)	ON-LINE FLOW RATES MAX (GPM)	ON-LINE FLOW RATES MIN (GPM)	ON-LINE FLOW RATES AVG (GPM)
JAN	1,395,000	2,404,000	2,373,484	0	1141	915	1066	148	85	123	72	19	55
FEB	2,002,000	2,288,000	2,566,818	0	1137	1114	1126	136	131	133	65	58	55
MAR		2,183,000	2,815,393	0	1141	1043.0	1117	168	118	138	69.0	51	63
APR	1,447,286	1,721,000	2,196,140	36	1140	982	1093	168	71	125	68	22	60
MAY	1,440,000	1,700,000	1,220,962	144	1080	864	990	201	29	138	86	20	40
JUN	2,597,000	2,307,000	1,709,684	0	1097	900	1066	210	151	169	68	19	41
JUL	2,307,000	3,376,000	1,477,024	0	1130	912	972	209	151	177	80	12	43
AUG	3,256,000	4,778,000	900,337	240	1087	891	991	208	124	153	55	11	42
SEP	1,974,000	2,361,000	210,489	624	994	902	956	196	95	140	45	17	32
OCT	971,000	1,867,000	1,078,275	192	1065	897	951	199	93	141	55	20	34
NOV	2,174,000	1,238,000	1,024,311	84	1023	892	921	163	88	120	53	19	28
DEC	1,242,000	1,274,000	1,285,030	0	1054	900	944	179	136	158	50	17	29

Total Amount Injected in 2010 - 18,857,947 gallons

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	P&A Date	ULSTR	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	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	CBM	No
7	0.23	JACQUE	2	30-045-34409	1483	1689	1689		H-27-29N-11W	HOLCOMB O&G	FRUITLAND COAL	CBM	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

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total 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	CBM	No
34	0.79	COOK	1	30-045-07940	6052	6226	6226		N-22-29N-11W	MANANA GAS INC	DAKOTA	Deep	Yes
35	0.79	COOK	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

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	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	CBM	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			Frtlnd		-34-29N-11W	Pre-Ongard	FRUITLAND SAND	DRY	No

Status	Total Wells	Pen Inj. Zone	
		Yes	No
P&A	15	3	12
Dry	4	0	4
INJ	2	2	0
CBM	7	2	5
Shallow	17	3	14
Deep	14	14	0
Total	59	24	35

Chavez, Carl J, EMNRD

From: Hurtado, Cindy [Cindy.Hurtado@wnr.com]
Sent: Wednesday, May 12, 2010 9:30 AM
To: Chavez, Carl J, EMNRD; 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
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

	WELL API NO. 30-045-29002-00
	5. Indicate Type of Lease STATE ☐ FEE X☐
	6. State Oil & Gas Lease No. 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 ☐ Gas Well ☐ OtherX (Disposal)	7. Lease Name or Unit Agreement Name Disposal 8. Well Number #001
2. Name of Operator Western Refining Southwest, Inc. – Bloomfield Refinery	9. OGRID Number 037218
3. Address of Operator #50 Road 4990 Bloomfield, NM 87413	10. Pool name or Wildcat Blanco/Mesa Verde
4. Well Location Unit Letter__I_: 2442___feet from the___South_____ line and __1250_feet from the __East_____line Section 27 Township 29 Range 11 NMPM County San Juan	
	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_____ Distance from nearest surface water_____ Pit Liner Thickness: mil Below-Grade Tank: Volume _____bbls; Construction Material_____	

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 ☐	
OTHER: MIT/BradenheadTest X☐		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 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Bloomfield Refinery requests permission to perform the annual High Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test on the Class I injection well referenced above on May 19, 2010.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.

SIGNATURE Cindy Hurtado TITLE Environmental Coordinator DATE 5/12/2010

Type or print name Cindy Hurtado E-mail address: cindy.hurtado@wnr.com Telephone No. (505)632-4161

For State Use Only

APPROVED BY: Carl J. Chavez TITLE Environmental Engr DATE 5/12/2010

Conditions of Approval (if any):

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
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

WELL API NO. 30-045-29002-00	
5. Indicate Type of Lease STATE ☐ FEE X☐	
6. State Oil & Gas Lease No. 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 ☐ Gas Well ☐ OtherX (Disposal)	7. Lease Name or Unit Agreement Name Disposal
	8. Well Number #001
2. Name of Operator Western Refining Southwest, Inc. – Bloomfeld Refinery	9. OGRID Number 037218
3. Address of Operator #50 Road 4990 Bloomfield, NM 87413	10. Pool name or Wildcat Blanco/Mesa Verde
4. Well Location Unit Letter__I_: 2442___feet from the___South_____ line and __1250_feet from the __East_____line Section 27 Township 29 Range 11 NMPM County San Juan	
	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_____ Distance from nearest surface water_____ Pit Liner Thickness: mil Below-Grade Tank: Volume _____bbls; Construction Material _____	

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 ☐	
OTHER: ☐		OTHER: MIT/BradenheadTest X☐	

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 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Bloomfield Refinery performed the annual High Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test on May 19, 2010. All tests were witnessed by Monica Kuehling of NMOCD-Aztec. The MIT held at 580 psi for 30 minutes.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. **I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.**

SIGNATURE Cindy Hurtado TITLE_ Environmental Coordinator__DATE___5/19/2010_____

Type or print name Cindy Hurtado E-mail address: cindy.hurtado@wnr.com Telephone No. (505)632-4161

For State Use Only

APPROVED BY:_____TITLE_____DATE_____

Conditions of Approval (if any):

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/3district.htm

BRADENHEAD TEST REPORT

(submit 1 copy to above address)

Date of Test 5-19-10 Operator San Juan Refining Co API #30-0 45-29002

Property Name Disposal Well No. 1 Location: Unit I Section 27 Township 29 Range 11

Well Status(Shut-In or Producing) Initial PSI: Tubing 918 Intermediate N/A Casing 164 Bradenhead 0

OPEN BRADENHEAD AND INTERMEDIATE TO ATMOSPHERE INDIVIDUALLY FOR 15 MINUTES EACH

PRESSURE

Testing	Bradenhead			INTERM	
	BH	Int	Csg	Int	Csg
TIME 5 min					
10 min					
15 min					
20 min					
25 min					
30 min					

FLOW CHARACTERISTICS

	BRADENHEAD	INTERMEDIATE
Steady Flow		
Surges		
Down to Nothing	✓	
Nothing		
Gas		
Gas & Water		
Water		

If bradenhead flowed water, check all of the descriptions that apply below:

CLEAR_____ FRESH_____ SALTY_____ SULFUR_____ BLACK_____

5 MINUTE SHUT-IN PRESSURE BRADENHEAD 0 INTERMEDIATE N/A

REMARKS: Puff when opened.

By Cindy Hurtado

Environmental Coordinator
(Position)

Witness M Monica Kuehling

E-mail address _____

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

MECHANICAL INTEGRITY TEST REPORT

(TA OR UIC)

Date of Test 5-19-10 Operator San Juan Refining Co. API # 30-0 45-29003

Property Name Disposal Well # 1 Location: Unit I Sec 27 Twn 29 Rge 11

Land Type:
State ____
Federal ____
Private ✓
Indian ____

Well Type:
Water Injection ____
Salt Water Disposal ✓
Gas Injection ____
Producing Oil/Gas ____
Pressure obervation ____

Temporarily Abandoned Well (Y/N): ____ TA Expires: ____

Casing Pres. 0 Tbg. SI Pres. ____ Max. Inj. Pres. ____
Bradenhead Pres. 0 Tbg. Inj. Pres. ____
Tubing Pres. 918
Int. Casing Pres. N/A

Pressured annulus up to 580 psi. for 30 mins. Test passed/failed

REMARKS:
Packer Set at 3221
Top Perf at 3276
Bradenhead Test Passed
Conviron Kill setting on panel through Menu

By Cindy Hurtado (Operator Representative)
Witness Monica Kuehling (NMOCD)

Environmental Coordinator (Position)

Revised 02-11-02

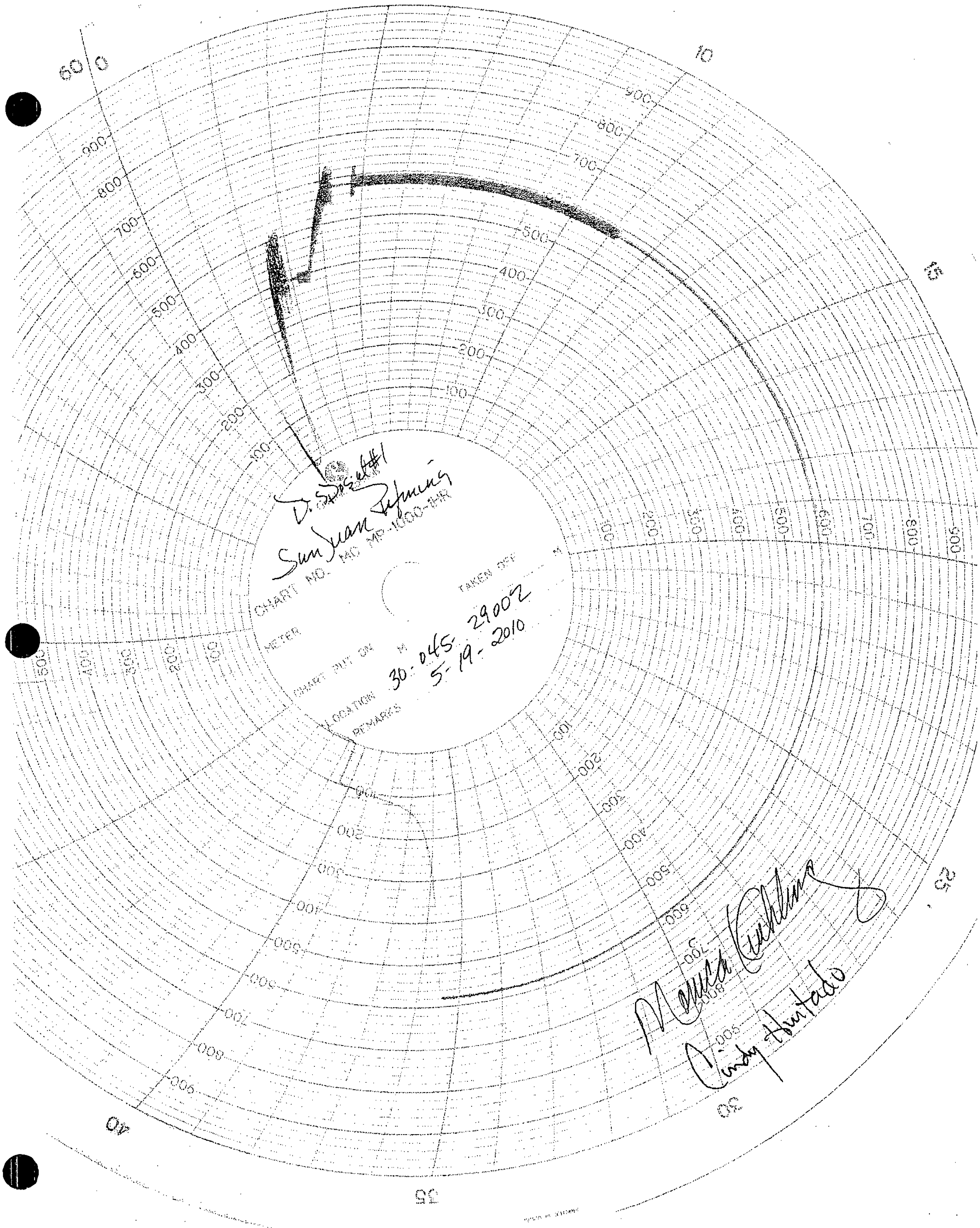


CHART NO. MC MP-1000-8HR
METER
CHART PUT ON M
TAKEN OFF M
LOCATION
REMARKS
San Juan Refining
30-045-29002
5-19-2010

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
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: 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,
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 I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

WELL API NO.
30-045-29002-00

5. Indicate Type of Lease
STATE ☐ FEE X☐

6. State Oil & Gas Lease No.
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.)

7. Lease Name or Unit Agreement Name
Disposal

1. Type of Well: Oil Well ☐ Gas Well ☐ OtherX (Disposal)

8. Well Number #001

2. Name of Operator
Western Refining Southwest, Inc. – Bloomfield Refinery

9. OGRID Number
037218

3. Address of Operator
#50 Road 4990 Bloomfield, NM 87413

10. Pool name or Wildcat
Blanco/Mesa Verde

4. Well Location
Unit Letter J : 2442 feet from the South line and 1250 feet from the East line
Section 27 Township 29 Range 11 NMPM County San Juan

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_____ Distance from nearest surface water_____

Pit Liner Thickness: _____ mil Below-Grade Tank: Volume _____ bbls; Construction Material _____

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 ☐	
OTHER: Annual Fall-Off Test X☐		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 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Bloomfield Refinery requests permission to perform the annual Fall-Off Test on the Class I injection well referenced above. The injection buildup period will begin on August 29, 2010. After 24 hours of stable injection the bottom hole pressure memory gauges will be lowered into the well (two memory gauges) and allowed to stabilize for 48 hours. The well will be shut-in for at least 72 hours.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.

SIGNATURE Cindy Hurtado TITLE Environmental Coordinator DATE 8/20/2010

Type or print name Cindy Hurtado E-mail address: cindy.hurtado@wnr.com Telephone No. (505)632-4161

For State Use Only

APPROVED BY: Carl J Chavez TITLE Environmental Engineer DATE 8/20/2010

Conditions of Approval (if any):

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

Order No.: 1001206

Dear Cindy Hurtado:

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

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Hall Environmental Analysis Laboratory, Inc. **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

Hall Environmental Analysis Laboratory, Inc.

Date: *10-Feb-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1001206	**Collection Date:**	1/14/2010 2:00:00 PM
Project:	Injection Well 1st QTR-2010	**Date Received:**	1/15/2010
Lab ID:	1001206-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **LJB**
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: **SNV**
Mercury	0.00039	0.00020		mg/L	1	1/21/2010 4:57:49 PM
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **SNV**
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
EPA METHOD 8270C: SEMIVOLATILES						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-chloroisopropyl)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	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *10-Feb-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1001206	**Collection Date:**	1/14/2010 2:00:00 PM
Project:	Injection Well 1st QTR-2010	**Date Received:**	1/15/2010
Lab ID:	1001206-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: LBJ
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 PM
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'-Dichlorobenzidine	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 PM
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 PM
Hexachloroethane	ND	50		µg/L	1	1/19/2010 11:09:40 PM
Indeno(1,2,3-cd)pyrene	ND	50		µg/L	1	1/19/2010 11:09:40 PM
Isophorone	ND	50		µg/L	1	1/19/2010 11:09:40 PM
2-Methylnaphthalene	ND	50		µg/L	1	1/19/2010 11:09:40 PM
2-Methylphenol	ND	50		µg/L	1	1/19/2010 11:09:40 PM
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 PM
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		µg/L	1	1/19/2010 11:09:40 PM
2-Nitroaniline	ND	50		µg/L	1	1/19/2010 11:09:40 PM
3-Nitroaniline	ND	50		µg/L	1	1/19/2010 11:09:40 PM
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 PM
2-Nitrophenol	ND	50		µg/L	1	1/19/2010 11:09:40 PM
4-Nitrophenol	ND	50		µg/L	1	1/19/2010 11:09:40 PM
Pentachlorophenol	ND	100		µg/L	1	1/19/2010 11:09:40 PM
Phenanthrene	52	50		µg/L	1	1/19/2010 11:09:40 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *10-Feb-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1001206	**Collection Date:**	1/14/2010 2:00:00 PM
Project:	Injection Well 1st QTR-2010	**Date Received:**	1/15/2010
Lab ID:	1001206-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						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		µg/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
cis-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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *10-Feb-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1001206	**Collection Date:**	1/14/2010 2:00:00 PM
Project:	Injection Well 1st QTR-2010	**Date Received:**	1/15/2010
Lab ID:	1001206-01	**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		µg/L	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
Trichloroethene (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
Vinyl chloride	ND	10		µg/L	10	1/18/2010 4:44:21 PM
Xylenes, 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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *10-Feb-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1001206	**Collection Date:**	1/14/2010 2:00:00 PM
Project:	Injection Well 1st QTR-2010	**Date Received:**	1/15/2010
Lab ID:	1001206-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SM 2320B: ALKALINITY						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 SOLIDS						Analyst: **MMS**
Total Dissolved Solids	6190	200		mg/L	1	1/22/2010 8:14:00 AM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the *Reporting Limit*	RL	*Reporting Limit*
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

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**
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		µg/L	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	ND	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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

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	1	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		µg/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/L	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-Tetrachloroethane	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		µg/L	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	1	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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602
Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

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	s.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 / eli-b

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602
Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

QA/QC Summary Report

Client: Hall Environmental
Project: 1001206

Report Date: 01/22/10
Work Order: C10010578

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW1010A									Batch: 100121A-FLSHPNT-S
Sample ID: LCS1_100121A	Laboratory Control Sample				Run: PM_FLASHPOINT A_100121				01/21/10 14:33
Flash Point (Ignitability)	90.8	°F	60	101	96	104			
- Flashpoint has been corrected for barometric pressure.									
Sample ID: MBLK1_100121A	Method Blank				Run: PM_FLASHPOINT A_100121				01/21/10 14:32
Flash Point (Ignitability)	> 140	°F	60						
- Flashpoint has been corrected for barometric pressure.									

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. • 2393 Salt Creek Highway (82601) • P.O. Box 3258 • Casper, WY 82602
Toll Free 888.235.0515 • 307.235.0515 • Fax 307.234.1639 • casper@energylab.com • www.energylab.com

QA/QC Summary Report

Client: Hall Environmental
Project: 1001206

Report Date: 01/26/10
Work Order: C10010578

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW846 Ch 7									Batch: B_44025
Sample ID: MB-44025	Method Blank				Run: SUB-B142181				01/22/10 13:41
Cyanide, Reactive	ND	mg/kg	0.05						
Method: SW846 Ch 7									Batch: B_R142154
Sample ID: MB-R142154	Method Blank				Run: SUB-B142154				01/22/10 11:00
Sulfide, Reactive	ND	mg/kg	10						
Sample ID: LCS-R142154	Laboratory Control Sample				Run: SUB-B142154				01/22/10 11:00
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: Western Refining Southwest, Inc.
Project: Injection Well 1st QTR-2010 **Work Order:** 1001206

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions											
Sample ID: MB		*MBLK*				Batch ID:	**R37163**	Analysis Date:	1/28/2010 4:08:14 PM		
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 ID:	**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 PM		
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 PM		
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 PM		
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			
Method: SM 2320B: Alkalinity											
Sample ID: MB		*MBLK*				Batch ID:	**R37000**	Analysis Date:	1/18/2010 3:57:00 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: 80PPM LCS		*LCS*				Batch ID:	**R37000**	Analysis Date:	1/18/2010 4:03:00 PM		
Alkalinity, Total (As CaCO3)	81.36	mg/L Ca	20	80	0	102	92.5	110			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 5ml rb		*MBLK*				Batch ID: **R36998**		Analysis 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								
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								
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								
2-Hexanone	ND	µg/L	10								
Isopropylbenzene	ND	µg/L	1.0								
4-Isopropyltoluene	ND	µg/L	1.0								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 5ml rb		*MBLK*				Batch ID: **R36998**		Analysis Date:	1/18/2010 9:41:25 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								
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: 100ng lcs		*LCS*				Batch ID: **R36998**		Analysis Date:	1/18/2010 11:06:25 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			
1,1-Dichloroethene	20.84	µg/L	1.0	20	0	104	80.2	128			
Trichloroethene (TCE)	22.69	µg/L	1.0	20	0	113	77.4	115			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-21147		*MBLK*				Batch ID:	21147	Analysis 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	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	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								
Fluorene	ND	µg/L	10								
Hexachlorobenzene	ND	µg/L	10								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-21147		*MBLK*				Batch ID:	**21147**	Analysis Date:		1/19/2010 2:56:45 PM	
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-21147		*LCS*				Batch ID:	**21147**	Analysis Date:		1/19/2010 3:26:09 PM	
Acenaphthene	74.70	µg/L	10	100	0	74.7	33.2	88.1			
4-Chloro-3-methylphenol	145.8	µg/L	10	200	0	72.9	26.5	101			
2-Chlorophenol	128.1	µg/L	10	200	0	64.1	27.5	88.7			
1,4-Dichlorobenzene	62.32	µg/L	10	100	0	62.3	27.2	74.1			
2,4-Dinitrotoluene	80.44	µg/L	10	100	0	80.4	32.6	107			
N-Nitrosodi-n-propylamine	65.36	µg/L	10	100	0	65.4	27.1	96.3			
4-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			
Pyrene	73.90	µg/L	10	100	0	73.9	27	96.3			
1,2,4-Trichlorobenzene	69.16	µg/L	10	100	0	69.2	30	77.9			
Sample ID: lcsd-21147		*LCSD*				Batch ID:	**21147**	Analysis Date:		1/20/2010 1:17:36 PM	
Acenaphthene	76.94	µg/L	10	100	0	76.9	33.2	88.1	2.95	30.5	
4-Chloro-3-methylphenol	150.9	µg/L	10	200	0	75.5	26.5	101	3.44	28.6	
2-Chlorophenol	118.6	µg/L	10	200	0	59.3	27.5	88.7	7.70	107	
1,4-Dichlorobenzene	63.72	µg/L	10	100	0	63.7	27.2	74.1	2.22	62.1	
2,4-Dinitrotoluene	88.76	µg/L	10	100	0	88.8	32.6	107	9.83	14.7	

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: lcsd-21147		*LCSD*				Batch ID:	**21147**	Analysis Date:		1/20/2010 1:17:36 PM	
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	
Method: EPA Method 7470: Mercury											
Sample ID: MBLK-21186		*MBLK*				Batch ID:	**21186**	Analysis Date:		1/21/2010 4:14:01 PM	
Mercury	ND	mg/L	0.00020								
Sample ID: LCS1-21186		*LCS*				Batch ID:	**21186**	Analysis Date:		1/21/2010 4:15:44 PM	
Mercury	0.004916	mg/L	0.00020	0.005	3E-05	97.6	80	120			
Method: EPA 6010B: Total Recoverable Metals											
Sample ID: MB-21166		*MBLK*				Batch ID:	**21166**	Analysis Date:		1/19/2010 1:22:12 PM	
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-21166		*LCS*				Batch ID:	**21166**	Analysis Date:		1/19/2010 1:24:25 PM	
Arsenic	0.5020	mg/L	0.020	0.5	0	100	80	120			
Barium	0.4952	mg/L	0.020	0.5	0	99.0	80	120			
Cadmium	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			
Lead	0.4919	mg/L	0.0050	0.5	0	98.4	80	120			
Magnesium	49.28	mg/L	1.0	50	0	98.6	80	120			
Potassium	51.47	mg/L	1.0	50	0	103	80	120			
Selenium	0.4879	mg/L	0.050	0.5	0	97.6	80	120			
Silver	0.5098	mg/L	0.0050	0.5	0	102	80	120			
Sodium	52.39	mg/L	1.0	50	0	105	80	120			
Method: SM2540C MOD: Total Dissolved Solids											
Sample ID: MBLK-21196		*MBLK*				Batch ID:	**21196**	Analysis Date:		1/22/2010 8:14:00 AM	
Total Dissolved Solids	ND	mg/L	20.0								
Sample ID: LCS1-21196		*LCS*				Batch ID:	**21196**	Analysis Date:		1/22/2010 8:14:00 AM	
Total Dissolved Solids	1024	mg/L	20.0	1000	0	102	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name **WESTERN REFINING SOUT** Date Received: **1/15/2010**

Work Order Number **1001206** Received by: **ARS**

Checklist completed by: _____ 1/15/10 Sample ID labels checked by: _____
Signature Date Initials

Matrix: Carrier name: UPS

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 ☑	
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 ☐		
Water - VOA vials have zero headspace? No VOA vials submitted ☐		Yes ☑	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☑	No ☐	N/A ☐	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐	
Container/Temp Blank temperature?	**1.5°**	*<6° C Acceptable* If given sufficient time to cool.		

Number of preserved bottles checked for pH: 2>12 2<2

<2 >12 unless noted below.

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4161

email or Fax#: 505-632-3911

QA/QC Package:
☑ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name: Injection Well 1st Qtr-2010

Project #:

Project Manager:

Sampler: Cindy

On Ice: ☑ Yes ☐ No

Sample Temperature: 1.5

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1002006	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1) TDS	EDB (Method 504.1) Backup	8310 (PNA or PAH)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F,Cl,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Sulfides	EC, pH, SO4, Alk, Cl	Air Bubbles (Y or N)
1-14-10	2p	H2O	Injection Well	3-VOA	HCl	1										X						
				1-Liter	Amber	1											X					
				1-500ml	HNO3	1							X									
				1-500ml		1												X				
				1-500ml	NaOH	1													X			
				1-500ml	Zn Acetate	1														X		
				1500ml		1				X											X	
				1-250m	H2SO4	1					X											
			Trip Blank 115%			2																

Date:	Time:	Relinquished by:	Received by:	Date	Time
1-14-10	3pm	Cindy Hurtado		1/15/10	10:25
Date:	Time:	Relinquished by:	Received by:	Date	Time

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.

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

Order No.: 1004554

Dear Cindy Hurtado:

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

Hall Environmental Analysis Laboratory, Inc.

Date: *01-Jun-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1004554	**Collection Date:**	4/22/2010 11:00:00 AM
Project:	Injection Well 2nd QTR 4-21-10	**Date Received:**	4/23/2010
Lab ID:	1004554-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **MMS**
Chloride	1200	10		mg/L	100	5/6/2010 3:11:57 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: SEMIVOLATILES						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)perylene	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 3:46:28 PM
Bis(2-chloroethyl)ether	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Bis(2-chloroisopropyl)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	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *01-Jun-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1004554	**Collection Date:**	4/22/2010 11:00:00 AM
Project:	Injection Well 2nd QTR 4-21-10	**Date Received:**	4/23/2010
Lab ID:	1004554-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: LBJ
2-Chloronaphthalene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
2-Chlorophenol	ND	50		µg/L	1	5/4/2010 3:46:28 PM
4-Chlorophenyl phenyl ether	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Chrysene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Di-n-butyl phthalate	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Di-n-octyl phthalate	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Dibenz(a,h)anthracene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Dibenzofuran	ND	50		µg/L	1	5/4/2010 3:46:28 PM
1,2-Dichlorobenzene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
1,3-Dichlorobenzene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
1,4-Dichlorobenzene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
3,3'-Dichlorobenzidine	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Diethyl phthalate	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Dimethyl phthalate	ND	50		µg/L	1	5/4/2010 3:46:28 PM
2,4-Dichlorophenol	ND	100		µg/L	1	5/4/2010 3:46:28 PM
2,4-Dimethylphenol	ND	50		µg/L	1	5/4/2010 3:46:28 PM
4,6-Dinitro-2-methylphenol	ND	100		µg/L	1	5/4/2010 3:46:28 PM
2,4-Dinitrophenol	ND	100		µg/L	1	5/4/2010 3:46:28 PM
2,4-Dinitrotoluene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
2,6-Dinitrotoluene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Fluoranthene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Fluorene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Hexachlorobenzene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Hexachlorobutadiene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Hexachlorocyclopentadiene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Hexachloroethane	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Indeno(1,2,3-cd)pyrene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Isophorone	ND	50		µg/L	1	5/4/2010 3:46:28 PM
2-Methylnaphthalene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
2-Methylphenol	ND	50		µg/L	1	5/4/2010 3:46:28 PM
3+4-Methylphenol	ND	50		µg/L	1	5/4/2010 3:46:28 PM
N-Nitrosodi-n-propylamine	ND	50		µg/L	1	5/4/2010 3:46:28 PM
N-Nitrosodimethylamine	ND	50		µg/L	1	5/4/2010 3:46:28 PM
N-Nitrosodiphenylamine	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Naphthalene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
2-Nitroaniline	ND	50		µg/L	1	5/4/2010 3:46:28 PM
3-Nitroaniline	ND	50		µg/L	1	5/4/2010 3:46:28 PM
4-Nitroaniline	ND	50		µg/L	1	5/4/2010 3:46:28 PM
Nitrobenzene	ND	50		µg/L	1	5/4/2010 3:46:28 PM
2-Nitrophenol	ND	50		µg/L	1	5/4/2010 3:46:28 PM
4-Nitrophenol	ND	50		µg/L	1	5/4/2010 3:46:28 PM

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *01-Jun-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1004554	**Collection Date:**	4/22/2010 11:00:00 AM
Project:	Injection Well 2nd QTR 4-21-10	**Date Received:**	4/23/2010
Lab ID:	1004554-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **LBJ**
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		µg/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
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *01-Jun-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1004554	**Collection Date:**	4/22/2010 11:00:00 AM
Project:	Injection Well 2nd QTR 4-21-10	**Date Received:**	4/23/2010
Lab ID:	1004554-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	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		µg/L	1	4/28/2010 1:44:39 PM
1,1-Dichloroethene	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
Hexachlorobutadiene	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/L	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:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *01-Jun-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1004554	**Collection Date:**	4/22/2010 11:00:00 AM
Project:	Injection Well 2nd QTR 4-21-10	**Date Received:**	4/23/2010
Lab ID:	1004554-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						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**
pH	7.60	0.1		pH units	1	4/27/2010 12:38:00 AM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	3060	100		mg/L	1	4/27/2010 3:58:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *01-Jun-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Trip Blank
Lab Order:	1004554	**Collection Date:**	
Project:	Injection Well 2nd QTR 4-21-10	**Date Received:**	4/23/2010
Lab ID:	1004554-02	**Matrix:**	TRIP BLANK

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: HL
Benzene	ND	1.0		µg/L	1	4/27/2010 6:42:25 PM
Toluene	ND	1.0		µg/L	1	4/27/2010 6:42:25 PM
Ethylbenzene	ND	1.0		µg/L	1	4/27/2010 6:42:25 PM
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	4/27/2010 6:42:25 PM
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	4/27/2010 6:42:25 PM
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 PM
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	ND	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 PM
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
Bromomethane	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 PM
Chlorobenzene	ND	1.0		µg/L	1	4/27/2010 6:42:25 PM
Chloroethane	ND	2.0		µg/L	1	4/27/2010 6:42:25 PM
Chloroform	ND	1.0		µg/L	1	4/27/2010 6:42:25 PM
Chloromethane	ND	1.0		µg/L	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		µg/L	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		µg/L	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		µg/L	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

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *01-Jun-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Trip Blank
Lab Order:	1004554	**Collection Date:**	
Project:	Injection Well 2nd QTR 4-21-10	**Date Received:**	4/23/2010
Lab ID:	1004554-02	**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		µg/L	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		µg/L	1	4/27/2010 6:42:25 PM
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	4/27/2010 6:42:25 PM
trans-1,2-DCE	ND	1.0		µg/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	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

ESC
L·A·B S·C·I·E·N·C·E·S
YOUR LAB OF CHOICE

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

May 05, 2010

ESC Sample # : L456130-01

Site ID :

Project # : 1004554

Date Received : April 27, 2010
Description : 1004554

Sample ID : INJECTION WELL

Collected By :
Collection Date : 04/22/10 11:00

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.

Reported: 05/05/10 17:03 Printed: 05/05/10 17:03
L456130-01 (FLASHPOINT) - Did Not Flash @ 170 F

ESC
L·A·B S·C·I·E·N·C·E·S
YOUR LAB OF CHOICE

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

L456130

May 05, 2010

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
Reactive Sulfide (SW846 7.3.4.1)	< 25	mg/l			WG475486	04/28/10 15:10
Corrosivity	5.10				WG475800	04/29/10 17:19
Reactive CN (SW846 7.3.3.2)	< .125	mg/l			WG475450	04/29/10 17:33

Duplicate

Analyte	Units	Result	Duplicate	RPD	Limit	Ref Samp	Batch
Reactive Sulfide (SW846 7.3.4.1)	mg/l	0	0	0	20	L456130-01	WG475446
Corrosivity		0	0	0	10	L456130-01	WG475800
Reactive CN (SW846 7.3.3.2)	mg/l	0	0	0	20	L456130-01	WG475450
Flashpoint	deg F	0	0	0	20	L456675-01	WG475968

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
Reactive Sulfide (SW846 7.3.4.1)	mg/l	100	82.0	82.0	0-130	WG475446
Corrosivity		6.46	6.40	99.1	97.9-100.8	WG475800
Flashpoint	deg F	82	85.0	104.	96-104	WG475968

Laboratory Control Sample Duplicate

Analyte	Units	Result	Ref	%Rec	Limit	RPD	Limit	Batch
Reactive Sulfide (SW846 7.3.4.1)	mg/l	76.0	82.0	76.0	0-130	7.59	20	WG475446
Corrosivity		6.40	6.40	99.0	97.9-100.8	0	10	WG475800
Flashpoint	deg F	82.0	85.0	100.	96-104	3.59	7	WG475968

Batch number /Run number / Sample number cross reference

WG475446: R1199436: L456130-01
WG475800: R1200800: L456130-01
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

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions											
Sample ID: MB		*MBLK*				Batch ID:	**R38365**	Analysis Date:	4/23/2010 12:19:50 PM		
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 AM		
Chloride	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		*MBLK*				Batch ID:	**R38552**	Analysis Date:	5/5/2010 3:04:25 PM		
Chloride	ND	mg/L	0.50								
Sulfate	ND	mg/L	0.50								
Sample ID: LCS		*LCS*				Batch ID:	**R38365**	Analysis Date:	4/23/2010 12:37:15 PM		
Chloride	5.126	mg/L	0.50	5	0	103	90	110			
Sulfate	10.36	mg/L	0.50	10	0	104	90	110			
Sample ID: LCS		*LCS*				Batch ID:	**R38365**	Analysis Date:	4/24/2010 4:34:46 AM		
Chloride	4.958	mg/L	0.50	5	0	99.2	90	110			
Sulfate	9.968	mg/L	0.50	10	0	99.7	90	110			
Sample ID: LCS		*LCS*				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			
Sulfate	10.33	mg/L	0.50	10	0	103	90	110			
Method: SM 2320B: Alkalinity											
Sample ID: MB		*MBLK*				Batch ID:	**R38393**	Analysis Date:	4/26/2010 2:53:00 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: MB-II		*MBLK*				Batch ID:	**R38393**	Analysis Date:	4/26/2010 9:33:00 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: MB		*MBLK*				Batch ID:	**R38419**	Analysis Date:	4/27/2010 2:22:00 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: 80PPM LCS		*LCS*				Batch ID:	**R38393**	Analysis Date:	4/26/2010 2:58:00 PM		
Alkalinity, Total (As CaCO3)	79.36	mg/L Ca	20	80	0	99.2	96.5	104			
Sample ID: 80PPM LCS-II		*LCS*				Batch ID:	**R38393**	Analysis Date:	4/26/2010 9:39:00 PM		
Alkalinity, Total (As CaCO3)	79.96	mg/L Ca	20	80	0	100	96.5	104			
Sample ID: 80PPM LCS		*LCS*				Batch ID:	**R38419**	Analysis Date:	4/27/2010 2:28:00 PM		
Alkalinity, Total (As CaCO3)	79.76	mg/L Ca	20	80	0	99.7	96.5	104			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 5ml rb		*MBLK*				Batch ID: **R38406**		Analysis Date:	4/27/2010 9:17:56 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	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								
1,1-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:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 5ml rb		*MBLK*				Batch ID: **R38406**		Analysis Date:	4/27/2010 9:17:56 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								
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: b8		*MBLK*				Batch ID: **R38406**		Analysis 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								
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								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b8		*MBLK*					Batch ID: **R38406**		Analysis Date:	4/27/2010 11:35:09 PM	
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								
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	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-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: **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

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 5ml rb		*MBLK*				Batch ID: **R38447**		Analysis Date:	4/28/2010 9:44:36 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	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								
1,1-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:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 5ml rb		*MBLK*				Batch ID:	**R38447**	Analysis Date:	4/28/2010 9:44:36 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								
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: 100ng lcs		*LCS*				Batch ID:	**R38406**	Analysis Date:	4/27/2010 10:46:41 AM		
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			
1,1-Dichloroethene	19.05	µg/L	1.0	20	0	95.2	90.3	138			
Trichloroethene (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 PM		
Benzene	18.01	µg/L	1.0	20	0	90.0	82.4	116			
Toluene	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			
1,1-Dichloroethene	19.12	µg/L	1.0	20	0	95.6	90.3	138			
Trichloroethene (TCE)	17.50	µg/L	1.0	20	0	87.5	64	129			
Sample ID: 100ng lcs		*LCS*				Batch ID:	**R38447**	Analysis Date:	4/28/2010 11:18:25 AM		
Benzene	17.81	µg/L	1.0	20	0	89.0	82.4	116			
Toluene	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			
1,1-Dichloroethene	18.98	µg/L	1.0	20	0	94.9	90.3	138			
Trichloroethene (TCE)	18.13	µg/L	1.0	20	0	90.7	64	129			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-22099		*MBLK*				Batch ID:	**22099**	Analysis Date:		**5/4/2010 11:39:59 AM**	
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	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	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								
Fluorene	ND	µg/L	10								
Hexachlorobenzene	ND	µg/L	10								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-22099		*MBLK*				Batch ID:	**22099**	Analysis Date:		5/4/2010 11:39:59 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								
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-22099		*LCS*				Batch ID:	**22099**	Analysis Date:		5/4/2010 2:45:06 PM	
Acenaphthene	50.98	µg/L	10	100	0	51.0	33.2	88.1			
4-Chloro-3-methylphenol	80.56	µg/L	10	200	0	40.3	26.5	101			
2-Chlorophenol	80.66	µg/L	10	200	0	40.3	27.5	88.7			
1,4-Dichlorobenzene	37.40	µg/L	10	100	0	37.4	27.2	74.1			
2,4-Dinitrotoluene	42.14	µg/L	10	100	0	42.1	32.6	107			
N-Nitrosodi-n-propylamine	42.06	µg/L	10	100	0	42.1	27.1	96.3			
4-Nitrophenol	50.10	µg/L	10	200	0	25.1	6.78	74.7			
Pentachlorophenol	69.66	µg/L	20	200	3.92	32.9	14.8	113			
Phenol	53.62	µg/L	10	200	0	26.8	17	53.4			
Pyrene	40.80	µg/L	10	100	0	40.8	27	96.3			
1,2,4-Trichlorobenzene	44.66	µg/L	10	100	0	44.7	30	77.9			
Sample ID: lcsd-22099		*LCSD*				Batch ID:	**22099**	Analysis Date:		5/4/2010 3:15:46 PM	
Acenaphthene	42.82	µg/L	10	100	0	42.8	33.2	88.1	17.4	30.5	
4-Chloro-3-methylphenol	85.98	µg/L	10	200	0	43.0	26.5	101	6.51	28.6	
2-Chlorophenol	85.80	µg/L	10	200	0	42.9	27.5	88.7	6.18	107	
1,4-Dichlorobenzene	35.58	µg/L	10	100	0	35.6	27.2	74.1	4.99	62.1	
2,4-Dinitrotoluene	43.06	µg/L	10	100	0	43.1	32.6	107	2.16	14.7	

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: lcsd-22099		*LCSD*				Batch ID:	**22099**	Analysis Date:		5/4/2010 3:15:46 PM	
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**	Analysis Date:		5/4/2010 3:28:56 PM	
Mercury	ND	mg/L	0.00020								
Sample ID: LCS-22150		*LCS*				Batch ID:	**22150**	Analysis 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**	Analysis Date:		5/4/2010 3:32:33 PM	
Mercury	0.005593	mg/L	0.00020	0.005	0	112	80	120	2.32	0	

Qualifiers:

E	*Estimated value*	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA 6010B: Total Recoverable Metals											
Sample ID: MB-22113		*MBLK*				Batch ID:	**22113**	Analysis Date:	5/3/2010 12:16:43 PM		
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-22113		*LCS*				Batch ID:	**22113**	Analysis Date:	5/3/2010 12:18:52 PM		
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	51.96	mg/L	1.0	50	0	104	80	120			
Chromium	0.5065	mg/L	0.0060	0.5	0	101	80	120			
Lead	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	0.5	0.0011	102	80	120			
Sodium	54.84	mg/L	1.0	50	0	110	80	120			
Sample ID: LCS-22113		*LCS*				Batch ID:	**22113**	Analysis Date:	5/3/2010 12:21:59 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			
Lead	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	0.5	0.0011	102	80	120			
Sodium	54.90	mg/L	1.0	50	0	110	80	120			
Method: SM2540C MOD: Total Dissolved Solids											
Sample ID: MB-22067		*MBLK*				Batch ID:	**22067**	Analysis Date:	4/27/2010 3:58:00 PM		
Total Dissolved Solids	ND	mg/L	20.0								
Sample ID: LCS-22067		*LCS*				Batch ID:	**22067**	Analysis Date:	4/27/2010 3:58:00 PM		
Total Dissolved Solids	1032	mg/L	20.0	1000	0	103	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name WESTERN REFINING SOUT Date Received: 4/23/2010

Work Order Number 1004554 Received by: ARS

Checklist completed by: _____ 4/23/10 Sample ID labels checked by: _____

Signature Date Initials

Matrix: Carrier name: UPS

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 ☑	
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 ☐		
Water - VOA vials have zero headspace?	No VOA vials submitted ☐	Yes ☑	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☑	No ☐	N/A ☐	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐	

Number of preserved bottles checked for pH: 2 2

<2 >12 unless noted below

Container/Temp Blank temperature? **4.9°** *<6° C Acceptable*
If given sufficient time to cool.

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4161

email or Fax#: 505-632-3911

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other _____

☐ EDD (Type) _____

Turn-Around Time:
☒ Standard ☐ Rush _____

Project Name:
Injection Well 2nd QTR 4-21-10

Project #:

Project Manager:

Sampler: GH KMK

On Ice: ☒ Yes ☐ No

Sample Temperature: 4.1

HEAL No. 1004554

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	
4-22-10	11AM	H_2O	Injection Well	3-VOA	HCl	1
				1-Liter	Amber	1
				1-500ml	←	1
				1-500ml	←	1
				1-125ml	H_2SO_4	1
				1-500ml	HNO_3	1
				1-500ml	NaOH	1
				1-500ml	Zinc Acetate	1
			Trip Blank			2

Date:	Time:	Relinquished by:	Received by:	Date	Time
4-22-10	2:45p	Cindy Hurtado			
				4/23/10	10:20
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks:

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TDS	Back 4D	8310 (PNA or PAH)	RCRA 8 Metals Ca, Mg, Na, K	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Sulfides	Ec, pH, SO_4, Alk, Cl	Air Bubbles (Y or N)
									X						
										X					
											X				
			X											X	
				X											
						X									
												X			
													X		

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.

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

Order No.: 1007798

Dear Cindy Hurtado:

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,

for Andy Freeman, Laboratory Manager

NM Lab # NM9425 NM0901
AZ license # AZ0682
ORELAP Lab # NM100001
Texas Lab# T104704424-08-TX

Hall Environmental Analysis Laboratory, Inc.

Date: *09-Aug-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1007798	**Collection Date:**	7/21/2010 8:30:00 AM
Project:	Injection Well 3rd QTR 7/21/10	**Date Received:**	7/22/2010
Lab ID:	1007798-01	**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
Chromium	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	ND	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: SEMIVOLATILES						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	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *09-Aug-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1007798	**Collection Date:**	7/21/2010 8:30:00 AM
Project:	Injection Well 3rd QTR 7/21/10	**Date Received:**	7/22/2010
Lab ID:	1007798-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: LBJ
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-butyl 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	ND	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
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *09-Aug-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1007798	**Collection Date:**	7/21/2010 8:30:00 AM
Project:	Injection Well 3rd QTR 7/21/10	**Date Received:**	7/22/2010
Lab ID:	1007798-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						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	7/26/2010 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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *09-Aug-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1007798	**Collection Date:**	7/21/2010 8:30:00 AM
Project:	Injection Well 3rd QTR 7/21/10	**Date Received:**	7/22/2010
Lab ID:	1007798-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						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 PM
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 PM
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-Isopropyltoluene	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	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *09-Aug-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1007798	**Collection Date:**	7/21/2010 8:30:00 AM
Project:	Injection Well 3rd QTR 7/21/10	**Date Received:**	7/22/2010
Lab ID:	1007798-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						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 SOLIDS						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

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	°F		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.

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 ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions											
Sample ID: MB		*MBLK*				Batch ID:	**R39990**	Analysis Date:	7/22/2010 10:08:01 AM		
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 AM		
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 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 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			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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 ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 1007798-01a msd		*MSD*				Batch ID: **R40039**		Analysis Date:		7/26/2010 3:14:17 PM	
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-Dichloroethene	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**		Analysis Date:		7/26/2010 9:32:51 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								
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-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								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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 ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b2		*MBLK*				Batch ID: **R40039**		Analysis Date:	7/26/2010 9:32:51 AM		
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 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-Trichloropropane	ND	µg/L	2.0								
Vinyl chloride	ND	µg/L	1.0								
Xylenes, Total	ND	µg/L	1.5								
Sample ID: b6		*MBLK*				Batch ID: **R40039**		Analysis Date:	7/26/2010 7:37:36 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								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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 ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b6		*MBLK*				**Batch ID: R40039**		**Analysis Date: 7/26/2010 7:37:36 PM**			
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								
1,1-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								
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								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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 ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b6		*MBLK*				Batch ID:	**R40039**	Analysis Date:	7/26/2010 7:37:36 PM		
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: 100ng lcs		*LCS*				Batch ID:	**R40039**	Analysis Date:	7/26/2010 10:25:19 AM		
Benzene	19.06	µg/L	1.0	20	0	95.3	82.4	116			
Toluene	22.82	µg/L	1.0	20	0	114	89.5	123			
Chlorobenzene	21.00	µg/L	1.0	20	0	105	87.8	120			
1,1-Dichloroethene	21.41	µg/L	1.0	20	0	107	90.3	138			
Trichloroethene (TCE)	17.98	µg/L	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 PM		
Benzene	19.84	µg/L	1.0	20	0	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	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	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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 ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-23145		*MBLK*				**Batch ID: 23145**		**Analysis Date: 7/28/2010 12:10:57 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	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	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								
Fluorene	ND	µg/L	10								
Hexachlorobenzene	ND	µg/L	10								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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 ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-23145		*MBLK*				**Batch ID: 23145**		**Analysis Date: 7/28/2010 12:10:57 PM**			
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-23145		*LCS*				**Batch ID: 23145**		**Analysis Date: 7/28/2010 12:41:12 PM**			
Acenaphthene	55.44	µg/L	10	100	0	55.4	29.3	113			
4-Chloro-3-methylphenol	145.2	µg/L	10	200	0	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			
4-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			
1,2,4-Trichlorobenzene	55.30	µg/L	10	100	0	55.3	23	107			
Sample ID: lcsd-23145		*LCSD*				**Batch ID: 23145**		**Analysis 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	
4-Chloro-3-methylphenol	165.0	µg/L	10	200	0	82.5	23.3	123	12.8	28.6	
2-Chlorophenol	122.1	µg/L	10	200	0	61.1	23.9	112	13.1	107	
1,4-Dichlorobenzene	55.38	µg/L	10	100	0	55.4	16.5	106	12.8	62.1	
2,4-Dinitrotoluene	70.84	µg/L	10	100	0	70.8	27.7	126	23.6	14.7	R

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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 ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: lcsd-23145		*LCSD*				Batch ID: **23145**		Analysis 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**		Analysis Date:		7/26/2010 5:21:09 PM	
Mercury	ND	mg/L	0.00020								
Sample ID: LCS-23144		*LCS*				Batch ID: **23144**		Analysis 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		*LCS*				Batch ID: **23144**		Analysis Date:		7/26/2010 5:24:46 PM	
Mercury	0.005365	mg/L	0.00020	0.005	0	107	80	120	1.79	0	
Method: EPA 6010B: Total Recoverable Metals											
Sample ID: MB-23130		*MBLK*				Batch ID: **23130**		Analysis Date:		7/29/2010 3:03:07 PM	
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-23130		*LCS*				Batch ID: **23130**		Analysis Date:		7/29/2010 3:15:05 PM	
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	0.4661	mg/L	0.0060	0.5	0	93.2	80	120			
Lead	0.4658	mg/L	0.0050	0.5	0	93.2	80	120			
Magnesium	52.35	mg/L	1.0	50	0	105	80	120			
Potassium	55.81	mg/L	1.0	50	0.0462	112	80	120			
Selenium	0.4724	mg/L	0.050	0.5	0	94.5	80	120			
Silver	0.4872	mg/L	0.0050	0.5	0	97.4	80	120			
Sodium	54.98	mg/L	1.0	50	0	110	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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 ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SM2540C MOD: Total Dissolved Solids											
Sample ID: MB-23142		*MBLK*				Batch ID:	**23142**	Analysis Date:	7/27/2010 1:27:00 PM		
Total Dissolved Solids	ND	mg/L	20.0								
Sample ID: LCS-23142		*LCS*				Batch ID:	**23142**	Analysis Date:	7/27/2010 1:27:00 PM		
Total Dissolved Solids	1014	mg/L	20.0	1000	0	101	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

QA/QC Summary Report

Client: Hall Environmental
Project: 1007798

Report Date: 08/02/10
Work Order: B10072234

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW1010A										Batch: R151335
Sample ID: LCS-R151335	Laboratory Control Sample					Run: PENSKY MARTEN CLOSED C			07/27/10 10:00	
Flash Point (Ignitability)		90.0	°F	30	100	98	102			
Sample ID: LCSD-R151335	Laboratory Control Sample Duplicate					Run: PENSKY MARTEN CLOSED C			07/12/10 11:00	
Flash Point (Ignitability)		90.0	°F	30	100	98	102			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Client: Hall Environmental
Project: 1007798

Report Date: 08/02/10
Work Order: B10072234

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW846 Ch 7										Batch: 47890
Sample ID: MB-47890		Method Blank				Run: AUTOAN201-B_100728B				07/28/10 15:42
Cyanide, Reactive		ND	mg/kg	0.05						
Method: SW846 Ch 7										Batch: R151368
Sample ID: MB-R151368		Method Blank				Run: MISC-HZW_100727B				07/27/10 08:00
Sulfide, Reactive		ND	mg/kg	10						
Sample ID: LCS-R151368		Laboratory Control 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
Project: 1007798

Report Date: 08/02/10
Work Order: B10072234

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW9040C									Analytical Run: PH METER_100730B	
Sample ID: ICV	Initial Calibration Verification Standard								07/30/10 13:00	
pH of Liquid Waste		4.02	s.u.	0.10	100	98	102			
Method: SW9040C									Batch: R151564	
Sample ID: B10072075-001ADUP	Sample Duplicate					Run: PH METER_100730B			07/30/10 13:00	
pH of Liquid Waste		ND	s.u.	0.10					10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name **WESTERN REFINING SOUT** Date Received: **7/22/2010**

Work Order Number **1007798** Received by: **TLS**

Checklist completed by: _____ 7/22/10 Sample ID labels checked by: _____
Signature Date Initials

Matrix: Carrier name: UPS

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 ☐	
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 bottles checked for pH:
Water - VOA vials have zero headspace? No VOA vials submitted ☐		Yes ☑	No ☐	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 noted below.*
Container/Temp Blank temperature?	**3.6°**	*<6° C Acceptable* If given sufficient time to cool.		

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4161

email or Fax#: 505-632-3911

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other _____

☐ EDD (Type) _____

Turn-Around Time:
☒ Standard ☐ Rush _____

Project Name:
Injection Well 3rd QTR 7-21-10

Project #:

Project Manager:

Sampler: Bob

On Ice: ☒ Yes ☐ No

Sample Temperature: 3.6

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 100-1192
7-21-10	8:30	H_2O	Injection Well	3-VOA	HCl	1
				1-liter	Amber	1
				1-500 ml	—	1
				1-500 ml	—	1
				1-125 ml	H_2SO_4	1
				1-500 ml	HNO_3	1
				1-500 ml	NaOH	1
				1-500 ml	Zinc Acetate	1

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	~~TPH (Method 418.1)~~ TDS	~~EDB (Method 504.1)~~ Back up	8310 (PNA or PAH)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	EC, pH, SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
									X						
										X					
											X				
			X										X		
				X											
						X									
												X			
													X	X	

Date:	Time:	Relinquished by:	Received by:	Date	Time
7-21-10	3:00	Robert Knabon		7/22/10	1050
Date:	Time:	Relinquished by:	Received by:	Date	Time

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.

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

Order No.: 1010B70

Dear Cindy Hurtado:

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

Hall Environmental Analysis Laboratory, Inc.

Date: *15-Nov-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1010B70	**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 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 RECOVERABLE 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: SEMIVOLATILES						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		µg/L	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		µg/L	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
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

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 8270C: SEMIVOLATILES						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/L	1	11/1/2010 1:08:54 PM
Hexachloroethane	ND	50.0		µg/L	1	11/1/2010 1:08:54 PM
Indeno(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	ND	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		µg/L	1	11/1/2010 1:08:54 PM
Nitrobenzene	ND	50.0		µg/L	1	11/1/2010 1:08:54 PM
2-Nitrophenol	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
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *15-Nov-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1010B70	**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: SEMIVOLATILES						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 5:02:06 PM
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,2,4-Trimethylbenzene	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-Chlorotoluene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

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 8260B: VOLATILES						Analyst: **MMS**
cis-1,2-DCE	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/29/2010 5:02:06 PM
Dibromochloromethane	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
Dibromomethane	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,4-Dichlorobenzene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
Dichlorodifluoromethane	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,1-Dichloroethane	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,1-Dichloroethene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,2-Dichloropropane	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,3-Dichloropropane	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
2,2-Dichloropropane	ND	2.0		µg/L	1	10/29/2010 5:02:06 PM
1,1-Dichloropropene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
Hexachlorobutadiene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
2-Hexanone	ND	10		µg/L	1	10/29/2010 5:02:06 PM
Isopropylbenzene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
4-Isopropyltoluene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
4-Methyl-2-pentanone	ND	10		µg/L	1	10/29/2010 5:02:06 PM
Methylene Chloride	ND	3.0		µg/L	1	10/29/2010 5:02:06 PM
n-Butylbenzene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
n-Propylbenzene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
sec-Butylbenzene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
Styrene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
tert-Butylbenzene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	10/29/2010 5:02:06 PM
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
trans-1,2-DCE	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
Trichlorofluoromethane	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/29/2010 5:02:06 PM
Vinyl chloride	ND	1.0		µg/L	1	10/29/2010 5:02:06 PM
Xylenes, Total	ND	1.5		µg/L	1	10/29/2010 5:02:06 PM
Surr: 1,2-Dichloroethane-d4	97.5	77.7-113		%REC	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

Hall Environmental Analysis Laboratory, Inc.

Date: *15-Nov-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	1010B70	**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 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		%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		mg/L CaCO3	1	11/3/2010 3:42:00 PM
Carbonate	ND	2.0		mg/L CaCO3	1	11/3/2010 3:42:00 PM
Bicarbonate	280	20		mg/L CaCO3	1	11/3/2010 3:42:00 PM
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: **IC**
Specific Conductance	1400	0.010		µmhos/cm	1	11/3/2010 3:42:00 PM
SM4500-H+B: PH						Analyst: **IC**
pH	7.16	0.100		pH units	1	11/3/2010 3:42:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	982	40.0		mg/L	1	11/1/2010 7:37:00 AM

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *15-Nov-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Trip Blank
Lab Order:	1010B70	**Collection Date:**	
Project:	Injection Well 4th QTR 10-25-10	**Date Received:**	10/27/2010
Lab ID:	1010B70-02	**Matrix:**	TRIP BLANK

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **BDH**
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 PM
Ethylbenzene	ND	1.0		µg/L	1	10/28/2010 4:52:05 PM
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	10/28/2010 4:52:05 PM
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 PM
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 PM
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		µg/L	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
1,1-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

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

Hall Environmental Analysis Laboratory, Inc.

Date: *15-Nov-10*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Trip Blank
Lab Order:	1010B70	**Collection Date:**	
Project:	Injection Well 4th QTR 10-25-10	**Date Received:**	10/27/2010
Lab ID:	1010B70-02	**Matrix:**	TRIP BLANK

Analyses	Result	PQL	Qual	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-Tetrachloroethane	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
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- NC Non-Chlorinated
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitation Limit
- S Spike recovery outside accepted recovery limits

Inorganic non-metals

Client: **Hall Environmental Analysis Laboratory** Laboratory ID: **LJ29015-001**

Description: **1010B70-01E/Injection Well** Matrix: **Aqueous**

Date Sampled: **10/25/2010 1020**

Date Received: **10/29/2010**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Ignitability) 1010A	1	11/08/2010 1730	SAS		46089
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	
1		(Reactive Sul) 7.3.4	1	11/09/2010 1654	SNM	11/09/2010 1000	

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Ignitability (Pensky-Martens Closed-Cup)		**1010A**	**>140**				**° F**	**1**
pH		**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
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

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	LowLimit	HighLimit	%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 AM		
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 AM		
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: Alkalinity											
Sample ID: MB		*MBLK*				Batch ID:	**R41937**	Analysis Date:	11/3/2010 12:01:00 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: MB-2		*MBLK*				Batch ID:	**R41937**	Analysis Date:	11/3/2010 5:04:00 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		*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 PM		
Alkalinity, Total (As CaCO3)	79.32	mg/L Ca	20	80	0	99.2	96.5	104			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 5mL rb		*MBLK*									
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-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								

Batch ID: **R41845** **Analysis Date:** 10/28/2010 10:12:01 AM

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 5mL rb		*MBLK*									
				Batch ID: **R41845**			Analysis Date: 10/28/2010 10:12:01 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								
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: 5ml rb		*MBLK*									
				Batch ID: **R41879**			Analysis Date: 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								
1,3,5-Trimethylbenzene	ND	µg/L	1.00								
1,2-Dichloroethane (EDC)	ND	µg/L	1.00								
1,2-Dibromoethane (EDB)	ND	µg/L	1.00								
Naphthalene	ND	µg/L	2.00								
1-Methylnaphthalene	ND	µg/L	4.00								
2-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								
Bromomethane	ND	µg/L	3.00								
2-Butanone	ND	µg/L	10.0								
Carbon disulfide	ND	µg/L	10.0								
Carbon Tetrachloride	ND	µg/L	1.00								
Chlorobenzene	ND	µg/L	1.00								
Chloroethane	ND	µg/L	2.00								
Chloroform	ND	µg/L	1.00								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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

Method: EPA Method 8260B: VOLATILES

Sample ID: 5ml rb *MBLK* Batch ID: R41879 Analysis Date: 10/29/2010 10:04:17 AM

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
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	ND	µg/L	1.00								
Dibromomethane	ND	µg/L	1.00								
1,2-Dichlorobenzene	ND	µg/L	1.00								
1,3-Dichlorobenzene	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								
Hexachlorobutadiene	ND	µg/L	1.00								
2-Hexanone	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								
Tetrachloroethene (PCE)	ND	µg/L	1.00								
trans-1,2-DCE	ND	µg/L	1.00								
trans-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								
1,1,1-Trichloroethane	ND	µg/L	1.00								
1,1,2-Trichloroethane	ND	µg/L	1.00								
Trichloroethene (TCE)	ND	µg/L	1.00								
Trichlorofluoromethane	ND	µg/L	1.00								
1,2,3-Trichloropropane	ND	µg/L	2.00								
Vinyl chloride	ND	µg/L	1.00								
Xylenes, Total	ND	µg/L	1.50								

Sample ID: b6 *MBLK* Batch ID: R41901 Analysis Date: 11/1/2010 4:25:32 PM

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b6		*MBLK*									
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-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								

Batch ID: R41901 Analysis Date: 11/1/2010 4:25:32 PM

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b6		*MBLK*				**Batch ID: R41901**		**Analysis Date:**	11/1/2010 4:25:32 PM		
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-Trichloropropane	ND	µg/L	2.0								
Vinyl chloride	ND	µg/L	1.0								
Xylenes, Total	ND	µg/L	1.5								
Sample ID: 100ng lcs		*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			
Toluene	20.58	µg/L	1.0	20	0	103	81	114			
Chlorobenzene	20.71	µg/L	1.0	20	0	104	85.2	113			
1,1-Dichloroethene	18.74	µg/L	1.0	20	0	93.7	79.6	124			
Trichloroethene (TCE)	16.21	µg/L	1.0	20	0	81.0	78.3	102			
Sample ID: 100ng lcs		*LCS*				**Batch ID: R41879**		**Analysis Date:**	10/29/2010 10:59:20 AM		
Benzene	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			
1,1-Dichloroethene	17.62	µg/L	1.0	20	0	88.1	79.6	124			
Trichloroethene (TCE)	18.89	µg/L	1.0	20	0	94.5	78.3	102			
Sample ID: 100ng lcs		*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			
Toluene	21.15	µg/L	1.0	20	0	106	81	114			
Chlorobenzene	20.01	µg/L	1.0	20	0	100	85.2	113			
1,1-Dichloroethene	21.46	µg/L	1.0	20	0	107	79.6	124			
Trichloroethene (TCE)	16.38	µg/L	1.0	20	0	81.9	78.3	102			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-24313		*MBLK*				**Batch ID: 24313**		**Analysis Date: 11/1/2010 9:03:09 AM**			
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 phthalate	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								
4-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								
1,2-Dichlorobenzene	ND	µg/L	5.00								
1,3-Dichlorobenzene	ND	µg/L	10.0								
1,4-Dichlorobenzene	ND	µg/L	5.00								
3,3'-Dichlorobenzidine	ND	µg/L	10.0								
Diethyl phthalate	ND	µg/L	10.0								
Dimethyl phthalate	ND	µg/L	10.0								
2,4-Dichlorophenol	ND	µg/L	20.0								
2,4-Dimethylphenol	ND	µg/L	10.0								
4,6-Dinitro-2-methylphenol	ND	µg/L	20.0								
2,4-Dinitrophenol	ND	µg/L	5.00								
2,4-Dinitrotoluene	ND	µg/L	5.00								
2,6-Dinitrotoluene	ND	µg/L	10.0								
Fluoranthene	ND	µg/L	10.0								
Fluorene	ND	µg/L	10.0								
Hexachlorobenzene	ND	µg/L	5.00								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-24313		*MBLK*				**Batch ID: 24313**		**Analysis Date:**	11/1/2010 9:03:09 AM		
Hexachlorobutadiene	ND	µg/L	10.0								
Hexachlorocyclopentadiene	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								
Pentachlorophenol	ND	µg/L	5.00								
Phenanthrene	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	µg/L	10.0								
2,4,6-Trichlorophenol	ND	µg/L	10.0								
Sample ID: lcs-24313		*LCS*				**Batch ID: 24313**		**Analysis Date:**	11/1/2010 10:04:42 AM		
Acenaphthene	61.28	µg/L	10.0	100	0	61.3	31	99.4			
4-Chloro-3-methylphenol	60.36	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			
1,4-Dichlorobenzene	55.22	µg/L	10.0	100	0	55.2	20.6	85.6			
2,4-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			
4-Nitrophenol	67.64	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			
Phenol	50.20	µg/L	10.0	100	0	50.2	17.5	60.5			
Pyrene	57.70	µg/L	10.0	100	0	57.7	46.8	92.2			
1,2,4-Trichlorobenzene	55.00	µg/L	10.0	100	0	55.0	25.2	92.3			
Sample ID: lcsd-24313		*LCSD*				**Batch ID: 24313**		**Analysis Date:**	11/1/2010 10:34:07 AM		
Acenaphthene	60.02	µg/L	10.0	100	0	60.0	31	99.4	2.08	30	
4-Chloro-3-methylphenol	64.00	µg/L	10.0	100	0	64.0	34.3	111	5.82	30.8	
2-Chlorophenol	58.62	µg/L	10.0	100	0	58.6	24.1	98.7	1.19	31	
1,4-Dichlorobenzene	55.38	µg/L	10.0	100	0	55.4	20.6	85.6	0.289	37	
2,4-Dinitrotoluene	81.68	µg/L	10.0	100	0	81.7	26.6	126	1.48	34.5	

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: lcsd-24313		*LCSD*				Batch ID:	**24313**	Analysis Date:		11/1/2010 10:34:07 AM	
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	µg/L	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 12:29:29 PM	
Mercury	ND	mg/L	0.00020								
Sample ID: LCS-24361		*LCS*				Batch ID:	**24361**	Analysis Date:		11/3/2010 12:31:16 PM	
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 12:33:04 PM	
Mercury	0.005067	mg/L	0.00020	0.005	0	101	80	120	0.168	0	
Method: EPA 6010B: Total Recoverable Metals											
Sample ID: MB-24343		*MBLK*				Batch ID:	**24343**	Analysis Date:		11/2/2010 11:22:19 AM	
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 11:25:32 AM	
Arsenic	0.5188	mg/L	0.020	0.5	0	104	80	120			
Barium	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	0.5	0.0012	99.7	80	120			
Lead	0.5073	mg/L	0.0050	0.5	0	101	80	120			
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			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	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

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SM2540C MOD: Total Dissolved Solids											
Sample ID: MB-24315		*MBLK*				Batch ID:	**24315**	Analysis Date:	11/1/2010 7:37:00 AM		
Total Dissolved Solids	ND	mg/L	20.0								
Sample ID: LCS-24315		*LCS*				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			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	NC	Non-Chlorinated
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name WESTERN REFINING SOUT | Date Received: 10/27/2010

Work Order Number 1010B70 | Received by: LCD

Checklist completed by: _____ 10/27/10 (Signature / Date) | Sample ID labels checked by: _____ (Initials)

Matrix: | Carrier name UPS

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 ☑		
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 ☐			
Water - VOA vials have zero headspace?	No VOA vials submitted ☐	Yes ☑	No ☐		
Water - Preservation labels on bottle and cap match?	Yes ☑	No ☐	N/A ☐		
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐		
Container/Temp Blank temperature?	1.7°	<6° C Acceptable If given sufficient time to cool.			

Number of preserved bottles checked for pH: 2 2

(2) >12 unless noted below.

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4161

email or Fax#: 505-632-3911

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other _____

☐ EDD (Type) _____

Turn-Around Time:
☒ Standard ☐ Rush _____

Project Name:
Injection Well 4th QTR 10-25-10

Project #:

Project Manager:

Sampler: Bob + Cindy

On Ice: ☒ Yes ☐ No

Sample Temperature: 1.4 °C

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1010376	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TDS	EDB (Method 504.1) Back up	8310 (PNA or PAH)	RCRA 8 Metals Ca, Mg, Na, K	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity, Reactivity	Ec, pH, SO_4, Alk, Cl	Sulfides	Air Bubbles (Y or N)
10-25-10	1020	H_2O	Injection Well	3-VOA	HCl	-1										X					
				1-Liter	Amber	-1											X				
				1-500ml	—	-1												X			
				1-500ml	—	-1				X									X		
				1-250ml	H_2SO_4	-1					X										
				1-500ml	HNO_3	-1							X								
				1-500ml	NaOH	-1												X			
				1-500ml	Zn Acetate	-1														X	
			Trip Blank			-2															

Date: 10-26-10 Time: 3:00 Relinquished by: Robert Krakow

Received by: Cindi C. Davidson Date: 10/27/10 Time: 11:10am

Date: Time: Relinquished by:

Received by: Date: Time:

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.

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 — Date: 12/2/10
Laboratory Manager

Approved By:

Carolyn Swanson — Date
Quality Assurance/Quality Control Officer

Table of Contents

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 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 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. A 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. 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 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)

Methodology	Matrix	Title of Method
120.1	DW NPW	"Conductance(Specific Conductance, *u*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)"
300.0	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"

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)

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.

$$RPD = 2 \times \frac{(\text{Sample Result} - \text{Duplicate Result})}{(\text{Sample Result} + \text{Duplicate Result})} \times 100$$

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.

$$Average = (\Sigma\ x_i) / n$$

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^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.

$$\text{Standard deviation} = s = [\Sigma (x_i - \text{average})^2 / (n - 1)]^{1/2}$$

Percent Recovery (MS, MSD, LCS and LCSD)

$$\text{Percent Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{(\text{Spike Added})} \times 100$$

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.

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:

$$\text{RPD} = 2 \times \frac{(\text{Sample Result} - \text{Duplicate Result})}{(\text{Sample Result} + \text{Duplicate Result})} \times 100$$

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:

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

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 x 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

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

b. Standard Deviation

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

c. Relative Standard Deviation

$RSD = s / RF_{AVE}$

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
Σ = the sum of all the individual values

2. Linear Regression

$y=mx+b$

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)

$CC (r) =\{ \Sigma((x_i-x_{ave})*(y_i-y_{ave})) \} / \{ SQRT((\Sigma(x_i-x_{ave})^2)*(\Sigma(y_i-y_{ave})^2)) \}$

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
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

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

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*(Cx/Cis)^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
$w = S^{-2} / (\Sigma S^{-2}/n)$
$S_{(xx)} = (\Sigma x^2w) - [(\Sigma xw)^2 / n]$
$S_{(xy)} = (\Sigma xyw) - [(\Sigma xw)*(\Sigma yw) / n]$
$S_{(xx2)} = (\Sigma x^3w) - [(\Sigma xw)*(\Sigma x^2w) / n]$
$S_{(x2y)} = (\Sigma x^2yw) - [(\Sigma x^2w)*(\Sigma yw) / n]$
$S_{(x2x2)} = (\Sigma x^4w) - [(\Sigma x^2w)^2 / n]$
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]

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 un-necessary 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
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 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)

1. Standard Methods for the Examination of Water and Wastewater: AOHA, AWWA, and WPCG; 20th Edition, 1999.

2. Methods for Chemical Analysis of Water and Wastes, USEPA, EPA-600/4-79-020, March 1979 and as amended December, 1982 (EPA-600/4-82-055)

3. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, USEPA SW-846, 3rd Edition, Updates I, II, IIA, IIB, III, December, 1996.

4. Methods of Soil Analysis: Parts 1 & 2, 2nd Edition, Agronomy Society of America, Monograph 9

5. Diagnosis & Improvement of Saline & Alkali Soils, Agriculture Handbook No. 60, USDA, 1954

6. Handbook on Reference Methods for Soil Testing, The Council on Soil Testing & Plant Analysis, 1980 and 1992

7. Field and Laboratory Methods Applicable to Overburdens and Mine Soils, USEPA, EPA-600/2-78-054, March 1978

8. Laboratory Procedures for Analyses of Oilfield Waste. Department of Natural Resources, Office of Conservation, Injection and Mining Division, Louisiana, August 1988

9. 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

10. Manual of Operating Procedures for the Analysis of Selected Soil, Water, Plant Tissue and Wastes Chemical and physical Parameter. Soil, Water, and Plant Analysis Laboratory, Dept. of Soil and Water Science, The University of Arizona, August 1989

11. Sampling Procedures and Chemical Methods in Use at the U.S. Salinity Laboratory for Characterizing Salt-Affected Soils and Water. USDA Salinity Laboratory.

12. Procedures for Collecting Soil Samples and Methods of Analysis for Soil Survey. USDA Soil Conservation Service, SSIR No. 1.

13. Soil Survey Laboratory Methods Manual. Soil Survey Laboratory Staff. Soil Survey Investigations Report No. 42, version 2.0, August 1992.

14. Methods for the Determination of Metals in Environmental Samples, 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. Analytical Chemistry of PCB's. Erickson, Mitchell D., CRC Press, Inc. 1992.

18. Environmental Perspective on the Emerging Oil Shale Industry, 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.

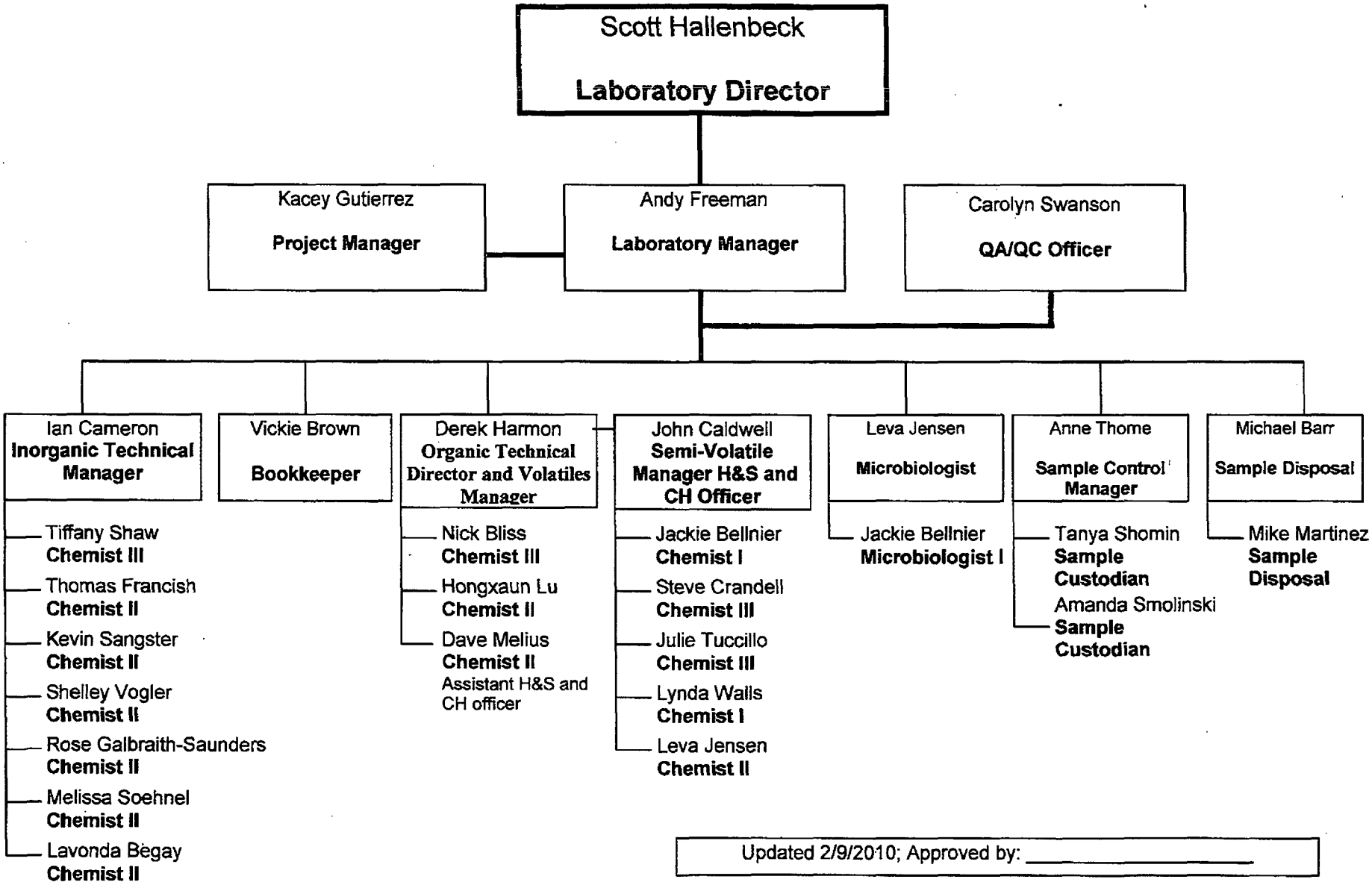
21. Manual for the Certification of Laboratories Analyzing Drinking Water, Criteria and procedures Quality Assurance Fifth Edition, U.S. Environmental Protection Agency, January 2005.

22. Technical Notes on Drinking Water Methods, U.S. Environmental Protection Agency, October 1994.

Appendix A

Personnel Chart / Organizational Structure

Diagram of Organizational Structure



Updated 2/9/2010; Approved by: _____

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:

Air	*Drinking Water*	*Non Potable Water*	*Solids and 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

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

Certificate No: NM100001 - 007

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

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number.***
Customers. PLease verify the current accreditation standing with ORELAP.

MATRIX : Drinking Water

Reference	Code	Description
✓ EPA 200.7 5	10014003	ICP - metals

Analyte Code	Analyte
1000	Aluminum
1015	Barium
1020	Beryllium
1025	Boron
1030	Cadmium
1035	Calcium
1040	Chromium
1055	Copper
1070	Iron
1075	Lead
1085	Magnesium
1090	Manganese
1100	Molybdenum
1105	Nickel
1125	Potassium
1990	Silica as SIO2
1150	Silver
1155	Sodium
1176	Tin
1180	Titanium
1185	Vanadium
1190	Zinc

✓ EPA 245.1 3	10036609	Mercury by Cold Vapor Atomic Absorption

Analyte Code	Analyte
1095	Mercury

✓ EPA 300.0	10053006	Ion chromatography - anions.

Analyte Code	Analyte
1575	Chloride
1730	Fluoride
1810	Nitrate as N
1870	Orthophosphate as P
2000	Sulfate

ORELAP Fields of Accreditation

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number.***
Customers. PLease verify the current accreditation standing with ORELAP.

√EPA 5030B — 10163409 — Purge and trap for aqueous samples

Analyte Code	Analyte
125	Extraction/Preparation

√EPA 504.1 — 10083008 — EDB/DBCP/TCP micro-extraction, GC/ECD

Analyte Code	Analyte
4670	1,2-Dibromo-3-chloropropane (DBCP)
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)

√EPA 524.2 4.1 — 10088809 — Volatile Organic Compounds GC/MS Capillary Column

Analyte Code	Analyte
5105	1,1,1,2-Tetrachloroethane
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-Dibromoethane (Ethylene dichloride)
4655	1,2-Dichloropropane
5215	1,3,5-Trimethylbenzene
4615	1,3-Dichlorobenzene
4660	1,3-Dichloropropane
4620	1,4-Dichlorobenzene
4635	2-Chlorotoluene
4640	4-Chlorotoluene
4375	Benzene
4385	Bromobenzene
4390	Bromochloromethane
4395	Bromodichloromethane
4400	Bromoform
4455	Carbon tetrachloride
4475	Chlorobenzene
4575	Chlorodibromomethane
4485	Chloroethane (Ethyl chloride)
4505	Chloroform
4645	cis-1,2-Dichloroethylene
4660	cis-1,3-Dichloropropene
4595	Dibromomethane (Methylene bromide)
4765	Ethylbenzene
4835	Hexachlorobutadiene
4900	Isopropylbenzene
4950	Methyl bromide (Bromomethane)
4960	Methyl chloride (Chloromethane)
5000	Methyl tert-butyl ether (MTBE)
4975	Methylene chloride (Dichloromethane)
4435	n-Butylbenzene
5080	n-Propylbenzene
4440	sec-Butylbenzene
5100	Styrene
4445	tert-Butylbenzene
5115	Tetrachloroethylene (Perchloroethylene)
5140	Toluene

ORELAP Fields of Accreditation

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number.***
Customers. PLease verify the current accreditation standing with ORELAP.

Analyte Code	Analyte
4700	trans-1,2-Dichloroethylene
4685	trans-1,3-Dichloropropylene
5170	Trichloroethene (Trichloroethylene)
5175	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)
5235	Vinyl chloride
5280	Xylene (total)

√ SM 2320 B 20th ED 20045209 Alkalinity by Titration

Analyte Code	Analyte
1505	Alkalinity as CaCO3

√ SM 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 5310 B 20th ED 20137400 Total Organic Carbon by Combustion Infra-red Method

Analyte Code	Analyte
2040	Total organic carbon

ORELAP Fields of Accreditation

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number.***
Customers, PLease verify the current accreditation standing with ORELAP.

MATRIX: Non-Potable Water

Reference	Code	Description
√EPA 300.0	10053006	Ion chromatography - anions.

Analyte Code	Analyte
1540	Bromide
1575	Chloride
1730	Fluoride
1810	Nitrate as N
1820	Nitrate-nitrite
1840	Nitrite as N
1870	Orthophosphate as P
2000	Sulfate

Reference	Code	Description
√EPA 3005A	10138207	Acid Digestion of waters for Total Recoverable or Dissolved Metals

Analyte Code	Analyte
125	Extraction/Preparation

Reference	Code	Description
√EPA 3510C	10138202	Separatory Funnel Liquid-liquid extraction

Analyte Code	Analyte
125	Extraction/Preparation

Reference	Code	Description
√EPA 5030B	10153409	Purge and trap for aqueous samples

Analyte Code	Analyte
125	Extraction/Preparation

Reference	Code	Description
√EPA 6010B	10155609	ICP - AES

Analyte Code	Analyte
1000	Aluminum
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1025	Boron
1030	Cadmium
1035	Calcium
1040	Chromium
1050	Cobalt
1070	Iron
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

ORELAP Fields of Accreditation

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number.***
Customers. PLease verify the current accreditation standing with ORELAP.

✓EPA 7470A — 10165807 — Mercury In Liquid Waste by Cold Vapor Atomic Absorption

Analyte Code	Analyte
1095	Mercury

✓EPA 8015B — 10173601 — Non-halogenated organics using GC/FID

Analyte Code	Analyte
9369	Diesel range organics (DRO)
9408	Gasoline range organics (GRO)
9499	Motor Oil

✓EPA 8021B — 10174808 — Aromatic and Halogenated Volatiles by GC with PID and/or ECD Purge & Trap

Analyte Code	Analyte
5210	1,2,4-Trimethylbenzene
5215	1,3,5-Trimethylbenzene
4375	Benzene
4765	Ethylbenzene
5240	m+p-xylene
6000	Methyl tert-butyl ether (MTBE)
5260	o-Xylene
6140	Toluene
5280	Xylenes (total)

✓EPA 8081A — 10178606 — Organochlorine Pesticides by GC/ECD

Analyte Code	Analyte
7355	4,4'-DDD
7360	4,4'-DDE
7365	4,4'-DDT
7025	Aldrin
7110	alpha-BHC (alpha-Hexachlorocyclohexane)
7115	beta-BHC (beta-Hexachlorocyclohexane)
7105	delta-BHC
7470	Dieldrin
7510	Endosulfan I
7515	Endosulfan II
7520	Endosulfan sulfate
7540	Endrin
7530	Endrin aldehyde
7120	gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)
7685	Heptachlor
7690	Heptachlor epoxide
7810	Methoxychlor

✓EPA 8082 — 10178007 — Polychlorinated Biphenyls (PCBs) by GC/ECD

Analyte Code	Analyte
8880	Aroclor-1016 (PCB-1016)
8885	Aroclor-1221 (PCB-1221)
8890	Aroclor-1232 (PCB-1232)
8895	Aroclor-1242 (PCB-1242)
8900	Aroclor-1248 (PCB-1248)
8905	Aroclor-1254 (PCB-1254)
8910	Aroclor-1260 (PCB-1260)

✓EPA 8260B — 10184802 — Volatile Organic Compounds by purge and trap GC/MS

Analyte Code	Analyte
5105	1,1,1,2-Tetrachloroethane

ORELAP Fields of Accreditation

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number. Customers. PLease verify the current accreditation standing with ORELAP.***

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-chloropropane (DBCP)
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)
4610	1,2-Dichlorobenzene
4635	1,2-Dichloroethane (Ethylene dichloride)
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-Chlorotoluene
4860	2-Hexanone
6385	2-Methylnaphthalene
4540	4-Chlorotoluene
4910	4-Isopropyltoluene (p-Cymene)
4995	4-Methyl-2-pentanone (MIBK)
4315	Acetone
4375	Benzene
4385	Bromobenzene
4390	Bromochloromethane
4395	Bromodichloromethane
4400	Bromoform
4450	Carbon disulfide
4455	Carbon tetrachloride
4475	Chlorobenzene
4575	Chlorodibromomethane
4485	Chloroethane (Ethyl chloride)
4505	Chloroform
4645	cis-1,2-Dichloroethylene
4660	cis-1,3-Dichloropropene
4595	Dibromomethane (Methylene bromide)
4625	Dichlorodifluoromethane (Freon-12)
4765	Ethylbenzene
4835	Hexachlorobutadiene
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	Naphthalene
4435	n-Butylbenzene
5090	n-Propylbenzene
5250	o-Xylene
4440	sec-Butylbenzene
5100	Styrene
4445	tert-Butylbenzene
5115	Tetrachloroethylene (Perchloroethylene)
5140	Toluene

ORELAP Fields of Accreditation

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number.***
Customers. PLease verify the current accreditation standing with ORELAP.

Analyte Code	Analyte
4700	trans-1,2-Dichloroethylene
4685	trans-1,3-Dichloropropylene
5170	Trichloroethene (Trichloroethylene)
5175	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)
5235	Vinyl chloride
5260	Xylene (total)

✓EPA 8270C 10185805 Semivolatile Organic compounds by GC/MS

Analyte Code	Analyte
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)
6190	2,6-Dinitrotoluene (2,6-DNT)
5795	2-Chloronaphthalene
5800	2-Chlorophenol
6360	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)
6385	2-Methylnaphthalene
6400	2-Methylphenol (o-Cresol)
6460	2-Nitroaniline
6480	2-Nitrophenol
6412	3 & 4 Methylphenol
5945	3,3'-Dichlorobenzidine
6465	3-Nitroaniline
5660	4-Bromophenyl phenyl ether
6700	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
5562	Azobenzene
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
5587	Benzofluoranthene
5610	Benzoic acid
5630	Benzyl alcohol
5760	bis(2-Chloroethoxy)methane
5765	bis(2-Chloroethyl) ether
5780	bis(2-Chloroisopropyl) ether
5970	Butyl benzyl phthalate
5980	Carbazole
5955	Chrysene
6065	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)
5995	Dibenz(a,h) anthracene
5905	Dibenzofuran
6070	Diethyl phthalate
6135	Dimethyl phthalate

ORELAP Fields of Accreditation

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number. Customers. PLease verify the current accreditation standing with ORELAP.***

Analyte Code	Analyte
6025	Di-n-butyl phthalate
6200	Di-n-octyl phthalate
6266	Fluoranthene
6270	Fluorene
6275	Hexachlorobenzene
4635	Hexachlorobutadiene
6285	Hexachlorocyclopentadiene
4840	Hexachloroethane
6315	Indeno(1,2,3-cd) pyrene
6320	Isophorone
5005	Naphthalene
6015	Nitrobenzene
6546	n-Nitrosodi-n-propylamine
6535	n-Nitrosodiphenylamine
6605	Pentachlorophenol
6615	Phenanthrene
6625	Phenol
6665	Pyrene
5095	Pyridine

✓EPA 8310 — 10187607 — Polynuclear Aromatic Hydrocarbons by HPLC/UV/VIS

Analyte Code	Analyte
6380	1-Methylnaphthalene
5500	Acenaphthene
5505	Acenaphthylene
5555	Anthracene
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo(b)fluoranthene
5595	Chrysene
5605	Dibenz(a,h)anthracene
6265	Fluoranthene
6270	Fluorene
6315	Indeno(1,2,3-cd) pyrene
5005	Naphthalene
6615	Phenanthrene
6665	Pyrene

✓EPA 9060A — 10244801 — Total Organic Carbon

Analyte Code	Analyte
2040	Total organic carbon

✓SM 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
1515	Ammonia as N

ORELAP Fields of Accreditation

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

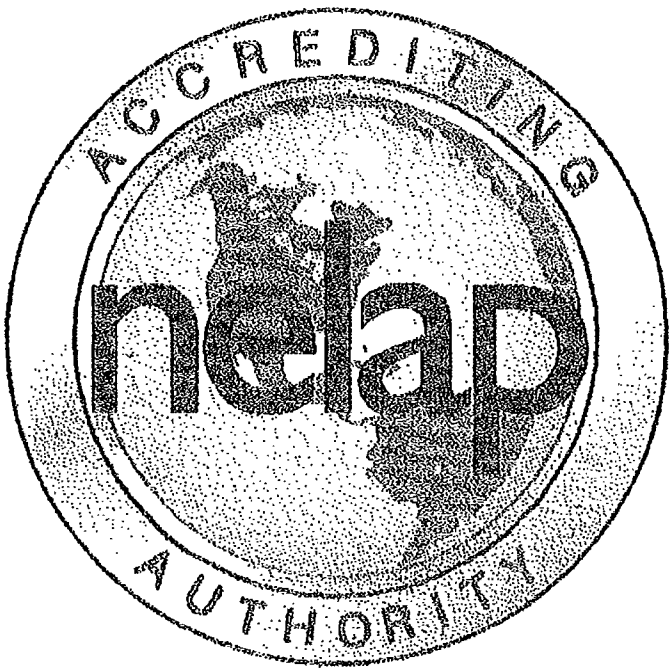
Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number. Customers. PLease verify the current accreditation standing with ORELAP.***

✓ SM 4500-Norg C 20th ED	20119602	Nitrogen (Organic) by Semi-micro Kjeldahl Method

Analyte Code	*Analyte*
1795	Kjeldahl nitrogen - total



ORELAP Fields of Accreditation

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number.***
Customers. PLease verify the current accreditation standing with ORELAP.

MATRIX: Solids

Reference	Code	Description
√EPA 3050B	10135601	Acid Digestion of Sediments, Sludges, and soils

Analyte Code	Analyte
125	Extraction/Preparation

Reference	Code	Description
√EPA 3540C	10140202	Soxhlet Extraction

Analyte Code	Analyte
125	Extraction/Preparation

Reference	Code	Description
√EPA 3546A	10141001	Pressurized Fluid Extraction (PFE)

Analyte Code	Analyte
125	Extraction/Preparation

Reference	Code	Description
√EPA 5035	10154004	Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples

Analyte Code	Analyte
125	Extraction/Preparation

Reference	Code	Description
√EPA 6010B	10166609	ICP - AES

Analyte Code	Analyte
1000	Aluminum
1005	Antimony
1010	Arsenic
1015	Barium
1020	Beryllium
1025	Boron
1030	Cadmium
1035	Calcium
1040	Chromium
1050	Cobalt
1055	Copper
1070	Iron
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

Reference	Code	Description
√EPA 7471A	10166208	Mercury in Solid Waste by Cold Vapor Atomic Absorption

Analyte Code	Analyte
1095	Mercury

ORELAP Fields of Accreditation

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number.***
Customers. PLease verify the current accreditation standing with ORELAP.

✓ EPA 8015B — 10173601 — Non-halogenated organics using GC/FID

Analyte Code	*Analyte*
9369	Diesel range organics (DRO)
9408	Gasoline range organics (GRO)
9499	Motor Oil

✓ EPA 8021B — 10174808 — Aromatic and Halogenated Volatiles by GC with PID and/or ECD Purge & Trap

Analyte Code	*Analyte*
4375	Benzene
4765	Ethylbenzene
5240	m+p-xylene
5000	Methyl tert-butyl ether (MTBE)
5250	o-Xylene
5140	Toluene
5260	Xylenes (total)

✓ EPA 8081A — 10178606 — Organochlorine Pesticides by GC/ECD

Analyte Code	*Analyte*
7355	4,4'-DDD
7360	4,4'-DDE
7365	4,4'-DDT
7025	Aldrin
7110	alpha-BHC (alpha-Hexachlorocyclohexane)
7115	beta-BHC (beta-Hexachlorocyclohexane)
7105	delta-BHC
7470	Dieldrin
7510	Endosulfan I
7515	Endosulfan II
7520	Endosulfan sulfate
7540	Endrin
7530	Endrin aldehyde
7120	gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)
7665	Heptachlor
7690	Heptachlor epoxide
7810	Methoxychlor

✓ EPA 8082 — 10179007 — Polychlorinated Biphenyls (PCBs) by GC/ECD

Analyte Code	*Analyte*
8880	Aroclor-1016 (PCB-1016)
8885	Aroclor-1221 (PCB-1221)
8890	Aroclor-1232 (PCB-1232)
8895	Aroclor-1242 (PCB-1242)
8900	Aroclor-1248 (PCB-1248)
8905	Aroclor-1254 (PCB-1254)
8910	Aroclor-1260 (PCB-1260)

✓ EPA 8260B — 10184802 — Volatile Organic Compounds by purge and trap GC/MS

Analyte Code	*Analyte*
5105	1,1,1,2-Tetrachloroethane
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

ORELAP Fields of Accreditation

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number.***
Customers. PLease verify the current accreditation standing with ORELAP.

Analyte Code	Analyte
5180	1,2,3-Trichloropropane
5155	1,2,4-Trichlorobenzene
5210	1,2,4-Trimethylbenzene
4570	1,2-Dibromo-3-chloropropane (DBCP)
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)
4610	1,2-Dichlorobenzene
4635	1,2-Dichloroethane (Ethylene dichloride)
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-Chlorotoluene
4860	2-Hexanone
6385	2-Methylnaphthalene
4540	4-Chlorotoluene
4910	4-Isopropyltoluene (p-Cymene)
4995	4-Methyl-2-pentanone (MIBK)
4316	Acetone
4375	Benzene
4385	Bromobenzene
4390	Bromochloromethane
4395	Bromodichloromethane
4400	Bromoform
4450	Carbon disulfide
4455	Carbon tetrachloride
4475	Chlorobenzene
4575	Chlorodibromomethane
4485	Chloroethane (Ethyl chloride)
4505	Chloroform
4645	cis-1,2-Dichloroethylene
4680	cis-1,3-Dichloropropene
4595	Dibromomethane (Methylene bromide)
4625	Dichlorodifluoromethane (Freon 12)
4785	Ethylbenzene
4835	Hexachlorobutadiene
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	Naphthalene
4435	n-Butylbenzene
5090	n-Propylbenzene
5260	o-Xylene
4440	sec-Butylbenzene
5100	Styrene
4445	tert-Butylbenzene
5115	Tetrachloroethylene (Perchloroethylene)
5140	Toluene
4700	trans-1,2-Dichloroethylene
4685	trans-1,3-Dichloropropylene
5170	Trichloroethene (Trichloroethylene)
5175	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)
5235	Vinyl chloride
5280	Xylene (total)

ORELAP Fields of Accreditation

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number.***
Customers. PLease verify the current accreditation standing with ORELAP.

✓EPA 8270C 10185805 Semivolatile Organic compounds by GC/MS

Analyte Code	*Analyte*
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)
6190	2,6-Dinitrotoluene (2,6-DNT)
5795	2-Chloronaphthalene
5800	2-Chlorophenol
6360	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)
6365	2-Methylnaphthalene
6400	2-Methylphenol (o-Cresol)
6460	2-Nitroaniline
6490	2-Nitrophenol
6412	3 & 4 Methylphenol
5945	3,3'-Dichlorobenzidine
6465	3-Nitroaniline
5660	4-Bromophenyl phenyl ether
5700	4-Chloro-3-methylphenol
5745	4-Chloroaniline
5625	4-Chlorophenyl phenylether
6470	4-Nitroaniline
6500	4-Nitrophenol
5500	Acenaphthene
5505	Acenaphthylene
5545	Aniline
5555	Anthracene
5562	Azobenzene
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo[b]fluoranthene
5610	Benzoic acid
5630	Benzyl alcohol
5760	bis(2-Chloroethoxy)methane
5765	bis(2-Chloroethyl) ether
5780	bis(2-Chloroisopropyl) ether
5670	Butyl benzyl phthalate
5680	Carbazole
5855	Chrysene
6065	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)
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
6285	Hexachlorocyclopentadiene
4840	Hexachloroethane

ORELAP Fields of Accreditation

ORELAP ID: NM100001
EPA CODE: NM00035
Certificate: NM100001 - 007

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque NM 87109

Issue Date: 03/01/2010 ***Expiration Date:*** 02/28/2011

As of 03/01/2010 ***this list supercedes all previous lists for this certificate number. Customers. PLease verify the current accreditation standing with ORELAP.***

Analyte Code	*Analyte*
6315	Indeno(1,2,3-cd) pyrene
6320	Isophorone
5005	Naphthalene
5015	Nitrobenzene
6530	n-Nitrosodimethylamine
6545	n-Nitrosodi-n-propylamine
6535	n-Nitrosodiphenylamine
6605	Pentachlorophenol
6615	Phenanthrene
6625	Phenol
6665	Pyrene
5095	Pyridine

√EPA 8310 10187607 Polynuclear Aromatic Hydrocarbons by HPLC/UV-VIS

Analyte Code	*Analyte*
6360	1-Methylnaphthalene
6365	2-Methylnaphthalene
5500	Acenaphthene
5505	Acenaphthylene
5555	Anthracene
5575	Benzo(a)anthracene
5580	Benzo(a)pyrene
5590	Benzo(g,h,i)perylene
5600	Benzo(k)fluoranthene
5585	Benzo(b)fluoranthene
5855	Chrysene
5895	Dibenz(a,h) anthracene
6265	Fluoranthene
6270	Fluorene
6315	Indeno(1,2,3-cd) pyrene
5005	Naphthalene
6615	Phenanthrene
6665	Pyrene

BILL RICHARDSON
Governor

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.nmenv.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 accreditiation is limited to the
State of Utah Accredited Fields of Accreditiation
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

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

State of Utah
GARY R HERBERT
Governor
GREGORY S BELL
Lieutenant Governor

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:

Metal Digestion

	Solid	Non-Potable Water	
3005 A	☐	☑	Acid Digestion Total Recoverable or Dissolved Metals

Metals

	Solid	Non-Potable Water	
6010 B	☐	☑	Aluminum
6010 B	☐	☑	Antimony
6010 B	☐	☑	Arsenic
6010 B	☐	☑	Barium
6010 B	☐	☑	Beryllium
6010 B	☐	☑	Boron
6010 B	☐	☑	Cadmium
6010 B	☐	☑	Calcium
6010 B	☐	☑	Chromium
6010 B	☐	☑	Cobalt
6010 B	☐	☑	Iron
6010 B	☐	☑	Lead
6010 B	☐	☑	Magnesium
6010 B	☐	☑	Manganese
6010 B	☐	☑	Molybdenum
6010 B	☐	☑	Nickel
6010 B	☐	☑	Potassium
6010 B	☐	☑	Selenium
6010 B	☐	☑	Silver
6010 B	☐	☑	Sodium
6010 B	☐	☑	Thallium
6010 B	☐	☑	Tin
6010 B	☐	☑	Titanium
6010 B	☐	☑	Vanadium

The expiration for the laboratory's certification is 2/28/2011. The Utah Environmental Laboratory Certification Program (ELCP) encourages clients and data users to verify the most current certification letter for the authorized method.

Metals

	Solid	Non-Potable Water	
6010 B	☐	☑	Zinc

Organic Extraction

	Solid	Non-Potable Water	
3510 C	☐	☑	Separatory Funnel Liquid-Liquid Extractions

Organic Instrumentation

	Solid	Non-Potable Water	
8015 B	☐	☑	Diesel Range Organics (DROs)
8015 B	☐	☑	Gasoline Range Organics (GROs)
8260 B	☐	☑	1,1,1,2-Tetrachloroethane
8260 B	☐	☑	1,1,1-Trichloroethane
8260 B	☐	☑	1,1,2,2-Tetrachloroethane
8260 B	☐	☑	1,1,2-Trichloroethane
8260 B	☐	☑	1,1-Dichloroethane
8260 B	☐	☑	1,1-Dichloroethylene (-ethene)
8260 B	☐	☑	1,1-Dichloropropene
8260 B	☐	☑	1,2,3-Trichlorobenzene
8260 B	☐	☑	1,2,3-Trichloropropane
8260 B	☐	☑	1,2,4-Trichlorobenzene
8260 B	☐	☑	1,2,4-Trimethylbenzene
8260 B	☐	☑	1,2-Dibromo-3-chloropropane (DBCP, Dibromochloropropane)
8260 B	☐	☑	1,2-Dibromoethane (EDB, Ethylene dibromide)
8260 B	☐	☑	1,2-Dichlorobenzene
8260 B	☐	☑	1,2-Dichloroethane
8260 B	☐	☑	1,2-Dichloropropane
8260 B	☐	☑	1,3,5-Trimethylbenzene
8260 B	☐	☑	1,3-Dichlorobenzene
8260 B	☐	☑	1,3-Dichloropropane
8260 B	☐	☑	1,4-Dichlorobenzene
8260 B	☐	☑	2,2-Dichloropropane
8260 B	☐	☑	2-Chlorotoluene
8260 B	☐	☑	2-Hexanone
8260 B	☐	☑	2-Methylnaphthalene
8260 B	☐	☑	4-Chlorotoluene
8260 B	☐	☑	4-Methyl-2-pentanone (MIBK, Isopropylacetone, Hexone)
8260 B	☐	☑	Acetone
8260 B	☐	☑	Benzene
8260 B	☐	☑	Bromobenzene
8260 B	☐	☑	Bromochloromethane
8260 B	☐	☑	Bromodichloromethane
8260 B	☐	☑	Bromoform
8260 B	☐	☑	Carbon Disulfide
8260 B	☐	☑	Carbon Tetrachloride
8260 B	☐	☑	Chlorobenzene
8260 B	☐	☑	Chlorodibromomethane [Dibromochloromethane]
8260 B	☐	☑	Chloroethane
8260 B	☐	☑	Chloroform
8260 B	☐	☑	cis-1,2-Dichloroethene (-ethylene)
8260 B	☐	☑	cis-1,3-dichloropropene

Organic Instrumentation

	Solid	Non-Potable Water	
8260 B	☐	☑	Dibromomethane
8260 B	☐	☑	Dichlorodifluoromethane
8260 B	☐	☑	Dichloromethane (DCM, Methylene chloride)
8260 B	☐	☑	Ethylbenzene
8260 B	☐	☑	Hexachlorobutadiene
8260 B	☐	☑	Isopropylbenzene
8260 B	☐	☑	Methyl bromide [Bromomethane]
8260 B	☐	☑	Methyl chloride [Chloromethane]
8260 B	☐	☑	Methyl Ethyl Ketone (MEK, 2-Butanone)
8260 B	☐	☑	Methyl-t-Butyl Ether (MTBE)
8260 B	☐	☑	Naphthalene
8260 B	☐	☑	n-Butylbenzene
8260 B	☐	☑	n-Propylbenzene
8260 B	☐	☑	ortho-Xylene
8260 B	☐	☑	p-Isopropyltoluene
8260 B	☐	☑	sec-Butylbenzene
8260 B	☐	☑	Styrene
8260 B	☐	☑	tert-Butylbenzene
8260 B	☐	☑	Tetrachloroethylene (Perchloroethylene -ethene)
8260 B	☐	☑	Toluene
8260 B	☐	☑	trans-1,2-Dichloroethylene (-ethene)
8260 B	☐	☑	trans-1,3-Dichloropropylene (-propene)
8260 B	☐	☑	Trichloroethene (Trichloroethylene)
8260 B	☐	☑	Trichlorofluoromethane
8260 B	☐	☑	Vinyl Chloride
8260 B	☐	☑	Volatile Organic Compounds
8260 B	☐	☑	Xylenes, Total
8270 C	☐	☑	1,2,4-Trichlorobenzene
8270 C	☐	☑	1,2-Dichlorobenzene
8270 C	☐	☑	1,3-Dichlorobenzene
8270 C	☐	☑	1,4-Dichlorobenzene
8270 C	☐	☑	2,4,5-Trichlorophenol
8270 C	☐	☑	2,4,6-Trichlorophenol
8270 C	☐	☑	2,4-Dichlorophenol
8270 C	☐	☑	2,4-Dimethylphenol
8270 C	☐	☑	2,4-Dinitrophenol
8270 C	☐	☑	2,4-Dinitrotoluene (2,4-DNT)
8270 C	☐	☑	2,6-Dinitrotoluene (2,6-DNT)
8270 C	☐	☑	2-Chloronaphthalene
8270 C	☐	☑	2-Chlorophenol
8270 C	☐	☑	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)
8270 C	☐	☑	2-Methylnaphthalene
8270 C	☐	☑	2-Methylphenol (o-cresol, 2-Hydroxytoluene)
8270 C	☐	☑	2-Nitroaniline
8270 C	☐	☑	2-Nitrophenol
8270 C	☐	☑	3,3'-Dichlorobenzidine
8270 C	☐	☑	3-Nitroaniline
8270 C	☐	☑	4-Bromophenyl Phenyl Ether
8270 C	☐	☑	4-Chloro-3-methylphenol
8270 C	☐	☑	4-Chloroaniline
8270 C	☐	☑	4-Chlorophenyl Phenyl Ether

Organic Instrumentation

	Solid	Non-Potable Water	
8270 C	☐	☑	4-Nitroaniline
8270 C	☐	☑	4-Nitrophenol
8270 C	☐	☑	Acenaphthene
8270 C	☐	☑	Acenaphthylene
8270 C	☐	☑	Aniline
8270 C	☐	☑	Anthracene
8270 C	☐	☑	Azobenzene
8270 C	☐	☑	Benzo(a)anthracene
8270 C	☐	☑	Benzo(a)pyrene
8270 C	☐	☑	Benzo(b)fluoranthene
8270 C	☐	☑	Benzo(g,h,i)perylene
8270 C	☐	☑	Benzo(k)fluoranthene
8270 C	☐	☑	Benzoic Acid
8270 C	☐	☑	Benzyl alcohol
8270 C	☐	☑	bis(2-chloroethoxy)methane
8270 C	☐	☑	bis(2-Chloroethyl)ether
8270 C	☐	☑	bis(2-chloroisopropyl)ether
8270 C	☐	☑	bis(2-Ethylhexyl) phthalate (DEHP)
8270 C	☐	☑	Butyl Benzyl Phthalate
8270 C	☐	☑	Carbazole
8270 C	☐	☑	Chrysene
8270 C	☐	☑	Dibenzo(a,h)anthracene
8270 C	☐	☑	Dibenzofuran
8270 C	☐	☑	Diethyl Phthalate
8270 C	☐	☑	Dimethyl Phthalate
8270 C	☐	☑	Di-n-butyl phthalate
8270 C	☐	☑	Di-n-octyl Phthalate
8270 C	☐	☑	Fluoranthene
8270 C	☐	☑	Fluorene
8270 C	☐	☑	Hexachlorobenzene
8270 C	☐	☑	Hexachlorobutadiene
8270 C	☐	☑	Hexachlorocyclopentadiene
8270 C	☐	☑	Hexachloroethane
8270 C	☐	☑	Indeno(1,2,3-cd)pyrene
8270 C	☐	☑	Isophorone
8270 C	☐	☑	Naphthalene
8270 C	☐	☑	Nitrobenzene
8270 C	☐	☑	n-Nitroso-di-n-Propylamine
8270 C	☐	☑	n-Nitrosodiphenylamine
8270 C	☐	☑	Pentachlorophenol
8270 C	☐	☑	Phenanthrene
8270 C	☐	☑	Phenol
8270 C	☐	☑	Pyrene
8270 C	☐	☑	Pyridine
8270 C	☐	☑	Semivolatile Organic Compounds

Volatile Organic Preparation

	Solid	Non-Potable Water	
5030 B	☐	☑	Purge-and-Trap for Aqueous Samples

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

UTAH DEPARTMENT OF HEALTH
4431 South 2700 West • Taylorsville, UT 84119 • phone (801)965-2400 • fax (801)965-2544
www.health.utah.gov/els/labimp/

Arizona Department of Health Services

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

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

Program 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

Total Licensed Parameters in this Program: 32

Program 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

License: 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 Licensed Parameters in this Program: 10

Program WW

Parameter	EPA Method	Billing Code	Cert Date
Alkalinity, Total	SM 2320B	NIA1	07/26/07
Chloride	EPA 300.0	NIIIA1	07/26/07
Fluoride	EPA 300.0	NIIIA1	07/26/07
Nitrate (As N)	EPA 300.0	NIIIA1	07/26/07
Nitrite (As N)	EPA 300.0	NIIIA1	07/26/07
Orthophosphate	EPA 300.0	NIIIA1	07/26/07
Residue, Filterable	SM 2540C	NIA8	07/26/07
Specific Conductance	EPA 120.1	NIA7	02/27/09
Sulfate	EPA 300.0	NIIIA1	07/26/07

Total Licensed Parameters in this Program: 9

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

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 30, 2010

CERTIFIED MAIL 91 7108 2133 3935 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 fjamison@tceq.state.tx.us.

Sincerely,

Frank Jamison
Records Specialist

Enclosures

Texas Commission on Environmental Quality

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

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704424-10-1**
Expiration Date:	**6/30/2011**
Issue Date:	**7/1/2010**

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Drinking Water***

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
Iron	OR	1070	10013806
Lead	OR	1075	10013806
Magnesium	OR	1085	10013806
Manganese	OR	1090	10013806
Molybdenum	OR	1100	10013806
Nickel	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

Method EPA 245.1

Analyte	AB	Analyte ID	Method ID
Mercury	OR	1095	10036609

Method EPA 300.0

Analyte	AB	Analyte ID	Method ID
Chloride	OR	1575	10053006
Fluoride	OR	1730	10053006
Nitrate as N	OR	1810	10053006

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704424-10-1
Expiration Date: 6/30/2011
Issue Date: 7/1/2010

Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Drinking Water***

Nitrite as N	OR	1840	10053006
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

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
1,2,4-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	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
Xylene (total)	OR	5260	10089006

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704424-10-1**
Expiration Date:	**6/30/2011**
Issue Date:	**7/1/2010**

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: Drinking Water

Method SM 2540 C

Analyte	AB	Analyte ID	Method ID
Residue-filterable (TDS)	OR	1955	20004404

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704424-10-1
Expiration Date: 6/30/2011
Issue Date: 7/1/2010

Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

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	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

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704424-10-1

Hall Environmental Analysis Laboratory, Inc.
Expiration Date: 6/30/2011

4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337
Issue Date: 7/1/2010

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non Potable Water***

Thallium	OR	1165	10155201
Tin	OR	1175	10155201
Titanium	OR	1180	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
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

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

Certificate: T104704424-10-1
Expiration Date: 6/30/2011
Issue Date: 7/1/2010

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non Potable Water***

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
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

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

Certificate: T104704424-10-1
Expiration Date: 6/30/2011
Issue Date: 7/1/2010

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

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

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704424-10-1
Expiration Date: 6/30/2011
Issue Date: 7/1/2010

Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***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

Method EPA 8270

Analyte	**AB**	**Analyte ID**	**Method ID**
1,2,4-Trichlorobenzene	OR	5155	10185203
1,2-Dichlorobenzene	OR	4610	10185203

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704424-10-1

Hall Environmental Analysis Laboratory, Inc.
Expiration Date: 6/30/2011

4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337
Issue Date: 7/1/2010

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non Potable Water***

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
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

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704424-10-1
Expiration Date: 6/30/2011
Issue Date: 7/1/2010

Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Non Potable Water***

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
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

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704424-10-1

Hall Environmental Analysis Laboratory, Inc.
Expiration Date: 6/30/2011

4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337
Issue Date: 7/1/2010

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

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

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate:	**T104704424-10-1**
Expiration Date:	**6/30/2011**
Issue Date:	**7/1/2010**

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Hazardous Material***

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
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

Method EPA 7471

Analyte	AB	Analyte ID	Method ID
Mercury	OR	1095	10166004

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704424-10-1
Expiration Date: 6/30/2011
Issue Date: 7/1/2010

Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

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

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

Certificate: T104704424-10-1
Expiration Date: 6/30/2011
Issue Date: 7/1/2010

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Hazardous Material***

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
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

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

Certificate: T104704424-10-1
Expiration Date: 6/30/2011
Issue Date: 7/1/2010

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Hazardous Material***

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
Isopropylbenzene	OR	4900	10184404
m+p-xylene	OR	5240	10184404

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704424-10-1
Expiration Date: 6/30/2011
Issue Date: 7/1/2010

Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

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
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

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704424-10-1

Hall Environmental Analysis Laboratory, Inc. **Expiration Date:** 6/30/2011

4901 Hawkins Road NE, Suite D **Issue Date:** 7/1/2010
Albuquerque, NM 87109-4337

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Hazardous Material***

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

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704424-10-1
Expiration Date: 6/30/2011
Issue Date: 7/1/2010

Hall Environmental Analysis Laboratory, Inc.
4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

Matrix: ***Solid & Hazardous Material***

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
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	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

Method EPA 8310

Analyte	**AB**	**Analyte ID**	**Method ID**

Texas Commission on Environmental Quality

NELAP - Recognized Laboratory Fields of Accreditation

Certificate: T104704424-10-1

Hall Environmental Analysis Laboratory, Inc.
Expiration Date: 6/30/2011

4901 Hawkins Road NE, Suite D
Albuquerque, NM 87109-4337
Issue Date: 7/1/2010

These fields of accreditation supercedeall previous fields. The Texas Commission on Environmental Quality urges customers to verify the laboratory's current accreditation status for particular methods and analyses.

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	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

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, December 07, 2010 7:52 AM
To: 'Gibson, Dan'; Moore, Darrell; 'Lackey, Johnny'; Schmaltz, Randy; McDaniel, Vic
Cc: 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: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

Western Refining

BLOOMFIELD REFINERY

WNR LISTED NYSE

RECEIVED OCD
2010 FEB -1 A 11:39

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.

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

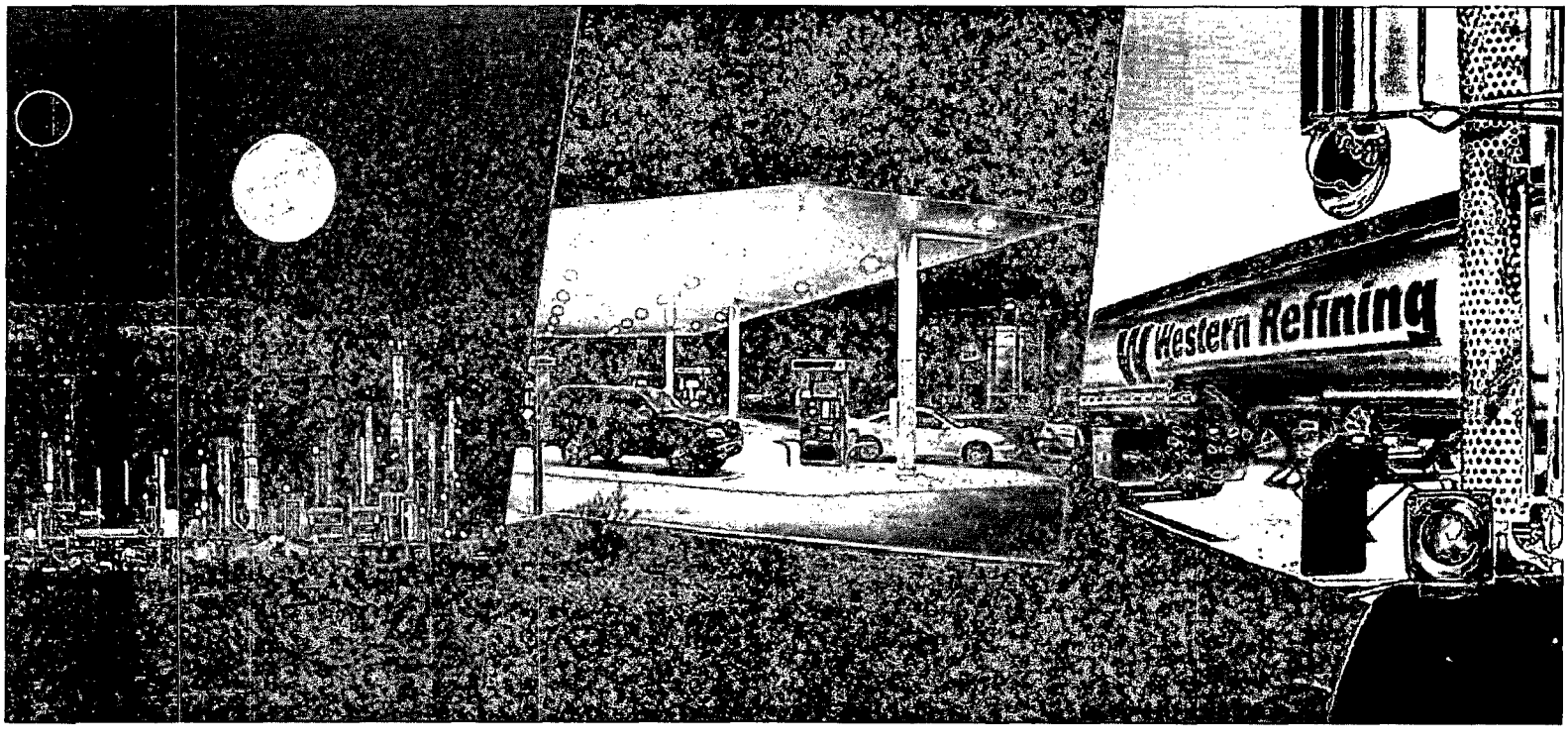
ANNUAL CLASS I WELL REPORT

Waste Disposal Well #1

January – December 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 Hurtado

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.

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.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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:	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 the activities were conducted throughout 2009 on Disposal Well #1 at Western's Bloomfield Refinery.

- 01/28/09 1st Quarterly Sampling Event
- 04/14/09 2nd Quarterly Sampling Event
- 04/28/09 Coil Tubing Well Cleanout/Acidization Procedure (See Form C-103 in Appendix A)
- 07/01/09 3rd Quarterly Sampling Event
- 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)
- 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)
- 09/28/09 Pressure Fall-off Test
- 10/01/09 4th Quarterly Sampling Event
- 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 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. 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

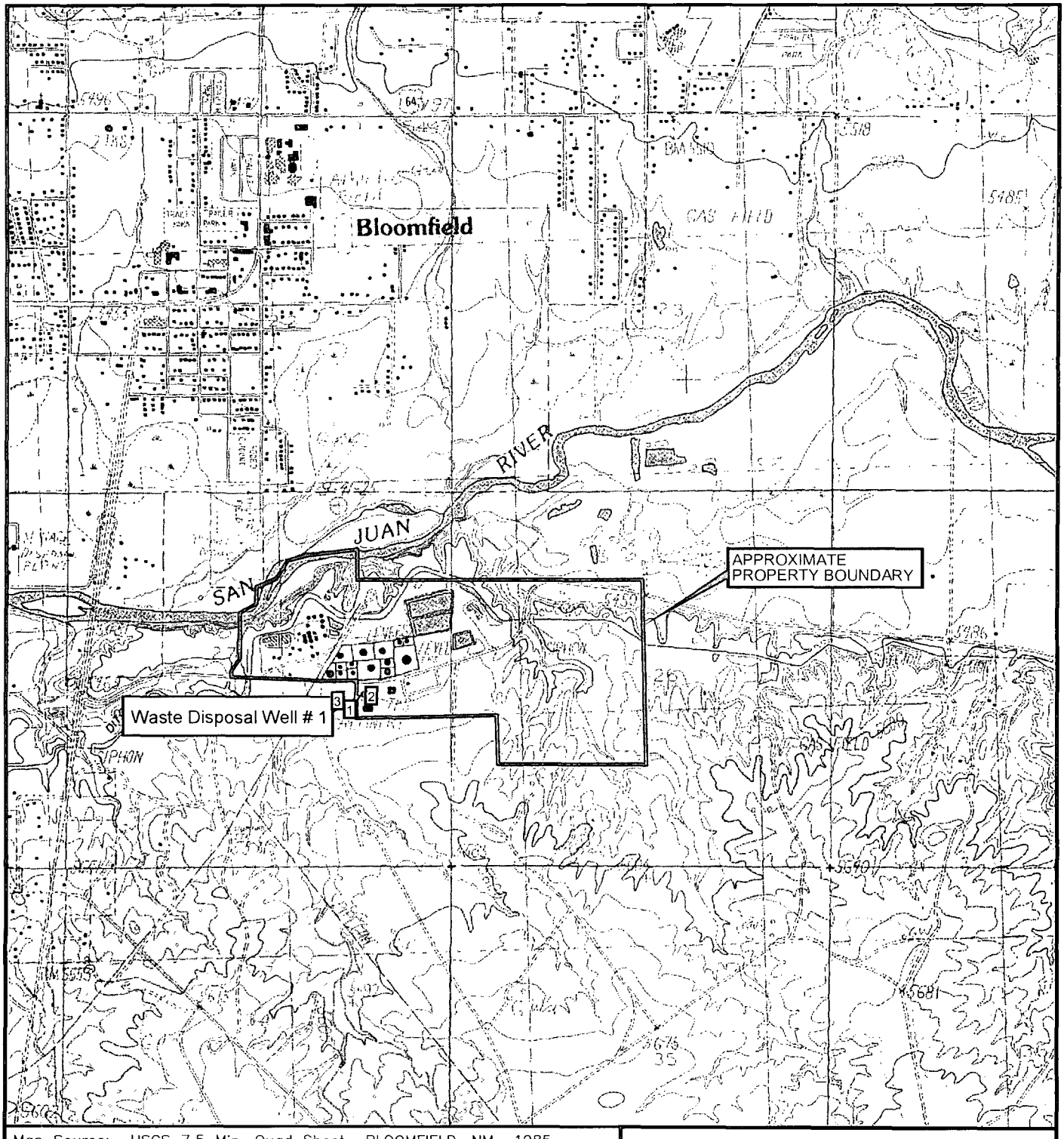
in the amended Administrative Order SWD-528 in order to optimize potential fluctuations in the dewatering activities associated with groundwater remediation and to accommodate any changes in operation of the facility.

9.0 References

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

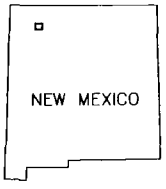
Cobb & Associates, 2009b, *2009 Annual Bottomhole Pressure Surveys and Pressure Falloff Tests for Waste Disposal Well #1Report* November 2, 2009.

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



Map Source: USGS 7.5 Min. Quad Sheet BLOOMFIELD, NM., 1985.

0 2000
SCALE IN FEET



QUADRANGLE LOCATION

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 01/06/10	FILE: WestRef-A25

FIGURE 1
SITE LOCATION MAP
BLOOMFIELD REFINERY

WESTERN REFINING DISPOSAL WELL #1

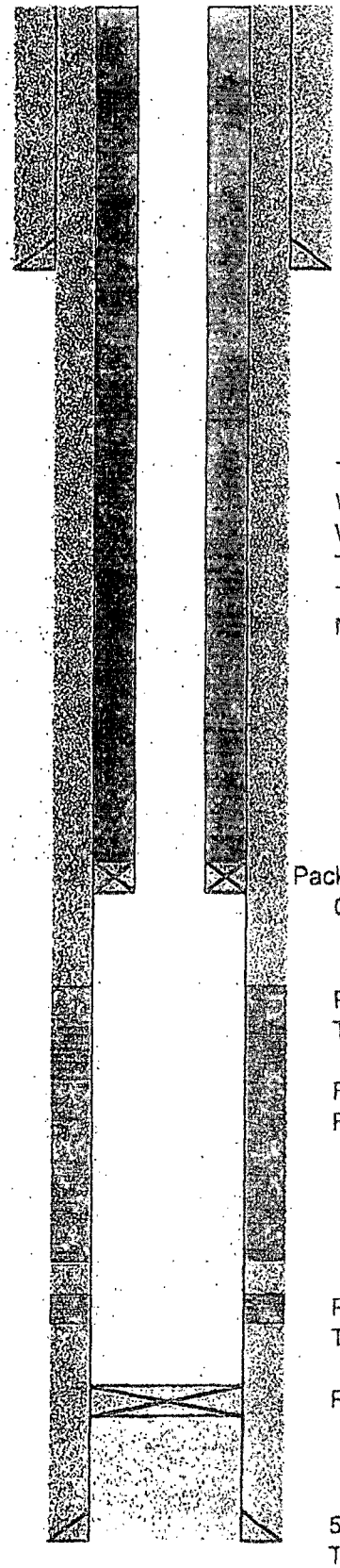
NW, SW SECTION 26, T29N, R11W

API NO.: 30-045-29002

SUBSURFACE — HOUSTON, TX; SOUTH BEND, IN; BATON ROUGE, LA

FIGURE 2
DISPOSAL WELL #1 WELL SCHEMATIC
Western Refining Inc.
Bloomfield, NM

Date:	6/26/2006	Approved By:	rls	Job No.:	70F5630
Drawn By:	rls	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'

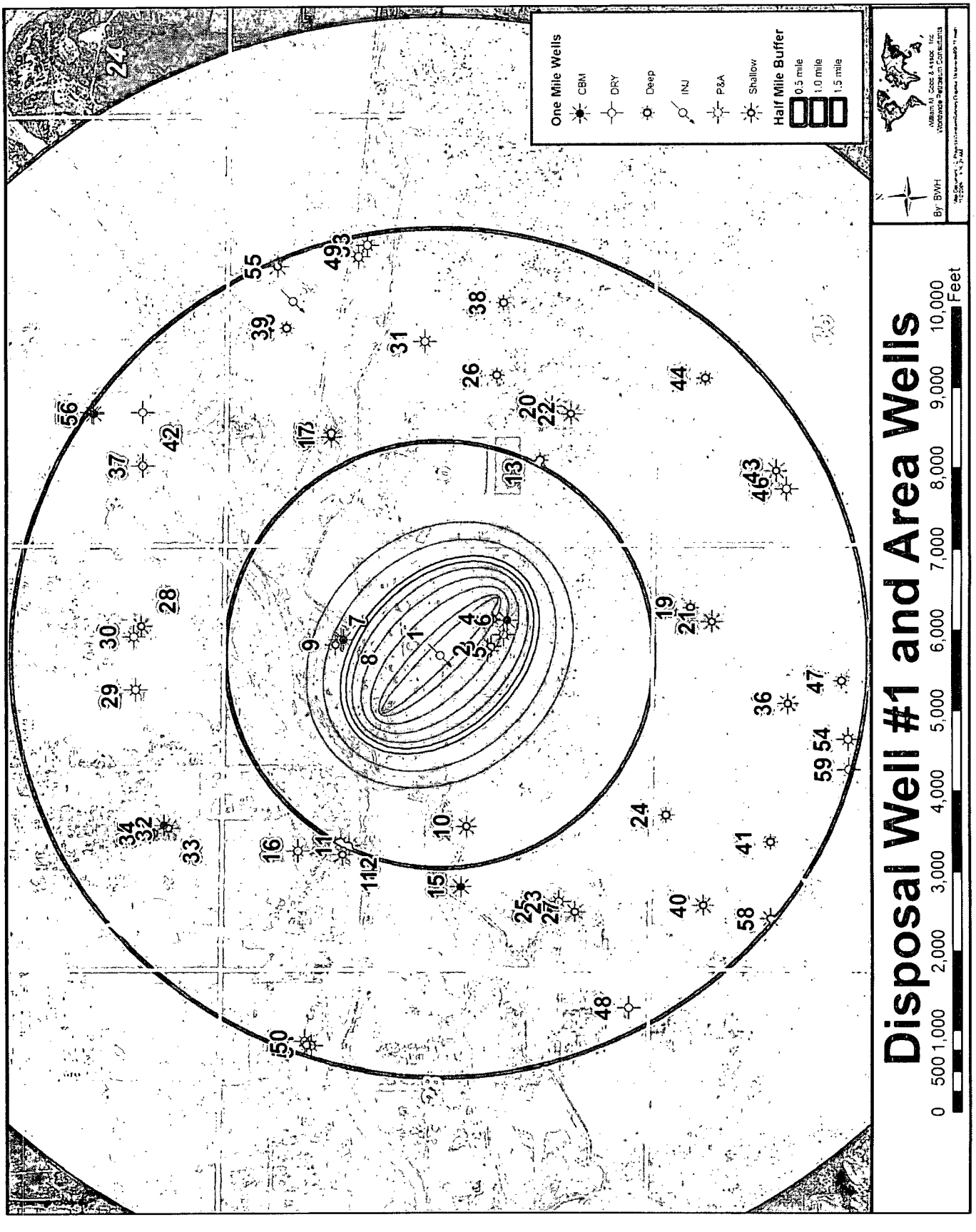
Fill was cleaned out of well on 4/20/06
Fill was orginally tagged at 3325'

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


Disposal Well #1 and Area Wells
One Mile Wells
CBM
DRY
Deep
INJ
P&A
Shallow
Half Mile Buffer
0.5 mile
1.0 mile
1.5 mile
0 500 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000
Feet
By: BWH

2009

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

	AMOUNT	AMOUNT	TOTALIZER								ON-LINE		
	OF WATER	TO SOLAR	AMOUNT	DOWN-	INJECTION PRESSURE			ANNULAR PRESSURE			FLOW RATES		
PERIOD	FROM RIVER	EVAP PONDS	INJECTED	TIME	MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	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	86	71	74
MAR	9,316,000	4,127,000	2,984,184	0	1122	1049.0	1108	191	170	178	*	*	67
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	98	69	82
JUN	9,188,000	4,001,000	3,063,006	0	1138	997	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	95	61	80
NOV	7,231,000	4,048,000	2,405,228	108	1108	956	1025	177	61	126	96	34	66
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 - estimated average from Feb. and April readings

Total amount injected in 2009 - 34,042,355 gallons

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	P&A Date	ULSTR	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	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	CBM	No
7	0.23	JACQUE	2	30-045-34409	1483	1689	1689		H-27-29N-11W	HOLCOMB O&G	FRUITLAND COAL	CBM	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

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	P&A Date	ULSTR	OPERATOR	RESERVOIR	Status	Pen. Ini. 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	COOK	1	30-045-07940	6052	6226	6226		N-22-29N-11W	MANANA GAS INC	DAKOTA	Deep	Yes
35	0.79	COOK	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

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	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	CBM	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			Frtlnd		-34-29N-11W	Pre-Ongard	FRUITLAND SAND	DRY	No

Status	Total Wells	Pen Inj. Zone	
		Yes	No
P&A	15	3	12
Dry	4	0	4
INJ	2	2	0
CBM	7	2	5
Shallow	17	3	14
Deep	14	14	0
Total	59	24	35

Section 6.0 Form C-103 Notifications

Submit 3 Copies To Appropriate District Office
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
June 19, 2008

WELL API NO.
30-045-~~29002-00~~ 29002

5. Indicate Type of Lease
STATE ☐ FEE ☐

6. State Oil & Gas Lease No.

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.)

7. Lease Name or Unit Agreement Name
Disposal

1. Type of Well: Oil Well ☐ Gas Well ☐ OtherX SWD

8. Well Number #001

2. Name of Operator
Western Refining Souhwest, Inc. – Bloomfield Refinery

9. OGRID Number
037218

3. Address of Operator
#50 Road 4990 Bloomfield, NM 87413

10. Pool name or Wildcat
SWD; Mesaverde

4. Well Location
Unit Letter I : 2442 feet from the South line and 1250 feet from the East line
Section 24 27 Township 29 Range 11 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:	☒			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 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

This Class I Injection Well operated by Western Refining Southwest, Inc. – Bloomfield Refinery is permitted by New Mexico OCD Discharge Permit Disposal Well UICL-9. EPA ID# NMD089416416

Well Maintenance (Down-Hole Clean Out) will be conducted starting approximately on 4-22-09 or no later than 4-30-09.

RCVD APR 20 '09

OIL CONS. DIV.

DIST. 3

Spud Date: Rig Release Date:

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Cindy Hurtado TITLE Environmental Coordinator DATE 4-16-09

Type or print name Cindy Hurtado E-mail address: cindy.hurtado@wnr.com PHONE: 505-632-4161

For State Use Only

APPROVED BY: Randy G. Rose TITLE Deputy Oil & Gas Inspector, District #3 DATE APR 24 2009

Conditions of Approval (if any):

Western Refining

BLOOMFIELD REFINERY

WNR LISTED NYSE

Jim Griswold
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RCVD APR 20 '09
OIL CONS. DIV.

DIST. 3

Certified Mail: 7007 0220 0004 0187 0756

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 clean-out) 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

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
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

	WELL API NO. 30-045-290002-00
	5. Indicate Type of Lease STATE ☐ FEE ☐
	6. State Oil & Gas Lease No.
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.)	7. Lease Name or Unit Agreement Name
1. Type of Well: Oil Well ☐ Gas Well ☐ OtherX	8. Well Number
2. Name of Operator Western Refining Southwest, Inc. – Bloomfeld Refinery	9. OGRID Number 037218
3. Address of Operator #50 Road 4990 Bloomfield, NM 87413	10. Pool name or Wildcat
4. Well Location Unit Letter I : 2442 feet from the South line and 1250 feet from the East line Section 24 Township 29 Range 11 NMPM County San Juan	
	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____ Distance from nearest surface water____ Pit Liner Thickness: ____ mil Below-Grade Tank: Volume ____ bbls; Construction Material ____	

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 ☐	
OTHER: ☐		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 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

The Class I Injection Well operated by Western Refining Southwest, Inc. – Bloomfield Refinery is permitted by New Mexico OCD Discharge Permit Disposal Well UICL-9. EPA ID# NMD089416416.

April 28, 2009 coil tubing clean out and acidization processes were completed on the Injection Well. 83 barrels of HCL acid was injected downhole, 65 barrels of flush water was used. After the process was completed the Injection Well was put back on line. The injection rate increasesd from 60 gpm to 100 gpm.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. *I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.*

SIGNATURE Cindy Hurtado TITLE Environmental Coordinator DATE 4-29-2009

Type or print name Cindy Hurtado E-mail address: Cindy.hurtado@wnr.com Telephone No. 505-632-4161

For State Use Only

APPROVED BY: [signature] TITLE Environmental Engineer DATE 5/14/09

Conditions of Approval (if any):

Submit 3 Copies To Appropriate District Office
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

WELL API NO. 30-045-29002-00	
5. Indicate Type of Lease STATE ☐ FEE X☐	
6. State Oil & Gas Lease No. 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 ☐ Gas Well ☐ OtherX (Disposal)	7. Lease Name or Unit Agreement Name Disposal 8. Well Number #001
2. Name of Operator San Juan Refining Co/Western Refining Southwest, Inc. – Bloomfeld Refinery	9. OGRID Number 037218
3. Address of Operator #50 Road 4990 Bloomfield, NM 87413	10. Pool name or Wildcat Blanco/Mesa Verde
4. Well Location Unit Letter I : 2442 feet from the South line and 1250 feet from the East line Section 27 Township 29 Range 11 NMPM County San Juan	
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_____ Distance from nearest surface water_____ Pit Liner Thickness: mil Below-Grade Tank: Volume _____ bbls; Construction Material	

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 ☐	
OTHER: Well Stimulation/Acidize Well X☐		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 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Western Refining Soutwest, Inc. – Bloomfield Refinery requests permission to perform well stimulation/acidization procedures on the Class I Injection well referenced above. Procedures for this project are attached.
The procedure will be scheduled pending approval from OCD.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.

SIGNATURE Cindy Hurtado TITLE Environmental Coordinator DATE 6/29/09

Type or print name Cindy Hurtado E-mail address: cindy.hurtado@wnr.com Telephone No. (505)632-4161

For State Use Only

APPROVED BY: Carl J Chavez TITLE Environmental Engineer DATE 6/29/09
Conditions of Approval (if any):

Western Refining

Procedure

May 12, 2009

Well:	**Disposal Well #1**	**Field:**	Mesaverde
Location:	Sec 26, T29N, R11W San Juan Co, New Mexico	**Elevation:** **API No:**	30-045-29002
By:	John Thompson	**Lease No:**	

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 procedure.
2. Rig up Halliburton to well head and pressure test pumps and lines to 4000 psi.
3. Pump 3,500 gal of 15% HCl acid w/ inihibtors and mutual solvent with 250 ea. bio-degradable ball sealers
4. Displace acid to bottom perforation with ~ 24 bbls of 2% KCl water (or disposal water if available).
5. Shut well in for ~ 1 hr and let acid treatment "soak". Rig down and release Halliburton.
6. 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 I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

	WELL API NO. 30-045-29002-00
	5. Indicate Type of Lease STATE ☐ FEE X☐
	6. State Oil & Gas Lease No. 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 ☐ Gas Well ☐ OtherX (Disposal)	7. Lease Name or Unit Agreement Name Disposal 8. Well Number #001
2. Name of Operator San Juan Refining Co/Western Refining Southwest, Inc. – Bloomfeld Refinery	9. OGRID Number 037218
3. Address of Operator #50 Road 4990 Bloomfield, NM 87413	10. Pool name or Wildcat Blanco/Mesa Verde
4. Well Location Unit Letter__I_: 2442___feet from the___South_____ line and __1250_feet from the __East_____line Section 27 Township 29 Range 11 NMPM County San Juan	
	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_____ Distance from nearest surface water_____ Pit Liner Thickness: mil Below-Grade Tank: Volume bbls; Construction Material	

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 ☐	
OTHER: ☐		OTHER: Well Stimulation/Acidize Well	X ☐

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 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

On July 7, 2009, Western Refining Southwest, Inc. – Bloomfield Refinery performed well stimulation/acidization procedures on the Class I Injection well referenced above. The procedure consisted of pumping 3500 gallons of 15% HCL acid in addition to 250 - 1.3 specific gravity "bio" ball sealers downhole. 800 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 flowback to the evaporation ponds overnight (14 hours). After the Injection Well was put back on line, flow rate increased from 70 gpm to 101 gpm.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. **I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.**

SIGNATURE Cindy Hurtado TITLE_ Environmental Coordinator__DATE___7/13/09_____

Type or print name Cindy Hurtado E-mail address: cindy.hurtado@wnr.com Telephone No. (505)632-4161

For State Use Only

APPROVED BY:_____TITLE_____DATE_____

Conditions of Approval (if any):

Submit 3 Copies To Appropriate District Office
District I
1625 N French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

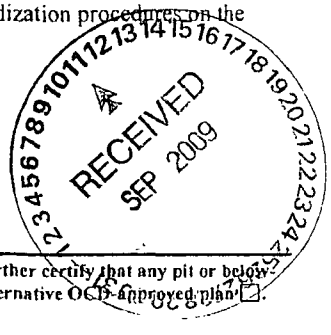
WELL API NO. 30-045-29002-00	
5. Indicate Type of Lease STATE ☐ FEE X☐	
6. State Oil & Gas Lease No. N/A	
SUNDRY NOTICES AND REPORTS ON WELLS (DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.) 1. Type of Well: Oil Well ☐ Gas Well ☐ OtherX (Disposal)	7. Lease Name or Unit Agreement Name Disposal 8. Well Number #001
2. Name of Operator San Juan Refining Co/Western Refining Southwest, Inc. – Bloomfeld Refinery	9. OGRID Number 037218
3. Address of Operator #50 Road 4990 Bloomfield, NM 87413	10. Pool name or Wildcat Blanco/Mesa Verde
4. Well Location Unit Letter I : 2442 feet from the South line and 1250 feet from the East line Section 27 Township 29 Range 11 NMPM County San Juan	
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_____ Distance from nearest surface water_____ Pit Liner Thickness: _____ mil Below-Grade Tank: Volume _____ bbls; Construction Material_____	

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 ☐	
OTHER: Well Stimulation/Acidize Well X☐		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 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Western Refining Soutwest, Inc. – Bloomfield Refinery requests permission to perform well stimulation/acidization procedures on the Class I Injection well referenced above. Procedures for this project are attached.
The procedure will be scheduled pending approval from OCD.



I hereby certify that the information above is true and complete to the best of my knowledge and belief. I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.

SIGNATURE Cindy Hurtado TITLE Environmental Coordinator DATE 9/11/09

Type or print name Cindy Hurtado E-mail address: cindy.hurtado@wnr.com Telephone No. (505)632-4161

For State Use Only

APPROVED BY: Tally G. Kelly TITLE Deputy Oil & Gas Inspector, District #3 DATE SEP 14 2009

Conditions of Approval (if any): NOTIFY NMOCD AZTEC 24 HOURS PRIOR TO BEGINNING OPERATIONS

Western Refining

Procedure

August 18, 2009

Well:	**Disposal Well #1**	**Field:**	Mesaverde
Location:		**Elevation:**	
	Sec 26, T29N, R11W		
	San Juan Co, New Mexico	**API No:**	30-045-29002
By:	John Thompson	**Lease No:**	

Project:

Lower injection pressure by pumping 15% HCl 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, Sanjel 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 balls.
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: '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
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

WELL API NO.
30-045-29002-00

5. Indicate Type of Lease
STATE ☐ FEE X☐

6. State Oil & Gas Lease No.
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.)

7. Lease Name or Unit Agreement Name
Disposal

1. Type of Well: Oil Well ☐ Gas Well ☐ OtherX (Disposal)

8. Well Number #001

2. Name of Operator
San Juan Refining Co/Western Refining Southwest, Inc. – Bloomfeld Refinery

9. OGRID Number
037218

3. Address of Operator
#50 Road 4990 Bloomfield, NM 87413

10. Pool name or Wildcat
Blanco/Mesa Verde

4. Well Location
Unit Letter I : 2442 feet from the South line and 1250 feet from the East line
Section 27 Township 29 Range 11 NMPM County San Juan

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_____ Distance from nearest surface water_____

Pit Liner Thickness: _____ mil Below-Grade Tank: Volume _____ bbls; Construction Material _____

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	☐		
OTHER	☐			OTHER: : Well Stimulation/Acidize Well X☐			

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 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

On September 15 & 16, 2009, Western Refining Soutwest, Inc. – Bloomfield Refinery performed well stimulation/acidization procedures on the Class I Injection well referenced above.
September 15, 2009 – Coil tubing clean out was performed. Tagged bottom at 3520' – circulated hole clean – spotted 200 gallons of 15% HCL across the perforations – shut in the well.
September 16, 2009 – Dropped 350 1.18 specific gravity "bio" balls – pumped in 4000 gallons of 15% HCL with corrosion inhibitor and Gas Perm 1000. Displaced acid with 28 bbls. of 2% KCL water. Shut in the well for 1 hour 45 minutes. Flowed back 870 bbls to frac tanks. Injection well was put back online – flow rate at 98gpm.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. **I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.**

SIGNATURE_____ TITLE_ Environmental Coordinator DATE__9/17/09_____

Type or print name Cindy Hurtado E-mail address: cindy.hurtado@wnr.com Telephone No. (505)632-4161

For State Use Only

APPROVED BY:_____ TITLE_____ DATE_____

Conditions of Approval (if any):

Submit 3 Copies To Appropriate District Office
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

WELL API NO. 30-045-29002-00	
5. Indicate Type of Lease STATE ☐ FEE X☐	
6. State Oil & Gas Lease No. 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 ☐ Gas Well ☐ OtherX (Disposal)	7. Lease Name or Unit Agreement Name Disposal 8. Well Number #001
2. Name of Operator San Juan Refining Co/Western Refining Southwest, Inc. -- Bloomfield Refinery	9. OGRID Number 037218
3. Address of Operator #50 Road 4990 Bloomfield, NM 87413	10. Pool name or Wildcat Blanco/Mesa Verde
4. Well Location Unit Letter I : 2442 feet from the South line and 1250 feet from the East line Section 27 Township 29 Range 11 NMPM County San Juan	
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____ Distance from nearest surface water____ Pit Liner Thickness: mil Below-Grade Tank: Volume____ bbls; Construction Material____	

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 ☐	
OTHER: Radioactive Tracer Test/MIT/BadenheadTest X☐		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 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

For the 5-year review of the permit and permit renewal, Western Refining Southwest, Inc. – Bloomfield Refinery requests permission to perform a Radioactive Tracer test to assess the mechanical integrity of the cement behind the casing on the Class I injection well referenced above. Two millicuries of Antimony B124 isotope will be used in the test. A Gamma Ray correlation log will be run. This test is tentatively scheduled for September 23, 2009.

Bloomfield Refinery also requests permission to perform the annual High Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test on September 24, 2009.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.

SIGNATURE Cindy Hurtado TITLE Environmental Coordinator DATE 9/17/09

Type or print name Cindy Hurtado E-mail address: cindy.hurtado@wnr.com Telephone No. (505)632-4161

For State Use Only

APPROVED BY: Carl J. Chavez TITLE Env. Engr. DATE 9/18/09

Conditions of Approval (if any):

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
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

WELL API NO.
30-045-29002-00

5. Indicate Type of Lease
STATE ☐ FEE X☐

6. State Oil & Gas Lease No.
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.)

7. Lease Name or Unit Agreement Name
Disposal

1. Type of Well: Oil Well ☐ Gas Well ☐ OtherX (Disposal)

8. Well Number #001

2. Name of Operator
San Juan Refining Co/Western Refining Southwest, Inc. – Bloomfeld Refinery

9. OGRID Number
037218

3. Address of Operator
#50 Road 4990 Bloomfield, NM 87413

10. Pool name or Wildcat
Blanco/Mesa Verde

4. Well Location
Unit Letter J : 2442 feet from the South line and 1250 feet from the East line
Section 27 Township 29 Range 11 NMPM County San Juan

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_____ Distance from nearest surface water_____

Pit Liner Thickness: mil Below-Grade Tank: Volume _____ bbls; Construction Material _____

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 ☐	
OTHER ☐		OTHER: : Radioactive Tracer Test/MIT/BadenheadTest ☐X	

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 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Western Refining Southwest, Inc. – Bloomfield Refinery performed a Radioactive Tracer test on September 23, 2009 on the Class I injection well referenced above. Monica Kuehling of NMOCD-Aztec witnessed all proceedings pertaining to this test. Two millicuries of Scandium (Sc 46) was injected downhole and flushed with 5000 gallons of water. A Gamma Ray correlation log was run from 3506' 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.

Bloomfield Refinery performed the annual High Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test on September 24, 2009. All tests were witnessed by Monica Kuehling of NMOCD-Aztec. The MIT held at 580 psi for 30 minutes.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.

SIGNATURE Cindy Hurtado TITLE Environmental Coordinator DATE 9/28/09

Type or print name Cindy Hurtado E-mail address: cindy.hurtado@wnr.com Telephone No. (505)632-4161

For State Use Only

APPROVED BY: _____ TITLE _____ DATE _____

Conditions of Approval (if any):

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

MECHANICAL INTEGRITY TEST REPORT

(TA OR UIC)

Date of Test 9-24-09 Operator San Juan Refining API # 30-0 45-29002

Property Name SWD Well # 1 Location: Unit I Sec 27 Twn 29 Rge 11

Land Type:
State ____
Federal ____
Private /
Indian ____

Well Type:
Water Injection ____
Salt Water Disposal /
Gas Injection ____
Producing Oil/Gas ____
Pressure obervation ____

SWD-528

Temporarily Abandoned Well (Y/N): ____ TA Expires: ____

Casing Pres. 0 Tbg. SI Pres. ____ Max. Inj. Pres. ____
Bradenhead Pres. 0 Tbg. Inj. Pres. ____
Tubing Pres. 960
Int. Casing Pres. N/A

RCVD SEP 24 '09
OIL CONS. DIV.
DIST. 3

Pressured annulus up to 580 psi. for 30 mins. Test passed/failed

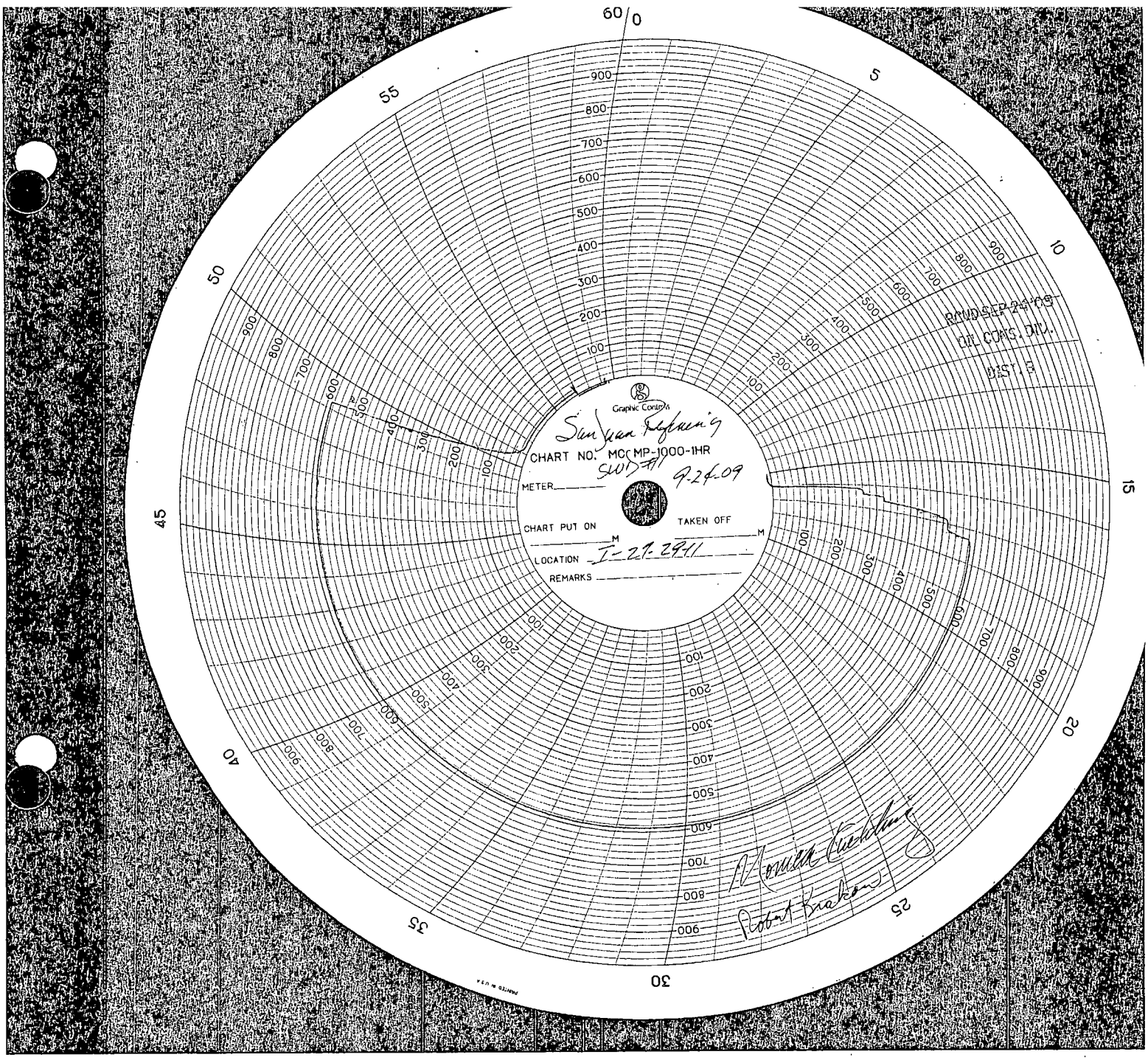
REMARKS:

By Robert Erickson (Operator Representative)

Witness Monica Cuthbert (NMOCD)

(Position)

Revised 02-11-02


Graphic Controls
San Juan Refining
CHART NO. MC MP-1000-1HR
SWD #1
9-24-09
METER
CHART PUT ON
TAKEN OFF
LOCATION T-27-29N
REMARKS
RCVD SEP 29 '09
OIL CONS. DIV.
DIST. 3
Printed in U.S.A.

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/3district.htm

BRADENHEAD TEST REPORT

(submit 1 copy to above address)

Date of Test 9-24-09 Operator San Juan Prod. API #30-0 45-29002

Property Name SWD Well No. 1 Location: Unit L Section 27 Township 29 Range 11

Well Status(Shut-In or Producing) Initial PSI: Tubing 960 Intermediate N/A Casing 76 Bradenhead 0

OPEN BRADENHEAD AND INTERMEDIATE TO ATMOSPHERE INDIVIDUALLY FOR 15 MINUTES EACH

PRESSURE

Testing	Bradenhead BH	Bradenhead Int	Bradenhead Csg	INTERM Int	INTERM Csg
TIME					
5 min					
10 min					
15 min					
20 min					
25 min					
30 min					

FLOW CHARACTERISTICS

	BRADENHEAD	INTERMEDIATE
Steady Flow		
Surges		
Down to Nothing	✓	
Nothing		
Gas		RCVD SEP 24 '09
Gas & Water		OIL CONS. DIV.
Water		DIST. 3

If bradenhead flowed water, check all of the descriptions that apply below:

CLEAR_____ FRESH_____ SALTY_____ SULFUR_____ BLACK_____

5 MINUTE SHUT-IN PRESSURE BRADENHEAD 0 INTERMEDIATE N/A

REMARKS: Puff When opened

By Robert Krakow Witness Monica Kuehling

(Position)

E-mail address _____

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

Order No.: 0901396

Dear Cindy Hurtado:

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

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Hall Environmental Analysis Laboratory, Inc.

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	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: RAGS
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: SEMIVOLATILES						Analyst: JDC
Acenaphthene	ND	50		µg/L	1	2/2/2009
Acenaphthylene	ND	50		µg/L	1	2/2/2009
Aniline	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 Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

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	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: JDC
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		µg/L	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	ND	50		µg/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		µg/L	1	2/2/2009
N-Nitrosodi-n-propylamine	ND	50		µg/L	1	2/2/2009
N-Nitrosodimethylamine	ND	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
Nitrobenzene	ND	50		µg/L	1	2/2/2009
2-Nitrophenol	ND	50		µg/L	1	2/2/2009
4-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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

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	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						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	2/2/2009
1,2,4-Trichlorobenzene	ND	50		µg/L	1	2/2/2009
2,4,5-Trichlorophenol	ND	50		µg/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	1	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-Dichloropropene	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	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

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	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						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-Tetrachloroethane	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
Trichlorofluoromethane	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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	*Spike recovery outside accepted recovery limits*		

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	Qual	Units	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: **KMS**
Total Dissolved Solids	3800	100		mg/L	1	1/29/2009

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *12-Feb-09*

CLIENT: Western Refining Southwest, Inc.
Lab Order: 0901396
Project: Injection Well 1st QTR 1/28/09
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
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 PM
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 9:12:26 PM
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	1/29/2009 9:12:26 PM
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	ND	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-Dichloroethene	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	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *12-Feb-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	TRIP BLANK
Lab Order:	0901396	**Collection Date:**	
Project:	Injection Well 1st QTR 1/28/09	**Date Received:**	1/29/2009
Lab ID:	0901396-02	**Matrix:**	TRIP BLANK

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: HL
Isopropylbenzene	ND	1.0		µg/L	1	1/29/2009 9:12:26 PM
4-Isopropyltoluene	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-Butylbenzene	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		µg/L	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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

ENVIRONMENTAL SCIENCE CORP.

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

February 05, 2009

Date Received : January 30, 2009
Description : 0901396

Sample ID : INJECTION WELL

Collected By :
Collection Date : 01/28/09 10:30

ESC Sample # : L385818-01

Site ID :

Project # : 0901396

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
L385818-01 (FLASHPOINT) - Did Not Flash @170f

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 300.0: Anions									
Sample ID: MB		*MBLK*			Batch ID:	**R32335**	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:	**R32335**	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:	**R32355**	Analysis Date:		2/9/2009 10:16:02 AM
Chloride	ND	mg/L	0.10						
Sulfate	ND	mg/L	0.50						
Sample ID: LCS		*LCS*			Batch ID:	**R32335**	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:	**R32335**	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:	**R32355**	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			
Method: SM 2320B: Alkalinity									
Sample ID: MB		*MBLK*			Batch ID:	**R32296**	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:	**R32296**	Analysis Date:		2/4/2009
Alkalinity, Total (As CaCO3)	85.00	mg/L CaC	20	104	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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 8270C: Semivolatiles**
Sample ID: **mb-18194** *MBLK* Batch ID: **18194** Analysis Date: 2/2/2009

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
hloronaphthalene	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	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	µg/L	10
Fluorene	ND	µg/L	10
Hexachlorobenzene	ND	µg/L	10

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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 8270C: Semivolatiles									
Sample ID: mb-18194		*MBLK*			Batch ID:	**18194**	Analysis Date:		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 ID:	**18194**	Analysis Date:		2/2/2009
Acenaphthene	64.96	µg/L	10	65.0	11	123			
4-Chloro-3-methylphenol	125.2	µg/L	10	62.6	15.4	119			
2-Chlorophenol	114.8	µg/L	10	57.4	12.2	122			
1,4-Dichlorobenzene	50.48	µg/L	10	50.5	16.9	100			
2,4-Dinitrotoluene	70.42	µg/L	10	70.4	13	138			
N-Nitrosodi-n-propylamine	59.14	µg/L	10	59.1	9.93	122			
4-Nitrophenol	92.52	µg/L	10	46.3	12.5	87.4			
Pentachlorophenol	144.4	µg/L	20	72.2	3.55	114			
Phenol	74.86	µg/L	10	37.4	7.53	73.1			
Pyrene	60.86	µg/L	10	60.9	12.6	140			
1,2,4-Trichlorobenzene	50.20	µg/L	10	50.2	17.4	98.7			
Sample ID: lcsd-18194		*LCSD*			Batch ID:	**18194**	Analysis Date:		2/2/2009
Acenaphthene	62.40	µg/L	10	62.4	11	123	4.02	30.5	
4-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	

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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 8270C: Semivolatiles									
Sample ID: lcsd-18194		*LCSD*			Batch ID:	**18194**	Analysis Date:		2/2/2009
N-Nitrosodi-n-propylamine	58.68	µg/L	10	58.7	9.93	122	0.781	30.3	
4-Nitrophenol	86.82	µg/L	10	48.4	12.5	87.4	4.54	36.3	
Pentachlorophenol	153.2	µg/L	20	76.6	3.55	114	5.95	49	
Phenol	75.12	µg/L	10	37.6	7.53	73.1	0.347	52.4	
Pyrene	65.42	µg/L	10	65.4	12.6	140	7.22	16.3	
1,2,4-Trichlorobenzene	48.16	µg/L	10	48.2	17.4	98.7	4.15	36.4	
Method: EPA Method 7470: Mercury									
Sample ID: MB-18218		*MBLK*			Batch ID:	**18218**	Analysis Date:		2/3/2009 2:10:52 PM
Mercury	ND	mg/L	0.00020						
Sample ID: LCS-18218		*LCS*			Batch ID:	**18218**	Analysis Date:		2/3/2009 2:12:36 PM
Mercury	0.004727	mg/L	0.00020	94.5	80	120			
Method: EPA 6010B: Total Recoverable Metals									
Sample ID: MB-18221		*MBLK*			Batch ID:	**18221**	Analysis Date:		2/3/2009 6:24:44 PM
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: LCS-18221		*LCS*			Batch ID:	**18221**	Analysis Date:		2/3/2009 6:28:32 PM
Arsenic	0.5244	mg/L	0.020	105	80	120			
Barium	0.4913	mg/L	0.010	98.3	80	120			
Cadmium	0.5001	mg/L	0.0020	100	80	120			
Calcium	50.82	mg/L	0.50	102	80	120			
Chromium	0.5023	mg/L	0.0060	100	80	120			
Lead	0.4975	mg/L	0.0050	98.7	80	120			
Magnesium	50.55	mg/L	0.50	101	80	120			
Potassium	53.97	mg/L	1.0	108	80	120			
Selenium	0.4843	mg/L	0.050	96.9	80	120			
Silver	0.5147	mg/L	0.0050	102	80	120			
Sodium	55.05	mg/L	0.50	110	80	120			
Method: SM 2540 C: Total Dissolved Solids									
Sample ID: MB-18191		*MBLK*			Batch ID:	**18191**	Analysis Date:		1/29/2009
Total Dissolved Solids	20.00	mg/L	20						
Sample ID: LCS-18191		*LCS*			Batch ID:	**18191**	Analysis Date:		1/29/2009
Total Dissolved Solids	1036	mg/L	20	102	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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									
Sample ID: b2		*MBLK*			Batch ID: **R32209**		Analysis Date: 1/29/2009 10:23:08 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	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						
1,1-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:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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									
Sample ID: b2		*MBLK*			Batch ID: **R32209**		Analysis Date:	1/29/2009 10:23:08 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						
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: 5ml rb		*MBLK*			Batch ID: **R32237**		Analysis Date:	1/30/2009 8:28:07 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	1.0						
Chlorobenzene	ND	µg/L	1.0						
Chloroethane	ND	µg/L	2.0						
Chloroform	ND	µg/L	1.0						

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	*RPD outside accepted recovery limits*	S	Spike recovery outside accepted recovery limits

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									
Sample ID: 5ml rb		*MBLK*			Batch ID: **R32237**		Analysis Date:	1/30/2009 8:28:07 AM	
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						
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	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-Trichloropropane	ND	µg/L	2.0						
Vinyl chloride	ND	µg/L	1.0						
Xylenes, Total	ND	µg/L	1.5						
Sample ID: b6		*MBLK*			Batch ID: **R32237**		Analysis Date:	1/30/2009 11:32:07 PM	

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: 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									
Sample ID: b6		*MBLK*			Batch ID: **R32237**		Analysis Date: 1/30/2009 11:32:07 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						
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						
2-Hexanone	ND	µg/L	10						
Isopropylbenzene	ND	µg/L	1.0						
4-Isopropyltoluene	ND	µg/L	1.0						

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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									
Sample ID: b6		*MBLK*			Batch ID: **R32237**		Analysis Date: 1/30/2009 11:32:07 PM		
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-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						
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						

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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									
Sample ID: b7		*MBLK*			Batch ID: **R32237**		Analysis Date:	1/31/2009 10:11:51 AM	
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						
2-Hexanone	ND	µg/L	10						
[illegible]propylbenzene	ND	µg/L	1.0						
[illegible]sopropyltoluene	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						
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: 100ng lcs		*LCS*			Batch ID: **R32209**		Analysis Date:	1/29/2009 12:00:27 PM	

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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									
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/L	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:	**R32237**	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	133			
1,1-Dichloroethene	20.06	µg/L	1.0	100	97.9	140			
Trichloroethene (TCE)	19.56	µg/L	1.0	97.8	90.5	112			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name WESTERN REFINING SOUT | Date Received: 1/29/2009

Work Order Number 0901396 | Received by: TLS

Checklist completed by: _____ Signature 1/29/09 Date | Sample ID labels checked by: _____ Initials

Matrix: | Carrier name UPS

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 ☑	
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 ☐		
Water - VOA vials have zero headspace? No VOA vials submitted ☐		Yes ☑	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☑	No ☐	N/A ☐	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐	
Container/Temp Blank temperature?	1°	<6° C Acceptable If given sufficient time to cool.		

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR4990
Bloomfield, NM 87413

Phone #: 505-632-4161

email or Fax#: 505-632-3911

QA/QC Package:
☑ Standard ☐ Level 4 (Full Validation)
☐ Other
☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name: injection well 1st QTR 1-28-09

Project #:

Project Manager:

Sampler: Bob

On Ice: ☑ Yes ☐ No

Sample Temperature: 1

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No 0901394	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	TDS	8310 (PNA or PAH)	RCRA 8 Metals Na, Ca, Mg, K	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Sulfides	Ca, pH, SO_4, Alk, Cl	Air Bubbles (Y or N)
1-28-09	10:30	H_2O	injection well	3-VOA	HCl	1										X						
				1-Liter	Amber	1											X					
				1-500 ml	HNO_3	1							X									
				1-500 ml	N/A	1												X				
				1-500 ml	NaOH	1													X			
				1-500 ml	Zn acetate	1														X		
				1-500 ml	N/A	1															X	
				1- 125 ml	H_2SO_4	1						X										
				1-500 ml	N/A	1					X											
			Trip Blank	2-VOA		2										X						

Date	Time	Relinquished by	Received by	Date	Time
1-28-09	11:05	Robert Knahow		1/29/09	955
Date	Time	Relinquished by	Received by	Date	Time

Remarks: per BK- no 8310
AT 214109

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.

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

Order No.: 0904211

Dear Cindy Hurtado:

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

4901 Hawkins NE ▪ Suite D ▪ Albuquerque, NM 87109
505.345.3975 ▪ Fax 505.345.4107
www.hallenvironmental.com

Hall Environmental Analysis Laboratory, Inc.

Date: *04-May-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0904211	**Collection Date:**	4/14/2009 8:45:00 AM
Project:	Injection Well 2nd QTR 4/14/09	**Date Received:**	4/15/2009
Lab ID:	0904211-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: TAF
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: MMS
Mercury	0.0012	0.00020		mg/L	1	4/24/2009 2:48:03 PM
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: NMO
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: SEMIVOLATILES						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)perylene	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-chloroethyl)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	50		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-Chloro-3-methylphenol	ND	50		µg/L	1	4/20/2009
4-Chloroaniline	ND	50		µg/L	1	4/20/2009
2-Chloronaphthalene	ND	50		µg/L	1	4/20/2009

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *04-May-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0904211	**Collection Date:**	4/14/2009 8:45:00 AM
Project:	Injection Well 2nd QTR 4/14/09	**Date Received:**	4/15/2009
Lab ID:	0904211-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: JDC
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
Hexachlorobenzene	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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0904211	**Collection Date:**	4/14/2009 8:45:00 AM
Project:	Injection Well 2nd QTR 4/14/09	**Date Received:**	4/15/2009
Lab ID:	0904211-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						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	50		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		µg/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	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *04-May-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0904211	**Collection Date:**	4/14/2009 8:45:00 AM
Project:	Injection Well 2nd QTR 4/14/09	**Date Received:**	4/15/2009
Lab ID:	0904211-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: HL
Dibromochloromethane	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
Dibromomethane	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,2-Dichlorobenzene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,3-Dichlorobenzene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,4-Dichlorobenzene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
Dichlorodifluoromethane	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,1-Dichloroethane	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,1-Dichloroethene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,2-Dichloropropane	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,3-Dichloropropane	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
2,2-Dichloropropane	ND	2.0		µg/L	1	4/21/2009 6:01:15 PM
1,1-Dichloropropene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
Hexachlorobutadiene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
2-Hexanone	ND	10		µg/L	1	4/21/2009 6:01:15 PM
Isopropylbenzene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
4-Isopropyltoluene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
4-Methyl-2-pentanone	ND	10		µg/L	1	4/21/2009 6:01:15 PM
Methylene Chloride	ND	3.0		µg/L	1	4/21/2009 6:01:15 PM
n-Butylbenzene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
n-Propylbenzene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
sec-Butylbenzene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
Styrene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
tert-Butylbenzene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	4/21/2009 6:01:15 PM
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
trans-1,2-DCE	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,1,1-Trichloroethane	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,1,2-Trichloroethane	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
Trichloroethene (TCE)	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
Trichlorofluoromethane	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
1,2,3-Trichloropropane	ND	2.0		µg/L	1	4/21/2009 6:01:15 PM
Vinyl chloride	ND	1.0		µg/L	1	4/21/2009 6:01:15 PM
Xylenes, Total	ND	1.5		µg/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

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- RL Reporting Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *04-May-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0904211	**Collection Date:**	4/14/2009 8:45:00 AM
Project:	Injection Well 2nd QTR 4/14/09	**Date Received:**	4/15/2009
Lab ID:	0904211-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	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: **NSB**
Specific Conductance	5000	0.010		µmhos/cm	1	4/15/2009
SM4500-H+B: PH						Analyst: **NSB**
pH	7.44	0.1		pH units	1	4/15/2009
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **JMP**
Total Dissolved Solids	2800	100		mg/L	1	4/15/2009

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *04-May-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	TRIP BLANK
Lab Order:	0904211	**Collection Date:**	
Project:	Injection Well 2nd QTR 4/14/09	**Date Received:**	4/15/2009
Lab ID:	0904211-02	**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 6:30:01 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		µg/L	1	4/21/2009 6:30:01 PM
2-Hexanone	ND	10		µg/L	1	4/21/2009 6:30:01 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *04-May-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	TRIP BLANK
Lab Order:	0904211	**Collection Date:**	
Project:	Injection Well 2nd QTR 4/14/09	**Date Received:**	4/15/2009
Lab ID:	0904211-02	**Matrix:**	TRIP BLANK

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: HL
Isopropylbenzene	ND	1.0		µg/L	1	4/21/2009 6:30:01 PM
4-Isopropyltoluene	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		µg/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	ND	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	ND	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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

ENERGY LABORATORIES, INC. * 1120 S 27th St * PO Box 30916 * Billings, MT 59107-0916
Toll Free 800.735.4489 * 406.252.6325 * FAX 406.252.6069 * ell@energylab.com

LABORATORY ANALYTICAL REPORT

Client: Hall Environmental
Project: 0904211
Lab ID: 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	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
IGNITABILITY							
Flash Point (Ignitability)	>200	°F		30		SW1010A	02/17/09 15:00 / clr
CORROSIVITY							
pH of Liquid Waste	7.35	s.u.		0.10		SW9040C	04/17/09 11:30 / clr
REACTIVITY							
Cyanide, Reactive	ND	mg/kg		0.05	250	SW846 Ch 7	04/21/09 09:57 / kjp
Sulfide, Reactive	ND	mg/kg		20	500	SW846 Ch 7	04/17/09 08:00 / pwo

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. • P.O. Box 30916 • 1120 South 27th Street • Billings, MT 59107-0916
Toll Free 800.735.4489 • 406.252.6325 • Fax 406.252.6069 • eli@energylab.com • www.energylab.com

QA/QC Summary Report

Client: Hall Environmental
Project: 0904211

Report Date: 04/22/09
Work Order: B09041551

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW846 Ch 7									Batch: 38348
Sample ID: MB-38348	Method Blank				Run: AUTOAN201-B_090421A				04/21/09 10:01
Cyanide, Reactive	ND	mg/kg	0.05						
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	32	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						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

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	RPDLimit	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									
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	
Alkalinity, Total (As CaCO3)	82.16	mg/L CaC	20	103	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES									
Sample ID: 5ml rb		*MBLK*				Batch ID: **R33331**	Analysis Date:	4/20/2009 8:54:55 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	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						
1,1-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:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES									
Sample ID: 5ml rb		*MBLK*			Batch ID: **R33331**		Analysis Date:	4/20/2009 8:54:55 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						
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						
[illegible]yl chloride	ND	µg/L	1.0						
[illegible]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						

Qualifiers:

[illegible]	Estimated value	H	Holding times for preparation or analysis exceeded
	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES									
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						
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						
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	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-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 8:37:30 AM	

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: Western Refining Southwest, Inc.
Project: Injection Well 2nd QTR 4/14/09 **Work Order:** 0904211

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	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	1.0						
[illegible]lorobenzene	ND	µg/L	1.0						
[illegible]roethane	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						
1,1-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:

[illegible]	Estimated value	H	Holding times for preparation or analysis exceeded
[illegible]	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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	RPDLimit	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						
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: 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						
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						

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES									
Sample ID: b4		*MBLK*			Batch ID: **R33347**		Analysis Date:	4/21/2009 8:24:43 PM	
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	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	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-Trichloropropane	ND	µg/L	2.0						
Vinyl chloride	ND	µg/L	1.0						
Xylenes, Total	ND	µg/L	1.5						
Sample ID: 100ng lcs		*LCS*			Batch ID: **R33347**		Analysis Date:	4/21/2009 9:37:16 AM	

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: Western Refining Southwest, Inc.
Project: Injection Well 2nd QTR 4/14/09 **Work Order:** 0904211

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES									
Sample ID: 100ng lcs		*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-Dichloroethene	22.45	µg/L	1.0	112	97.9	140			
Trichloroethene (TCE)	18.97	µg/L	1.0	94.8	90.5	112			
Sample ID: 100ng lcs_b		*LCS*			Batch ID:	**R33347**	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			S

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles									
Sample ID: *mb-18876*		*MBLK*			Batch ID: **18876**		Analysis Date:		4/20/2009
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	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/L	10						
1,4-Dichlorobenzene	ND	µg/L	5.0						
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	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						

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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	RPDLimit	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/L	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						
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-Trichlorophenol	ND	µg/L	10						
Method: EPA Method 7470: 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			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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	RPDLimit	Qual
Method: EPA 6010B: Total Recoverable Metals									
Sample ID: MB-18866		*MBLK*			Batch ID:	**18866**	Analysis Date:	4/20/2009 9:07:16 AM	
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 PM	
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: 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			
Lead	0.4924	mg/L	0.0050	98.5	80	120			
Magnesium	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			
Sample ID: LCS-18866		*LCS*			Batch ID:	**18866**	Analysis Date:	4/19/2009 5:54:40 PM	
Arsenic	0.5018	mg/L	0.020	100	80	120			
Barium	0.4664	mg/L	0.010	93.3	80	120			
Cadmium	0.4711	mg/L	0.0020	94.2	80	120			
Calcium	48.32	mg/L	0.50	96.3	80	120			
Chromium	0.4885	mg/L	0.0060	97.7	80	120			
Lead	0.4853	mg/L	0.0050	97.1	80	120			
Magnesium	46.35	mg/L	0.50	92.6	80	120			

Qualifiers:

J	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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	RPDLimit	Qual
Method: EPA 6010B: Total Recoverable Metals									
Sample ID: LCS-18866		*LCS*			Batch ID:	**18866**	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 Dissolved Solids									
Sample ID: MB-18843		*MBLK*			Batch ID:	**18843**	Analysis Date:	4/15/2009	
Total Dissolved Solids	ND	mg/L	20						
Sample ID: LCS-18843		*LCS*			Batch ID:	**18843**	Analysis Date:	4/15/2009	
Total Dissolved Solids	1006	mg/L	20	101	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name WESTERN REFINING SOUT | Date Received: 4/15/2009

Work Order Number 0904211 | Received by: ARS

Checklist completed by: _____ Signature 4/15/09 Date | Sample ID labels checked by: TD Initials

Matrix: | Carrier name: UPS

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 ☑	
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 ☐		
Water - VOA vials have zero headspace? No VOA vials submitted ☐		Yes ☑	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☑	No ☐	N/A ☐	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐	
Container/Temp Blank temperature?	4°	*<6° C Acceptable* If given sufficient time to cool.		

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4161

email or Fax#:

QA/QC Package:
☑ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name:
Injection Well 2nd QTR 4-14-09

Project #:

Project Manager:

Sampler: Bob

On Ice: ☑ Yes ☐ No

Sample Temperature: 2

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No 8040511	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	TDS	Backup (TDS)	RCRA 8 Metals Na, Ca, Mg, K	Anions (F,Cl,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Sulfides	E, pH, SO4, Alk, Cl	Air Bubbles (Y or N)
4-14-09	845A	H2O	Injection Well	3-VOA	HCl	1										X						
				1-Liter	Amber	1											X					
				1-500ml	HNO_3	1							X									
				1-500ml	N/A	1												X				
				1-500ml	NaOH	1													X			
				1-500ml	ZN acetate	1														X		
				1-500ml	N/A	1															X	
				1-250ml	H_2SO_4	1						X										
				1-500ml	N/A	1					X											
			Trip Blank	2-VOA		2																

Date:	Time:	Relinquished by:	Received by:	Date	Time
4-14-09	9:40	Robert Knabow		4/15/09	10:00
Date:	Time:	Relinquished by:	Received by:	Date	Time

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.

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

Order No.: 0907049

Dear Cindy Hurtado:

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

Hall Environmental Analysis Laboratory, Inc. **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

Hall Environmental Analysis Laboratory, Inc.

Date: *24-Jul-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0907049	**Collection Date:**	7/1/2009 10:30:00 AM
Project:	Injection Well 3rd QTR 7/1/09	**Date Received:**	7/2/2009
Lab ID:	0907049-01	**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-Chlorophenyl 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		µg/L	1	7/7/2009

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *24-Jul-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0907049	**Collection Date:**	7/1/2009 10:30:00 AM
Project:	Injection Well 3rd QTR 7/1/09	**Date Received:**	7/2/2009
Lab ID:	0907049-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **JDC**
2,4-Dinitrophenol	ND	100		µg/L	1	7/7/2009
2,4-Dinitrotoluene	ND	50		µg/L	1	7/7/2009
2,6-Dinitrotoluene	ND	50		µg/L	1	7/7/2009
Fluoranthene	ND	50		µg/L	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
Phenanthrene	ND	50		µg/L	1	7/7/2009
Phenol	ND	50		µg/L	1	7/7/2009
Pyrene	ND	50		µg/L	1	7/7/2009
Pyridine	ND	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
EPA METHOD 8260B: 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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *24-Jul-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0907049	**Collection Date:**	7/1/2009 10:30:00 AM
Project:	Injection Well 3rd QTR 7/1/09	**Date Received:**	7/2/2009
Lab ID:	0907049-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						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/L	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	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *24-Jul-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0907049	**Collection Date:**	7/1/2009 10:30:00 AM
Project:	Injection Well 3rd QTR 7/1/09	**Date Received:**	7/2/2009
Lab ID:	0907049-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: **HL**
4-Methyl-2-pentanone	ND	10		µg/L	1	7/9/2009 3:41:27 PM
Methylene Chloride	ND	3.0		µg/L	1	7/9/2009 3:41:27 PM
n-Butylbenzene	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
n-Propylbenzene	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
sec-Butylbenzene	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
Styrene	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
tert-Butylbenzene	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	7/9/2009 3:41:27 PM
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
trans-1,2-DCE	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
1,1,1-Trichloroethane	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
1,1,2-Trichloroethane	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
Trichloroethene (TCE)	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
Trichlorofluoromethane	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
1,2,3-Trichloropropane	ND	2.0		µg/L	1	7/9/2009 3:41:27 PM
Vinyl chloride	ND	1.0		µg/L	1	7/9/2009 3:41:27 PM
Xylenes, Total	ND	1.5		µg/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		%REC	1	7/9/2009 3:41:27 PM
SM 2320B: ALKALINITY						Analyst: **DAM**
Alkalinity, Total (As CaCO3)	270	20		mg/L CaCO3	1	7/2/2009
Carbonate	26	2.0		mg/L CaCO3	1	7/2/2009
Bicarbonate	240	20		mg/L CaCO3	1	7/2/2009
EPA 120.1: SPECIFIC CONDUCTANCE						Analyst: **DAM**
Specific Conductance	6400	0.010		µmhos/cm	1	7/2/2009
SM4500-H+B: PH						Analyst: **DAM**
pH	8.49	0.1		pH units	1	7/2/2009
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KMS**
Total Dissolved Solids	4400	100		mg/L	1	7/7/2009

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

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**
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)	ND	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
Naphthalene	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
cis-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/L	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		µg/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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

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	1	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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

ENVIRONMENTAL
SCIENCE CORP.

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

Date Received : July 07, 2009
Description : 0907049

Sample ID : INJECTION WELL

Collected By :
Collection Date : 07/01/09 10:30

ESC Sample # : L410913-01

Site ID :

Project # : 0907049

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Mercury	BDL	0.00020	mg/l	7470A	07/08/09	1
Arsenic	BDL	0.020	mg/l	6010B	07/12/09	1
Barium	0.36	0.0050	mg/l	6010B	07/12/09	1
Cadmium	BDL	0.0050	mg/l	6010B	07/12/09	1
Calcium	170	0.50	mg/l	6010B	07/12/09	1
Chromium	BDL	0.010	mg/l	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	mg/l	6010B	07/12/09	1
Selenium	0.021	0.020	mg/l	6010B	07/12/09	1
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.

Reported: 07/15/09 12:42 Printed: 07/15/09 12:43

ENVIRONMENTAL SCIENCE CORP.

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

Date Received : July 07, 2009
Description : 0907049

Sample ID : INJECTION WELL

Collected By :
Collection Date : 07/01/09 10:30

ESC Sample # : L410913-02

Site ID :

Project # : 0907049

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Corrosivity	Non-Corrosive			9040C	07/14/09	1
Flashpoint	See Footnote		deg F	D93/1010A	07/09/09	1
Reactive CN (SW846 7.3.3.2)	BDL	0.125	mg/l	9012B	07/14/09	1
Reactive Sulf.(SW846 7.3.4.1)	BDL	25.	mg/l	9034/9030B	07/10/09	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

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	WG430503	SAMP	Silver	R816846	J6
L410913-02	WG430800	SAMP	Corrosivity	R816188	T8

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*
T8	(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 Differrence.

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.

ENVIRONMENTAL SCIENCE CORP.

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

L410913

July 15, 2009

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
Mercury	< 0.00020	mg/l			WG430207	07/07/09 21:32
Reactive Sulf.(SW846 7.3.4.1)	< 25	mg/l			WG430672	07/10/09 18:20
Corrosivity	3.30				WG430800	07/14/09 09:30
Arsenic	< .002	mg/l			WG430503	07/12/09 10:52
Barium	< .005	mg/l			WG430503	07/12/09 10:52
Cadmium	< .005	mg/l			WG430503	07/12/09 10:52
Calcium	< .5	mg/l			WG430503	07/12/09 10:52
Chromium	< .01	mg/l			WG430503	07/12/09 10:52
Lead	< .005	mg/l			WG430503	07/12/09 10:52
Magnesium	< .5	mg/l			WG430503	07/12/09 10:52
Potassium	< .5	mg/l			WG430503	07/12/09 10:52
Selenium	< .02	mg/l			WG430503	07/12/09 10:52
Sodium	< .5	mg/l			WG430503	07/12/09 10:52
Silver	< .01	mg/l			WG430503	07/14/09 18:01

Duplicate

Analyte	Units	Result	Duplicate	RPD	Limit	Ref Samp	Batch
Mercury	mg/l	0.00	0.00	0.00	20	L410846-01	WG430207
Flashpoint	deg F	0.00	0.00	0.00	20	L410913-02	WG430692
Reactive Sulf.(SW846 7.3.4.1)	mg/l	0.00	0.00	0.00	20	L410913-02	WG430672
Corrosivity	5.30		5.30	NA	20	L410846-01	WG430800
Reactive CN (SW846 7.3.3.2)	mg/l	0.00	0.00	0.00	20	L410913-02	WG430669
Arsenic	mg/l	0.00	0.00	0.00	20	L411103-01	WG430503
Barium	mg/l	0.0775	0.0780	0.643	20	L411103-01	WG430503
Cadmium	mg/l	0.00	0.000110	NA	20	L411103-01	WG430503
Calcium	mg/l	6.43	6.30	2.04	20	L411103-01	WG430503
Chromium	mg/l	0.00	0.000500	NA	20	L411103-01	WG430503
Lead	mg/l	0.0173	0.0170	1.85	20	L411103-01	WG430503
Magnesium	mg/l	6.42	6.30	1.89	20	L411103-01	WG430503
Potassium	mg/l	1.90	2.00	5.13	20	L411103-01	WG430503
Selenium	mg/l	0.00	0.00	0.00	20	L411103-01	WG430503
Sodium	mg/l	0.686	0.770	11.5	20	L411103-01	WG430503
Silver	mg/l	0.00	0.00	0.00	20	L411103-01	WG430503

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
Mercury	mg/l	.003	0.00321	106	85-115	WG430207
Flashpoint	deg F	82	82.0	100.	96-104	WG430692

* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

ENVIRONMENTAL
SCIENCE CORP.

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

L410913

July 15, 2009

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
Reactive Sulf.(SW846 7.3.4.1)	mg/l	100	80.0	80.0	70-130	WG430672
Corrosivity		9.04	8.90	98.5	97.4-102.6	WG430800
Arsenic	mg/l	1.13	1.14	101.	85-115	WG430503
Barium	mg/l	1.13	1.18	104.	85-115	WG430503
Cadmium	mg/l	1.13	1.19	106.	85-115	WG430503
Calcium	mg/l	11.3	11.8	104.	85-115	WG430503
Chromium	mg/l	1.13	1.16	103.	85-115	WG430503
Lead	mg/l	1.13	1.18	104.	85-115	WG430503
Magnesium	mg/l	11.3	12.1	107.	85-115	WG430503
Potassium	mg/l	11.3	11.6	103.	85-115	WG430503
Selenium	mg/l	1.13	1.10	97.0	85-115	WG430503
Sodium	mg/l	11.3	11.7	104.	85-115	WG430503
Silver	mg/l	1.13	1.05	92.9	85-115	WG430503

Laboratory Control Sample Duplicate

Analyte	Units	Result	Ref	%Rec	Limit	RPD	Limit	Batch
Flashpoint	deg	80.0	82.0	98.0	96-104	2.47	7	WG430692
Reactive Sulf.(SW846 7.3.4.1)	mg/l	84.0	80.0	84.0	70-130	4.88	20	WG430672
Corrosivity		9.00	8.90	100.	97.4-102.6	1.12	10	WG430800

Matrix Spike

Analyte	Units	MS Res	Ref Res	TV	% Rec	Limit	Ref Samp	Batch
Mercury	mg/l	0.00328	0.000	.003	107.	70-130	L410896-01	WG430207
Arsenic	mg/l	1.14	0.00	1.13	101.	75-125	L411103-01	WG430503
Barium	mg/l	1.29	0.0760	1.13	108.	75-125	L411103-01	WG430503
Cadmium	mg/l	1.19	0.00011	1.13	105.	75-125	L411103-01	WG430503
Calcium	mg/l	18.0	6.30	11.3	104.	75-125	L411103-01	WG430503
Chromium	mg/l	1.18	0.00059	1.13	103.	75-125	L411103-01	WG430503
Lead	mg/l	1.18	0.0178	1.13	103.	75-125	L411103-01	WG430503
Magnesium	mg/l	18.2	6.30	11.3	105.	75-125	L411103-01	WG430503
Potassium	mg/l	13.3	2.00	11.3	100.	75-125	L411103-01	WG430503
Selenium	mg/l	1.10	0.00	1.13	97.3	75-125	L411103-01	WG430503
Sodium	mg/l	12.4	0.770	11.3	103.	75-125	L411103-01	WG430503
Silver	mg/l	0.305	0.00	1.13	27.0 *	75-125	L411103-01	WG430503

Matrix Spike Duplicate

Analyte	Units	MSD	Ref	%Rec	Limit	RPD	Limit	Ref Samp	Batch
Mercury	mg/l	0.0032	0.0032	100.	70-130	0.927	20	L410896-01	WG430207
Arsenic	mg/l	1.15	1.14	102.	75-125	0.873	20	L411103-01	WG430503
Barium	mg/l	1.26	1.29	105.	75-125	0.787	20	L411103-01	WG430503
Cadmium	mg/l	1.21	1.19	107.	75-125	1.67	20	L411103-01	WG430503
Calcium	mg/l	17.8	18.0	102.	75-125	1.12	20	L411103-01	WG430503
Chromium	mg/l	1.17	1.16	103.	75-125	0.858	20	L411103-01	WG430503

* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

ENVIRONMENTAL SCIENCE CORP.

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

L410913

July 15, 2009

Analyte	Units	MSD	Ref	%Rec	Limit	RPD	Limit	Ref Samp	Batch
			Matrix Spike Duplicate						
Lead	mg/l	[illegible]	[illegible]	104.	75-125	0.844	20	L411103-01	WG430503
Magnesium	mg/l	18.5	18.2	108.	75-125	1.63	20	L411103-01	WG430503
Potassium	mg/l	13.1	13.3	98.2	75-125	1.52	20	L411103-01	WG430503
Selenium	mg/l	[illegible]	[illegible]	97.3	75-125	0.00	20	L411103-01	WG430503
Sodium	mg/l	12.2	12.4	101.	75-125	1.63	20	L411103-01	WG430503
Silver	mg/l	0.290	0.305	25.664*	75-125	5.04	20	L411103-01	WG430503

Batch number /Run number / Sample number cross reference

WG430207: R810349: L410913-01
WG430692: R810907: L410913-02
WG430672: R815006: L410913-02
WG430800: R816188: L410913-02
WG430669: R816207: L410913-02
WG430503: R816846: L410913-01

* 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

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 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: Alkalinity									
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			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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 8260B: VOLATILES									
Sample ID: 5ml rb		*MBLK*			Batch ID: **R34458**		Analysis Date:	7/9/2009 10:46:20 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	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						
1,1-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:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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 8260B: VOLATILES									
Sample ID: 5ml rb		*MBLK*			Batch ID: **R34458**		Analysis Date:	7/9/2009 10:46:20 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						
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						
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 Date:	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			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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
Sample ID: mb-19539 *MBLK* Batch ID: 19539 Analysis Date: 7/7/2009

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	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	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
Fluorene	ND	µg/L	10
Hexachlorobenzene	ND	µg/L	10

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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									
Sample ID: mb-19539		*MBLK*			Batch ID:	**19539**	Analysis Date:		7/7/2009
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						
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 ID:	**19539**	Analysis Date:		7/7/2009
Acenaphthene	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	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	10	82.9	30	77.9			S

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

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									
Sample ID: lcs-19539		*LCS*			Batch ID: **19539**		Analysis Date:		7/7/2009
Surr: 2,4,6-Tribromophenol	160.2	µg/L	0	80.1	16.6	150			
Surr: 2-Fluorobiphenyl	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/L	0	53.2	10.7	80.3			
Sample ID: lcsd-19539		*LCSD*			Batch ID: **19539**		Analysis Date:		7/7/2009
Acenaphthene	76.20	µg/L	10	76.2	33.2	88.1	6.70	30.5	
4-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	
1,4-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	
4-Nitrophenol	65.22	µg/L	10	32.6	6.78	74.7	13.5	36.3	
Pentachlorophenol	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
1,2,4-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	0	
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	
Method: EPA 120.1: Specific Conductance									
Sample ID: 0907003-01B DUP		*DUP*			Batch ID: **R34382**		Analysis Date:		7/2/2009
Specific Conductance	15600	µmhos/cm	0.010				0.957	20	
Method: SM4500-H+B: pH									
Sample ID: 0907003-01B DUP		*DUP*			Batch ID: **R34382**		Analysis Date:		7/2/2009
pH	7.020	pH units	0.1				0.710	15	
Method: SM2540C MOD: Total Dissolved Solids									
Sample ID: 0907049-01CMSD		*MSD*			Batch ID: **19553**		Analysis Date:		7/7/2009
Total Dissolved Solids	9475	mg/L	100	101	80	120	0.945	20	
Sample ID: MB-19553		*MBLK*			Batch ID: **19553**		Analysis Date:		7/7/2009
Total Dissolved Solids	ND	mg/L	20						
Sample ID: LCS-19553		*LCS*			Batch ID: **19553**		Analysis Date:		7/7/2009
Total Dissolved Solids	1012	mg/L	20	101	80	120			
Sample ID: 0907049-01CMS		*MS*			Batch ID: **19553**		Analysis Date:		7/7/2009
Total Dissolved Solids	9565	mg/L	100	103	80	120			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name WESTERN REFINING SOUT | Date Received: 7/2/2009

Work Order Number 0907049 | Received by: TLS

Checklist completed by: 18 (Signature) 7/2/09 (Date) | Sample ID labels checked by: T> (Initials)

Matrix: | Carrier name: UPS

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 ☑	
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 bottles checked for pH:
Water - VOA vials have zero headspace? No VOA vials submitted ☐		Yes ☑	No ☐	5
Water - Preservation labels on bottle and cap match?	Yes ☑	No ☐	N/A ☐	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐	<2 >12 unless noted below.
Container/Temp Blank temperature?	2.6°	<6° C Acceptable If given sufficient time to cool.		

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4161

email or Fax#: 505-632-3911

QA/QC Package:
☐ Standard ☑ Level 4 (Full Validation)
☐ Other
☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name: Injection Well 3rd QTR July 1, 09

Project #:

Project Manager:

Sampler: Bob

On Ice: ☑ Yes ☐ No

Sample Temperature: 0.4°C

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No 0907049	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	[redacted] TDS	[redacted] Back up	RCRA 8 Metals Na, Ca, Mg, K	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Sulfides	EC, pH, SO_4, Alk, Cl	Air Bubbles (Y or N)
7-1-09	10:30	H_2O	Injection Well	3 VOA	HCl	1										X						
				1-Liter	Amber	1											X					
				1-500ml	HNO_3	1							X									
				1-500ml	N/A	1												X				
				1-500ml	NaOH	1													X			
				1-500ml	ZN acetate	1														X		
				1-500ml	N/A	1															X	
				1-250ml	H_2SO_4	1						X										
				1-500ml	N/A	1					X											
			Trip Blank	2-VOA		2																

Date	Time	Relinquished by:	Received by:	Date	Time
7-1-09	2:30	Robert Knabow			
				7/2/09	1015

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.

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

Order No.: 0910042

Dear Cindy Hurtado:

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

Hall Environmental Analysis Laboratory, Inc.

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	

Hall Environmental Analysis Laboratory, Inc.

Date: *26-Oct-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0910042	**Collection Date:**	10/1/2009 10:10:00 AM
Project:	Injection Well 4th QTR 10/1/09	**Date Received:**	10/2/2009
Lab ID:	0910042-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **TAF**
Chloride	1200	10		mg/L	100	10/5/2009 10:25:09 PM
Sulfate	180	50		mg/L	100	10/5/2009 10:25:09 PM
EPA METHOD 7470: MERCURY						Analyst: **MMS**
Mercury	0.00044	0.00020		mg/L	1	10/9/2009 4:02:44 PM
EPA 6010B: TOTAL RECOVERABLE METALS						Analyst: **SNV**
Arsenic	ND	0.020		mg/L	1	10/16/2009 1:38:07 PM
Barium	0.27	0.020		mg/L	1	10/16/2009 1:38:07 PM
Cadmium	ND	0.0020		mg/L	1	10/16/2009 1:38:07 PM
Calcium	100	1.0		mg/L	1	10/16/2009 1:38:07 PM
Chromium	ND	0.0060		mg/L	1	10/16/2009 1:38:07 PM
Lead	0.0072	0.0050		mg/L	1	10/16/2009 1:38:07 PM
Magnesium	24	1.0		mg/L	1	10/16/2009 1:38:07 PM
Potassium	17	1.0		mg/L	1	10/16/2009 1:38:07 PM
Selenium	ND	0.050		mg/L	1	10/16/2009 1:38:07 PM
Silver	ND	0.0050		mg/L	1	10/16/2009 1:38:07 PM
Sodium	770	10		mg/L	10	10/22/2009 2:46:11 PM
EPA METHOD 8270C: SEMIVOLATILES						Analyst: **JDC**
Acenaphthene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Acenaphthylene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Aniline	60	50		µg/L	1	10/13/2009 2:46:46 PM
Anthracene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Azobenzene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Benz(a)anthracene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Benzo(a)pyrene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Benzo(b)fluoranthene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Benzo(g,h,i)perylene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Benzo(k)fluoranthene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Benzoic acid	ND	100		µg/L	1	10/13/2009 2:46:46 PM
Benzyl alcohol	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Bis(2-chloroethoxy)methane	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Bis(2-chloroethyl)ether	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Bis(2-chloroisopropyl)ether	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Bis(2-ethylhexyl)phthalate	ND	50		µg/L	1	10/13/2009 2:46:46 PM
4-Bromophenyl phenyl ether	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Butyl benzyl phthalate	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Carbazole	ND	50		µg/L	1	10/13/2009 2:46:46 PM
4-Chloro-3-methylphenol	ND	50		µg/L	1	10/13/2009 2:46:46 PM
4-Chloroaniline	ND	50		µg/L	1	10/13/2009 2:46:46 PM
2-Chloronaphthalene	ND	50		µg/L	1	10/13/2009 2:46:46 PM

Qualifiers:

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- E Estimated value
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- MCL Maximum Contaminant Level
- ND Not Detected at the Reporting Limit
- RL Reporting Limit
- S Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *26-Oct-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0910042	**Collection Date:**	10/1/2009 10:10:00 AM
Project:	Injection Well 4th QTR 10/1/09	**Date Received:**	10/2/2009
Lab ID:	0910042-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES						Analyst: JDC
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 PM
Chrysene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Di-n-butyl phthalate	ND	50		µg/L	1	10/13/2009 2:46:46 PM
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 PM
Dibenzofuran	ND	50		µg/L	1	10/13/2009 2:46:46 PM
1,2-Dichlorobenzene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
1,3-Dichlorobenzene	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 PM
Dimethyl phthalate	ND	50		µg/L	1	10/13/2009 2:46:46 PM
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 PM
2,4-Dinitrotoluene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
2,6-Dinitrotoluene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
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 PM
Hexachlorobenzene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Hexachlorobutadiene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Hexachlorocyclopentadiene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
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 PM
Isophorone	ND	50		µg/L	1	10/13/2009 2:46:46 PM
2-Methylnaphthalene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
2-Methylphenol	ND	50		µg/L	1	10/13/2009 2:46:46 PM
3+4-Methylphenol	ND	50		µg/L	1	10/13/2009 2:46:46 PM
N-Nitrosodi-n-propylamine	ND	50		µg/L	1	10/13/2009 2:46:46 PM
N-Nitrosodimethylamine	ND	50		µg/L	1	10/13/2009 2:46:46 PM
N-Nitrosodiphenylamine	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Naphthalene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
2-Nitroaniline	ND	50		µg/L	1	10/13/2009 2:46:46 PM
3-Nitroaniline	ND	50		µg/L	1	10/13/2009 2:46:46 PM
4-Nitroaniline	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Nitrobenzene	ND	50		µg/L	1	10/13/2009 2:46:46 PM
2-Nitrophenol	ND	50		µg/L	1	10/13/2009 2:46:46 PM
4-Nitrophenol	ND	50		µg/L	1	10/13/2009 2:46:46 PM
Pentachlorophenol	ND	100		µg/L	1	10/13/2009 2:46:46 PM
Phenanthrene	ND	50		µg/L	1	10/13/2009 2:46:46 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *26-Oct-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0910042	**Collection Date:**	10/1/2009 10:10:00 AM
Project:	Injection Well 4th QTR 10/1/09	**Date Received:**	10/2/2009
Lab ID:	0910042-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *26-Oct-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0910042	**Collection Date:**	10/1/2009 10:10:00 AM
Project:	Injection Well 4th QTR 10/1/09	**Date Received:**	10/2/2009
Lab ID:	0910042-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	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/L	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	10/6/2009 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/L	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-Tetrachloroethane	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/L	5	10/6/2009 9:23:19 PM
Trichloroethene (TCE)	ND	5.0		µg/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:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *26-Oct-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	Injection Well
Lab Order:	0910042	**Collection Date:**	10/1/2009 10:10:00 AM
Project:	Injection Well 4th QTR 10/1/09	**Date Received:**	10/2/2009
Lab ID:	0910042-01	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
SM 2540 C: TOTAL DISSOLVED SOLIDS						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 CONDUCTANCE						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

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *26-Oct-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	TRIP BLANK
Lab Order:	0910042	**Collection Date:**	
Project:	Injection Well 4th QTR 10/1/09	**Date Received:**	10/2/2009
Lab ID:	0910042-02	**Matrix:**	TRIP BLANK

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: 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	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		µg/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
Chloroform	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-chloropropane	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-Dichloropropene	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	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *26-Oct-09*

CLIENT:	Western Refining Southwest, Inc.	**Client Sample ID:**	TRIP BLANK
Lab Order:	0910042	**Collection Date:**	
Project:	Injection Well 4th QTR 10/1/09	**Date Received:**	10/2/2009
Lab ID:	0910042-02	**Matrix:**	TRIP BLANK

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: HL
Isopropylbenzene	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
4-Isopropyltoluene	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
4-Methyl-2-pentanone	ND	10		µg/L	1	10/7/2009 10:51:37 PM
Methylene Chloride	ND	3.0		µg/L	1	10/7/2009 10:51:37 PM
n-Butylbenzene	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
n-Propylbenzene	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
sec-Butylbenzene	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
Styrene	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
tert-Butylbenzene	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	10/7/2009 10:51:37 PM
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
trans-1,2-DCE	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
Trichlorofluoromethane	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/7/2009 10:51:37 PM
Vinyl chloride	ND	1.0		µg/L	1	10/7/2009 10:51:37 PM
Xylenes, Total	ND	1.5		µg/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	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

ENVIRONMENTAL
SCIENCE CORP.

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 : October 06, 2009
Description : 0910042

ESC Sample # : L425671-01

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.

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	SAMP	Corrosivity	R943948	T8
	WG444644	SAMP	Reactive Sulf.(SW846 7.3.4.1)	R940988	J3

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J3	The associated batch QC was outside the established quality control range for precision.
T8	(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 Differrence.

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.

ENVIRONMENTAL SCIENCE CORP.

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

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
Reactive Sulf.(SW846 7.3.4.1)	2.25	mg/l		0	WG444644	10/09/09 09:00
Corrosivity	6.20				WG445108	10/10/09 14:25

Duplicate

Analyte	Units	Result	Duplicate	RPD	Limit	Ref Samp	Batch
Flashpoint	deg F	0	0	0	20	L425457-13	WG444653
Flashpoint	deg F	0	0	0	20	L425939-01	WG444653
Reactive Sulf.(SW846 7.3.4.1)	mg/l	80.0	39.0	25.5*	20	L425671-01	WG444644
Reactive CN (SW846 7.3.3.2)	mg/l	0	0	0	20	L425671-01	WG444642
Corrosivity		0	0	0	10	L425671-01	WG445108

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
Flashpoint	deg F	82	80.0	97.6	96-104	WG444653
Reactive Sulf.(SW846 7.3.4.1)	mg/l	100	89.0	89.0	70-130	WG444644
Corrosivity		9.68	9.70	100.	97.9-100.8	WG445108

Laboratory Control Sample Duplicate

Analyte	Units	Result	Ref	%Rec	Limit	RPD	Limit	Batch
Flashpoint	deg F	79.0	80.0	96.0	96-104	1.26	7	WG444653
Reactive Sulf.(SW846 7.3.4.1)	mg/l	89.0	89.0	89.0	70-130	0	20	WG444644
Corrosivity		9.70	9.70	100.	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 QC Qualifiers.'

Lab Order: 0910042
Client: Western Refining Southwest, Inc.
Project: Injection Well 4th QTR 10/1/09

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Instrument Run ID	QC Batch ID	Prep Date	Analysis Date
0910042-01A	Injection Well	10/1/2009 10:10:00 AM	Aqueous	EPA Method 8260B: VOLATILES	NEPTUNE_091006A	R35601		10/6/2009
				EPA Method 8260B: VOLATILES	NEPTUNE_091006A	R35601		10/6/2009
				EPA Method 8260B: VOLATILES	NEPTUNE_091006A	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_091002A	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	OSEIDON_091002A	R35564		10/2/2009
				SM 2540 C: Total Dissolved Solids	WC_091005F	20238		10/5/2009
				SM4500-H+B: pH	OSEIDON_091002A	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	NEPTUNE_091007A	R35624		10/7/2009
				EPA Method 8260B: VOLATILES	NEPTUNE_091006A	R35601		10/6/2009

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SM 2540 C: Total Dissolved Solids											
Sample ID: MB-20238		*MBLK*				Batch ID:	**20238**	Analysis Date:		10/5/2009	
Total Dissolved Solids	ND	mg/L	20.0								
Sample ID: LCS-20238		*LCS*				Batch ID:	**20238**	Analysis Date:		10/5/2009	
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 9:47:25 AM	
Chloride	ND	mg/L	0.10								
Sulfate	ND	mg/L	0.50								
Sample ID: MB		*MBLK*				Batch ID:	**R35577**	Analysis Date:		10/5/2009 2:52:30 PM	
Chloride	ND	mg/L	0.10								
Sulfate	ND	mg/L	0.50								
Sample ID: LCS		*LCS*				Batch ID:	**R35569**	Analysis Date:		10/2/2009 10:04:50 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 3:09:54 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											
Sample ID: MB		*MBLK*				Batch ID:	**R35564**	Analysis Date:		10/2/2009 1:41:00 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: 80PPM LCS		*LCS*				Batch ID:	**R35564**	Analysis Date:		10/2/2009 1:47:00 PM	
Alkalinity, Total (As CaCO3)	79.44	mg/L Ca	20	80	0	99.3	80	120			

Qualifiers:

*	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 5ml rb		*MBLK*				Batch ID: **R35601**		Analysis Date:	10/6/2009 9:23:18 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	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								
1,1-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:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 5ml rb		*MBLK*				Batch ID: **R35601**		Analysis Date:	10/6/2009 9:23:18 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								
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								
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**		Analysis 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)	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								

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: Western Refining Southwest, Inc.
Project: Injection Well 4th QTR 10/1/09 **Work Order:** 0910042

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b3		*MBLK*					Batch ID: **R35601**		Analysis 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/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								
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								

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: Western Refining Southwest, Inc.
Project: Injection Well 4th QTR 10/1/09 **Work Order:** 0910042

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%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	79.5	126			
Sample ID: 5ml rb		*MBLK*				Batch ID: **R35624**		Analysis Date:	10/7/2009 11:42:07 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	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								
1,1-Dichloroethene	ND	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

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 5ml rb		*MBLK*				Batch ID: **R35624**		Analysis Date:	10/7/2009 11:42:07 AM		
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								
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-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 Date:	10/8/2009 1:10:13 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								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b6		*MBLK*				Batch ID: **R35624**		Analysis 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	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-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								
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								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: b6		*MBLK*				Batch ID:	**R35624**	Analysis Date:	10/8/2009 1:10:13 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-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								
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	0	30	0	95.1	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	78.5	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			
Toluene	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	0	94.9	80.2	128			
Trichloroethene (TCE)	15.42	µg/L	1.0	20	0	77.1	77.4	115			S
Surr: 1,2-Dichloroethane-d4	9.507	µg/L	0	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 lcs		*LCS*				Batch ID:	**R35624**	Analysis Date:	10/7/2009 12:37:37 PM		
Benzene	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			
Trichloroethene (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			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8260B: VOLATILES											
Sample ID: 100ng lcs		*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/L	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	µg/L	0	10	0	94.3	78.5	130			
Surr: Toluene-d8	9.529	µg/L	0	10	0	95.3	79.5	126			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: 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								
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	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	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								
Fluorene	ND	µg/L	10								
Hexachlorobenzene	ND	µg/L	10								

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: mb-20263		*MBLK*				Batch ID: **20263**		Analysis Date: 10/13/2009 8:22:08 PM			
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								
[illegible]nol	ND	µg/L	10								
[illegible]rene	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	113			
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: lcs-20263		*LCS*				Batch ID: **20263**		Analysis Date: 10/13/2009 1:45:48 PM			
Acenaphthene	68.76	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			
1,2,4-Trichlorobenzene	62.24	µg/L	10	100	0	62.2	30	77.9			

Qualifiers:

[illegible] Estimated value
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.
Project: Injection Well 4th QTR 10/1/09 **Work Order:** 0910042

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 8270C: Semivolatiles											
Sample ID: lcs-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/L	0	200	0	35.9	10.7	80.3			
Method: EPA 120.1: Specific Conductance											
Sample ID: 0910020-04A DUP		*DUP*				Batch ID:	**R35564**	Analysis Date:	10/2/2009 2:35:00 PM		
Specific Conductance	704.1	µmhos/c	0.010						0.566	20	
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 Recoverable Metals											
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/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: 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			
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	50	0.4055	107	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

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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SM4500-H+B: pH											
Sample ID: 0910025-01GDUP		*DUP*				Batch ID: **R35564**		Analysis Date:		10/2/2009 6:12:00 PM	
pH	7.500	pH units	0.1						0		

Qualifiers:

J	Estimated value	H	Holding times for preparation or analysis exceeded
B	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name **WESTERN REFINING SOUT** Date Received: **10/2/2009**

Work Order Number **0910042** Received by: **TLS**

Checklist completed by: _____ 10/2/09 Sample ID labels checked by: _____
Signature Date Initials

Matrix: Carrier name: UPS

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 ☑	
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 ☐		
Water - VOA vials have zero headspace?	No VOA vials submitted ☐	Yes ☑	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☑	No ☐	N/A ☐	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐	
Container/Temp Blank temperature?	**4.3°**	*<6° C Acceptable* If given sufficient time to cool.		

Number of preserved bottles checked for pH: A

<2 >12 unless noted below.

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

ain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR4990
Bloomfield, NM 87413

Phone #: 505-632-4161

email or Fax#: 505-632-3911

QA/QC Package:
☐ Standard ☑ Level 4 (Full Validation)
☐ Other
☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name:
Injection Well 4TH QTR 10-1-09

Project #:

Project Manager:

Sampler: Bob

On Ice: ☑ Yes ☐ No

Sample Temperature: 4.5

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 0910512
10-1-09	1010	H2O	Injection Well	3-VOA	HCl	1
				1-liter	Amber	1
				1-500ml	HNO_3	1
				1-500ml	N/A	1
				1-500ml	NaOH	1
				1-500ml	ZN ACETATE	1
				1-500ml	N/A	1
				1-250	H_2SO_4	1
				1-500ml	N/A	1
			Trip Blank	2-VOA		2

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	~~EDB (Method 504.1)~~ TDS	~~8310 (PNAs PAH)~~ BACK up	RCRA 8 Metals Na, Ca, Mg, K	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Ignitability, Corrosivity	Reactivity	Sulfides	Ec, pH, SO_4, Alk, Cl	Air Bubbles (Y or N)
									X						
										X					
						X	.								
							.				X				
												X			
													X		
														X	
					X	X									
				X											

Date	Time	Relinquished by:	Received by:	Date	Time
10-1-09	2:30	Robert Knabow			
				10/2/09	1012

Date	Time	Relinquished by:	Received by:	Date	Time

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.

Hall Environmental Analysis Laboratory

QUALITY ASSURANCE PLAN

Effective Date: January 31st 2009

Revision 9.0

www.hallenvironmental.com

Control Number: 0000082

Approved By:

2-5-09

Nancy McDuffie — Date
Laboratory Manager

Table of Contents

Appendix C TCEQ Accreditation
Full list of approved analytes, methods, analytical techniques and fields of testing
Reserved, available upon request

Appendix D ADHS Accreditation
Full list of approved analytes, methods, analytical techniques and fields of testing
Reserved, available upon request

Appendix E NMED-DWB Certification
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.

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.

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 www.hallenvironmental.com.

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

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 in-house, 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.

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

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. 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 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. 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

Methodology	Title 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"

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 Detector"
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.

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.

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

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.

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.

$$RPD = \frac{2 \times (\text{Sample Result} - \text{Duplicate Result})}{(\text{Sample Result} + \text{Duplicate Result})} \times 100$$

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.

$$\text{Average} = (\Sigma x_i) / n$$

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^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.

$$\text{Standard deviation} = s = [\Sigma (x_i - \text{average})^2 / (n-1)]^{1/2}$$

Percent Recovery (MS, MSD, LCS and LCSD)

$$\text{Percent Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{(\text{Spike Added})} \times 100$$

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 = $x \pm s * \text{s-dist}$

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:

$$\text{RPD} = 2 \times \frac{(\text{Sample Result} - \text{Duplicate Result})}{(\text{Sample Result} + \text{Duplicate Result})} \times 100$$

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:

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

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 x s) is 0.0652.

Calibration Calculations

1. Response Factor or Calibration Factor:

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

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

$$RSD = s / RF_{AVE}$$

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
Σ = the sum of all the individual values

2. Linear Regression

$$y=mx+b$$

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)

$$CC (r) =\{ \Sigma((x_i-x_{ave})*(y_i-y_{ave})) \} / \{ SQRT((\Sigma(x_i-x_{ave})^2)*(\Sigma(y_i-y_{ave})^2)) \}$$

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
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

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

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:

n = number of replicate x,y pairs
x = x values
y = y values
$w = S^{-2} / (\Sigma S^{-2}/n)$
$S_{(xx)} = (\Sigma x^2 w) - [(\Sigma xw)^2 / n]$
$S_{(xy)} = (\Sigma xyw) - [(\Sigma xw)*(\Sigma yw) / n]$
$S_{(xx2)} = (\Sigma x^3 w) - [(\Sigma xw)*(\Sigma x^2 w) / n]$
$S_{(x2y)} = (\Sigma x^2 yw) - [(\Sigma x^2 w)*(\Sigma yw) / n]$
$S_{(x2x2)} = (\Sigma x^4 w) - [(\Sigma x^2 w)^2 / n]$
Or If unweighted calibration, w=1
S(xx) = (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.

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 un-necessary 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. Standard Methods for the Examination of Water and Wastewater: AOHA, AWWA, and WPCG; 20th Edition, 1999.

2. Methods for Chemical Analysis of Water and Wastes, USEPA, EPA-600/4-79-020, March 1979 and as amended December, 1982 (EPA-600/4-82-055)

3. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, USEPA SW-846, 3rd Edition, Updates I, II, IIA, IIB, III, December, 1996.

4. Methods of Soil Analysis: Parts 1 & 2, 2nd Edition, Agronomy Society of America, Monograph 9

5. Diagnosis & Improvement of Saline & Alkali Soils, Agriculture Handbook No. 60, USDA, 1954

6. Handbook on Reference Methods for Soil Testing, The Council on Soil Testing & Plant Analysis, 1980 and 1992

7. Field and Laboratory Methods Applicable to Overburdens and Mine Soils, USEPA, EPA-600/2-78-054, March 1978

8. Laboratory Procedures for Analyses of Oilfield Waste. Department of Natural Resources, Office of Conservation, Injection and Mining Division, Louisiana, August 1988

9. 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

10. Manual of Operating Procedures for the Analysis of Selected Soil, Water, Plant Tissue and Wastes Chemical and physical Parameter. Soil, Water, and Plant Analysis Laboratory, Dept. of Soil and Water Science, The University of Arizona, August 1989

11. Sampling Procedures and Chemical Methods in Use at the U.S. Salinity Laboratory for Characterizing Salt-Affected Soils and Water. USDA Salinity Laboratory.

12. Procedures for Collecting Soil Samples and Methods of Analysis for Soil Survey. USDA Soil Conservation Service, SSIR No. 1.

13. Soil Survey Laboratory Methods Manual. Soil Survey Laboratory Staff. Soil Survey Investigations Report No. 42, version 2.0, August 1992.

14. Methods for the Determination of Metals in Environmental Samples, 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. Analytical Chemistry of PCB's. Erickson, Mitchell D., CRC Press, Inc. 1992.

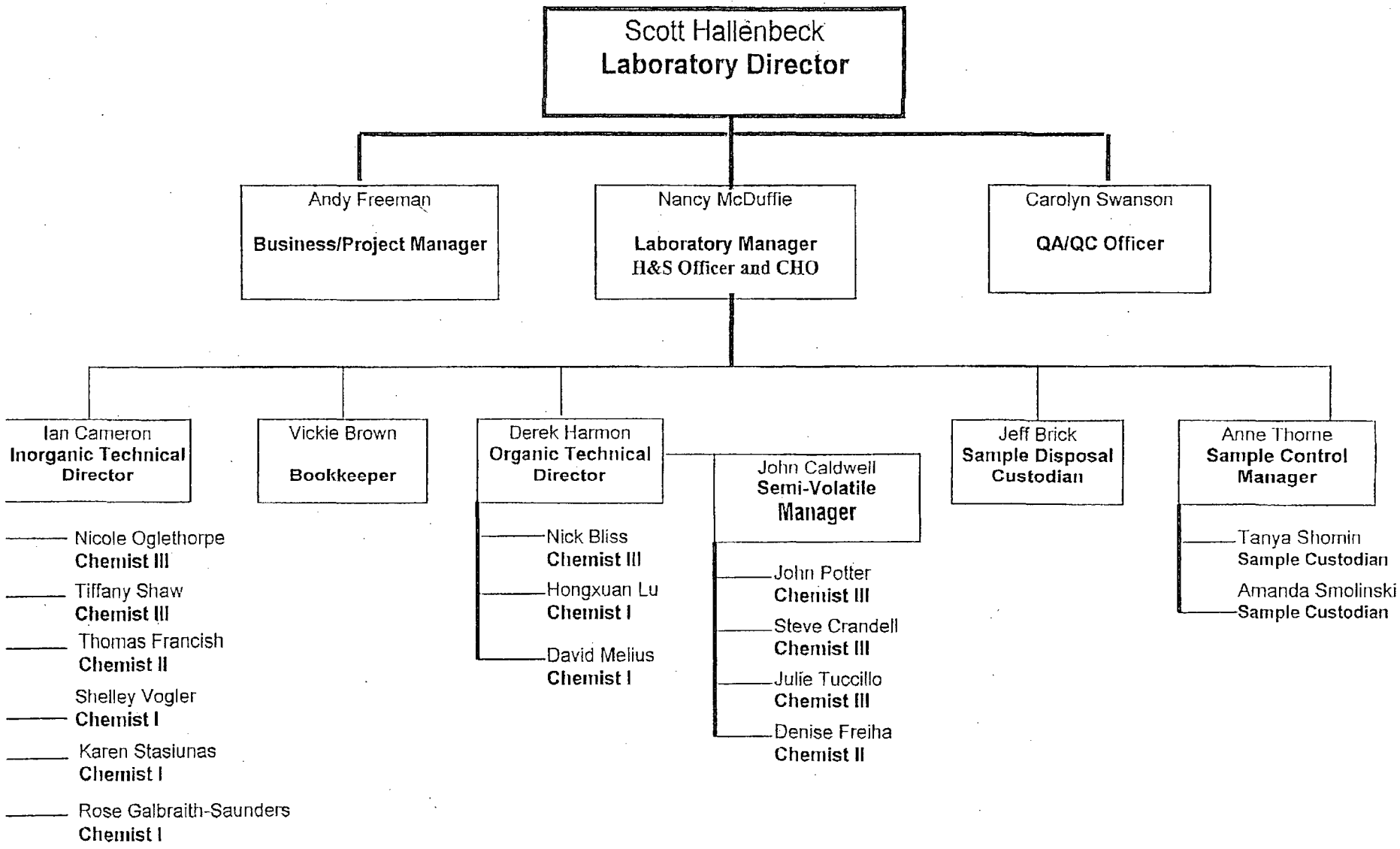
18. Environmental Perspective on the Emerging Oil Shale Industry, EPA Oil & Shale Research Group.

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

Diagram of Organizational Structure



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:

Air	*Drinking Water*	*Non Potable Water*	*Solids and 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
(503) 693-4122
FAX (503) 693-5602

NELAP Recognized

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.

MATRIX: Drinking Water

Reference		*Code*	*Description*
EPA 200.7 5		10014003	ICP - metals
Analyte Code	*Analyte*		
1000	Aluminum		
1015	Barium		
1020	Beryllium		
1025	Boron		
1030	Cadmium		
1035	Calcium		
1040	Chromium		
1055	Copper		
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	*Analyte*		
1095	Mercury		
EPA 300.0		10053006	Ion chromatography - anions.
Analyte Code	*Analyte*		
1575	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	*Analyte*		
1870	Orthophosphate as P		

ORELAP Fields of Accreditation

ORELAPID: NM100001
EPACode: NM00035

Hall Environmental Analysis Laboratory, Inc.

Certificate:
NM100001-009

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.

EPA 5030B 2		**10153409**	**Purge and trap for aqueous samples**
Analyte Code	***Analyte***		
125	Extraction/Preparation		
EPA 504.1		**10083008**	**EDB/DBCP/TCP micro-extraction, GC/ECD**
Analyte Code	***Analyte***		
4570	1,2-Dibromo-3-chloropropane (DBCP)		
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)		
EPA 524.2 4.1		**10088809**	**Volatile Organic Compounds GC/MS Capillary Column**
Analyte Code	***Analyte***		
5105	1,1,1,2-Tetrachloroethane		
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-Dichloropropane		
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 tetrachloride		
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		
5090	n-Propylbenzene		

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque, NM, 87109

Certificate:
NM100001-009

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.

4440	sec-Butylbenzene
5100	Styrene
4445	tert-Butylbenzene
5115	Tetrachloroethylene (Perchloroethylene)
5140	Toluene
4700	trans-1,2-Dicloroethylene
4685	trans-1,3-Dichloropropylene
5170	Trichloroethene (Trichloroethylene)
5175	Trichlorofluoromethane
5235	Vinyl chloride
5260	Xylene (total)

SM 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 5310 B 20th ED **20137400** Total Organic Carbon by Combustion Infra-red Method

Analyte Code	*Analyte*
2040	Total Organic Carbon

ORELAP Fields of Accreditation

ORELAPID: NM100001
EPACode: NM00035

Hall Environmental Analysis Laboratory, Inc.

Certificate:
NM100001-009

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.

MATRIX: Non-Potable Water

Reference		Code	Description
EPA 300.0		10053006	Ion chromatography - anions.
Analyte Code	*Analyte*		
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	*Analyte*		
125	Extraction/Preparation		
EPA 3510C 3		10138202	Separatory Funnel Liquid-liquid extraction
Analyte Code	*Analyte*		
125	Extraction/Preparation		
EPA 5030B 2		10153409	Purge and trap for aqueous samples
Analyte Code	*Analyte*		
125	Extraction/Preparation		
EPA 6010B 2		10155609	ICP - AES
Analyte Code	*Analyte*		
1000	Aluminum		
1005	Antimony		
1010	Arsenic		
1015	Barium		
1020	Beryllium		
1025	Boron		
1030	Cadmium		
1035	Calcium		
1040	Chromium		
1050	Cobalt		
1070	Iron		
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		
EPA 7470A 1		10165807	Mercury in Liquid Waste by by Cold Vapor Atomic Absorption
Analyte Code	*Analyte*		
1095	Mercury		

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque, NM, 87109

Certificate:
NM100001-009

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.

EPA 8015B 2		10173601	Non-halogenated organics using GC/FID
Analyte Code	*Analyte*		
9369	Diesel range organics (DRO)		
9408	Gasoline range organics (GRO)		
102	Motor Oil		
EPA 8021B 2		10174808	Aromatic and Halogenated Volatiles by GC with PID and/or ECD Purge &
Analyte Code	*Analyte*		
5210	1,2,4-Trimethylbenzene		
5215	1,3,5-Trimethylbenzene		
4375	Benzene		
4765	Ethylbenzene		
5240	m+p-xylene		
5000	Methyl tert-butyl ether (MTBE)		
5250	o-Xylene		
5140	Toluene		
5260	Xylene (total)		
EPA 8081A 1		10178606	Organochlorine Pesticides by GC/ECD
Analyte Code	*Analyte*		
7355	4,4'-DDD		
7360	4,4'-DDE		
7365	4,4'-DDT		
7025	Aldrin		
7110	alpha-BHC (alpha-Hexachlorocyclohexane)		
7115	beta-BHC (beta-Hexachlorocyclohexane)		
7105	delta-BHC		
7470	Dieldrin		
7510	Endosulfan I		
7515	Endosulfan II		
7520	Endosulfan sulfate		
7540	Endrin		
7530	Endrin aldehyde		
7120	gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)		
7685	Heptachlor		
7690	Heptachlor epoxide		
7810	Methoxychlor		
EPA 8082		10179007	Polychlorinated Biphenyls (PCBs) by GC/ECD
Analyte Code	*Analyte*		
8880	Aroclor-1016 (PCB-1016)		
8885	Aroclor-1221 (PCB-1221)		
8890	Aroclor-1232 (PCB-1232)		
8895	Aroclor-1242 (PCB-1242)		
8900	Aroclor-1248 (PCB-1248)		
8905	Aroclor-1254 (PCB-1254)		
8910	Aroclor-1260 (PCB-1260)		
EPA 8260B 2		10184802	Volatile Organic Compounds by purge and trap GC/MS
Analyte Code	*Analyte*		
5105	1,1,1,2-Tetrachloroethane		
5160	1,1,1-Trichloroethane		
5110	1,1,2,2-Tetrachloroethane		
5165	1,1,2-Trichloroethane		
4630	1,1-Dichloroethane		

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque, NM, 87109

Certificate:
NM100001-009

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.

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-chloropropane (DBCP)
4585	1,2-Dibromoethane (EDB, Ethylene dibromide)
4610	1,2-Dichlorobenzene
4635	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-Chlorotoluene
4860	2-Hexanone
6385	2-Methylnaphthalene
4540	4-Chlorotoluene
4995	4-Methyl-2-pentanone (MIBK)
4315	Acetone
4375	Benzene
4385	Bromobenzene
4390	Bromochloromethane
4395	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
4650	Dichloromethane (DCM, Methylene chloride)
4765	Ethylbenzene
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

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.

4910	p-Isopropyltoluene
4440	sec-Butylbenzene
5100	Styrene
4445	tert-Butylbenzene
5115	Tetrachloroethylene (Perchloroethylene)
5140	Toluene
4700	trans-1,2-Dicloroethylene
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	*Analyte*
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)
6190	2,6-Dinitrotoluene (2,6-DNT)
5795	2-Chloronaphthalene
5800	2-Chlorophenol
6385	2-Methylnaphthalene
6400	2-Methylphenol (o-Cresol)
6460	2-Nitroaniline
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

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.

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-Ethylhexyl)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
6285	Hexachlorocyclopentadiene
4840	Hexachloroethane
6315	Indeno[1,2,3-cd]pyrene
6320	Isophorone
5005	Naphthalene
5015	Nitrobenzene
6535	n-Nitrosodiphenylamine
6540	n-Nitrosodipropylamine
6605	Pentachlorophenol
6615	Phenanthrene
6625	Phenol
6665	Pyrene
5095	Pyridine

EPA 8310 **10187607** **Polynuclear Aromatic Hydrocarbons by HPLC/UV-VIS**

Analyte Code	*Analyte*
6380	1-Methylnaphthalene
5500	Acenaphthene
5505	Acenaphthylene
5555	Anthracene
5575	Benzo[a]anthracene
5580	Benzo[a]pyrene
5585	Benzo[b]fluoranthene
5590	Benzo[g,h,i]perylene
5600	Benzo[k]fluoranthene
5855	Chrysene
5895	Dibenz[a,h]anthracene
6265	Fluoranthene
6270	Fluorene
6315	Indeno[1,2,3-cd]pyrene
5005	Naphthalene
6615	Phenanthrene

Hall Environmental Analysis Laboratory, Inc.

4901 Hawkins Rd. NE, Suite D
Albuquerque, NM, 87109

Certificate:
NM100001-009

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.

6665	Pyrene		
SM 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		

ORELAP Fields of Accreditation

ORELAPID: NM100001
EPACode: NM00035

Hall Environmental Analysis Laboratory, Inc.

Certificate:
NM100001-009

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.

MATRIX Solids

Reference		*Code*	*Description*
EPA 3050A		10135407	Acid Digestion of Sediments, Sludges, and soils
Analyte Code	*Analyte*		
125	Extraction/Preparation		
EPA 3540C 3		10140202	Soxhlet Extraction
Analyte Code	*Analyte*		
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 So
Analyte Code	*Analyte*		
125	Extraction/Preparation		
EPA 6010B 2		10155609	ICP - AES
Analyte Code	*Analyte*		
1000	Aluminum		
1005	Antimony		
1010	Arsenic		
1015	Barium		
1020	Beryllium		
1025	Boron		
1030	Cadmium		
1035	Calcium		
1040	Chromium		
1050	Cobalt		
1055	Copper		
1070	Iron		
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		
EPA 7471A 1		10166208	Mercury in Solid Waste by Cold Vapor Atomic Absorption
Analyte Code	*Analyte*		
1095	Mercury		
EPA 8015B 2		10173601	Non-halogenated organics using GC/FID
Analyte Code	*Analyte*		
9369	Diesel range organics (DRO)		
9408	Gasoline range organics (GRO)		
102	Motor Oil		

ORELAP Fields of Accreditation

ORELAPID: NM100001
EPACode: NM00035

Hall Environmental Analysis Laboratory, Inc.

Certificate:
NM100001-009

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.

EPA 8021B 2		10174808	Aromatic and Halogenated Volatiles by GC with PID and/or ECD Purge &
Analyte Code	***Analyte***		
4375	Benzene		
4765	Ethylbenzene		
5240	m+p-xylene		
5000	Methyl tert-butyl ether (MTBE)		
5250	o-Xylene		
5140	Toluene		
5260	Xylene (total)		
EPA 8081A 1		10178606	Organochlorine Pesticides by GC/ECD
Analyte Code	***Analyte***		
7355	4,4'-DDD		
7360	4,4'-DDE		
7365	4,4'-DDT		
7025	Aldrin		
7110	alpha-BHC (alpha-Hexachlorocyclohexane)		
7115	beta-BHC (beta-Hexachlorocyclohexane)		
7105	delta-BHC		
7470	Dieldrin		
7510	Endosulfan I		
7515	Endosulfan II		
7520	Endosulfan sulfate		
7540	Endrin		
7530	Endrin aldehyde		
7120	gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)		
7685	Heptachlor		
7690	Heptachlor epoxide		
7810	Methoxychlor		
EPA 8082		10179007	Polychlorinated Biphenyls (PCBs) by GC/ECD
Analyte Code	***Analyte***		
8880	Aroclor-1016 (PCB-1016)		
8885	Aroclor-1221 (PCB-1221)		
8890	Aroclor-1232 (PCB-1232)		
8895	Aroclor-1242 (PCB-1242)		
8900	Aroclor-1248 (PCB-1248)		
8905	Aroclor-1254 (PCB-1254)		
8910	Aroclor-1260 (PCB-1260)		
EPA 8260B 2		10184802	Volatile Organic Compounds by purge and trap GC/MS
Analyte Code	***Analyte***		
5105	1,1,1,2-Tetrachloroethane		
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-chloropropane (DBCP)		

ORELAP Fields of Accreditation

ORELAPID: NM100001
EPACode: NM00035

Hall Environmental Analysis Laboratory, Inc.

Certificate:
NM100001-009

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.

4585	1,2-Dibromoethane (EDB, Ethylene dibromide)
4610	1,2-Dichlorobenzene
4635	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-Chlorotoluene
4860	2-Hexanone
6385	2-Methylnaphthalene
4540	4-Chlorotoluene
4995	4-Methyl-2-pentanone (MIBK)
4315	Acetone
4375	Benzene
4385	Bromobenzene
4390	Bromochloromethane
4395	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
4650	Dichloromethane (DCM, Methylene chloride)
4765	Ethylbenzene
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
4910	p-Isopropyltoluene
4440	sec-Butylbenzene
5100	Styrene
4445	tert-Butylbenzene
5115	Tetrachloroethylene (Perchloroethylene)
5140	Toluene
4700	trans-1,2-Dicloroethylene

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.

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	*Analyte*
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)
6190	2,6-Dinitrotoluene (2,6-DNT)
5795	2-Chloronaphthalene
5800	2-Chlorophenol
6385	2-Methylnaphthalene
6400	2-Methylphenol (o-Cresol)
6460	2-Nitroaniline
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
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

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.

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
6285	Hexachlorocyclopentadiene
4840	Hexachloroethane
6315	Indeno[1,2,3-cd]pyrene
6320	Isophorone
5005	Naphthalene
5015	Nitrobenzene
6530	n-Nitrosodimethylamine
6535	n-Nitrosodiphenylamine
6540	n-Nitrosodipropylamine
6605	Pentachlorophenol
6615	Phenanthrene
6625	Phenol
6665	Pyrene
5095	Pyridine

EPA 8310 — 10187607 — Polynuclear Aromatic Hydrocarbons by HPLC/UV-VIS

Analyte Code	*Analyte*
6380	1-Methylnaphthalene
6385	2-Methylnaphthalene
5500	Acenaphthene
5505	Acenaphthylene
5555	Anthracene
5575	Benzo[a]anthracene
5580	Benzo[a]pyrene
5585	Benzo[b]fluoranthene
5590	Benzo[g,h,i]perylene
5600	Benzo[k]fluoranthene
5855	Chrysene
5895	Dibenz[a,h]anthracene
6265	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

BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

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'
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: 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: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

CC: UIC Class I Well File "Annual Reporting" and "H2S Contingency Plan"

Permit ID	Operator	Annual Report Due Date	Submitted	Annual Report Contents
UICI-8 WDW-1	Navajo Refining Company	01/31/10		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. NMAC, a H2S 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 p:rovided 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 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 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 OCD 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 note 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. 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 GC/MS. Semi-volatile Organics GC/MS EPA Method 8270B including I and 2- methylnaphthalene. 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 (EPA Method 60 tO) and Arsenic and Mercury using atomic absorption (EPA Methods 7060 and 7470). d. EPA 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: 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: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

CC: UIC Class I Well File "Annual Reporting" and "H2S Contingency Plan"

Permit ID	Operator	Annual Report Due Date	Submitted	Annual Report Contents
UICI-9	Western Refining Southwest	01/31/10		9. Chemical Analysis of Injection Fluids: The following analyses of injection fluids will be conducted on a quarterly basis: a. Aromatic and halogenated volatile hydrocarbon scan by EPA method 8260C GC/MS including MTBE. Semi-Volatile Organics GC/MS 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 6O1OHCPMS) 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 Aztec 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'; 'lmolleur@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 http://www.emnrd.state.nm.us/OCD/brinewells.htm and OCD Brine Well Work Group Website at http://ocdimage.emnrd.state.nm.us/imaging/AEOrderFileView.aspx?appNo=pCJC0906359521.

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 http://ocdimage.emnrd.state.nm.us/imaging/AEOrderCriteria.aspx (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
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")