ANNUAL CLASS I WELL REPORT

Waste Disposal Well #1

January – December 2012

Western Refining

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

Submitted January 30, 2013

Prepared by:

Kelly Robinson
Environmental Supervisor

Certification

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

Ron Weaver
Regional Terminals Manager

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EXECUTIVE SUMMARY

This report provides a summary of activities conducted in 2012 on Waste Disposal Well #1 (WDW-#1) at the Bloomfield Refinery. The following is a summary of well operations and well testing activities performed in 2012.

Operational Summary

Injection Volume - The volume injected into the disposal well during 2012 was 8,996,020 gallons. Western Refining suspended refining operations at the Bloomfield Refinery on November 23, 2009. The crude unloading and product loading racks, storage tanks and other supporting equipment remain in operation.

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

Maintenance Operations - No down-hole maintenance activities were conducted in 2012.

Mechanical Integrity Tests - The 2012 well testing program witnessed by a representative of the New Mexico Oil Conservation Division (NMOCD) included a High-Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test. Results of these tests prove that the operational integrity of the well is sound.

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

Recommendations

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

1.0 INTRODUCTION

This report provides a summary of activities conducted during 2012 on Waste Disposal Well #1 (WDW #1). The disposal well is part of the Bloomfield Refinery operations. The refinery is located immediately south of Bloomfield, New Mexico in San Juan County. The well location is depicted in Figure 1. The physical address of the facility is as follows:

Bloomfield Refinery
#50 County Road 4990
Bloomfield, NM 87413

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

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

1.1 Well Information

Well Name & Number:	Waste Disposal Well #1
OCD UIC:	UIC-CL1-009
OCD Discharge Plan Permit Number:	GW-130
Well Classification:	Class I Non-hazardous
API Number:	30-045-29002
Legal Location:	1250 FEL, 2442FSL, I Sec 27 T29S R11E
Physical Address:	#50 Road 4990, Bloomfield, NM 87413

2.0 SUMMARY OF ACTIVITIES

The following list of activities was conducted in 2012 on WDW #1 located at the Bloomfield Refinery:

- 01/17/12 1st Quarter 2012 Sampling Event
- 04/03/12 2nd Quarter 2012 Sampling Event
- 07/31/12 3rd Quarter 2012 Sampling Event
- 09/06/12 Bradenhead Test
- 09/06/12 High-Pressure Shut-Down Test
- 09/06/12 Mechanical Integrity Test
- 10/11/12 4th Quarter 2011 Sampling Event

Quarterly samples collected for laboratory analysis were submitted to Hall Environmental Laboratories located in Albuquerque, New Mexico. Copies of the analytical reports are provided in Appendix B. A summary of the analytical results is provided in Table 3.

A representative of New Mexico Oil Conservation Division (NMOCD) was on-site to witness the Bradenhead Test, High-Pressure Shut-Down Test, and Mechanical Integrity Test on September 6, 2012. A copy of the test reports is provided in Appendix A.

The Annual Pressure Fall-Off Test was not conducted in 2012. In an e-mail to Western from NMOCD dated August 2, 2012, it states that Fall Off Test frequency requirements are believe evaluated by NMOCD and operators will be notified by NMOCD when a Fall Off Test is required. Western did not receive notification from NMOCD that a Fall-Off Test was required for 2012.

3.0 INJECTION VOLUME

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

3.1 Injection Volume

The volume injected into the disposal well during 2012 was 8,996,020 gallons. Throughout 2012 the Bloomfield Refinery injection well operated within the operational limits of less than 1,150 psi.

3.2 Injection Well Down-Time

The injection well was down approximately 4,019 hours in 2012. Decreased volume of plant produced water during 2012 resulted in extended periods in which the injection well was not operational. General maintenance activities on the injection well equipment 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,

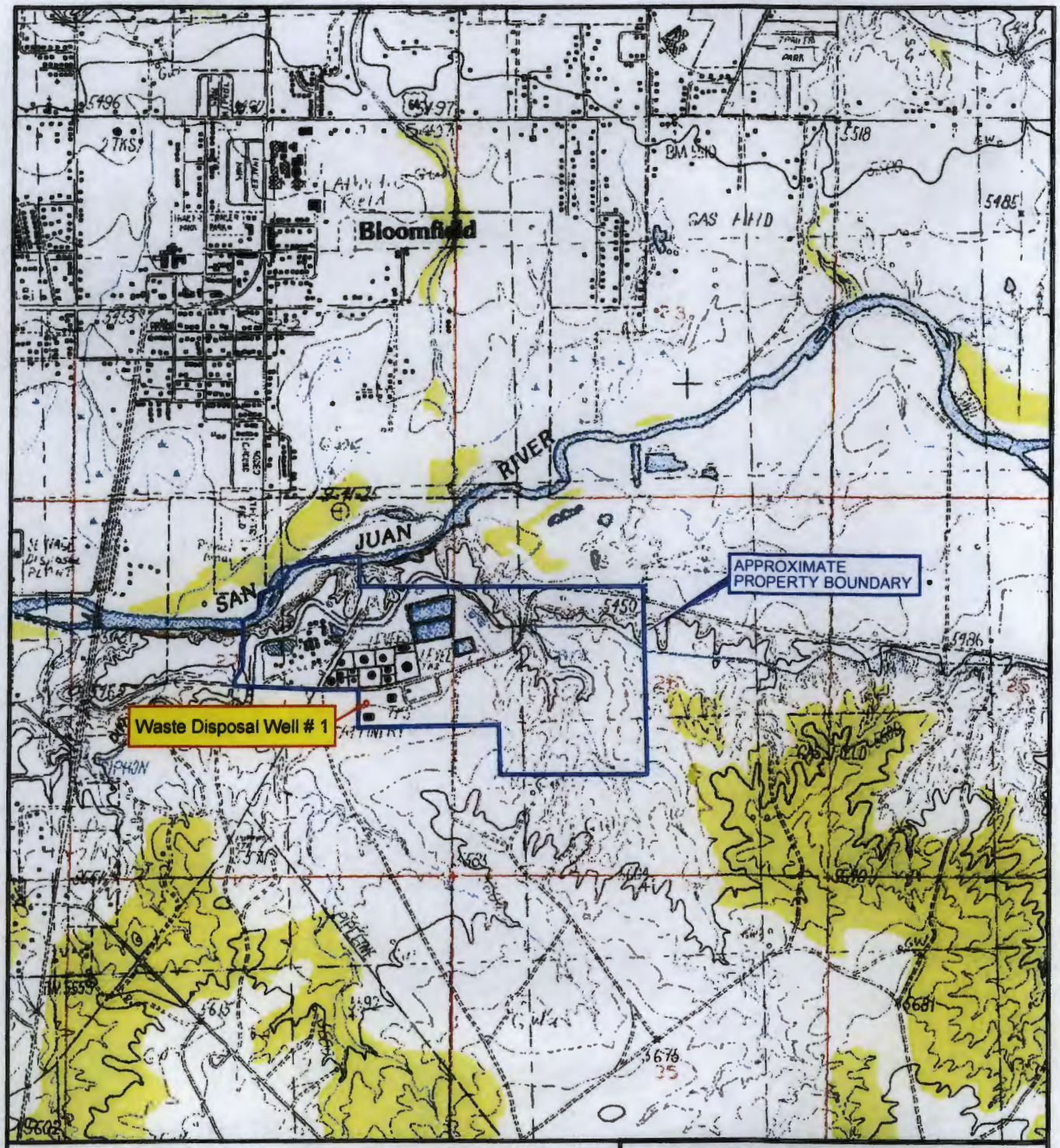
mechanical integrity testing, and Bradenhead testing in 2013. Western will continue to utilize the maximum operating injection pressure at the wellhead as permitted by Discharge Permit GW-130.

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.

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

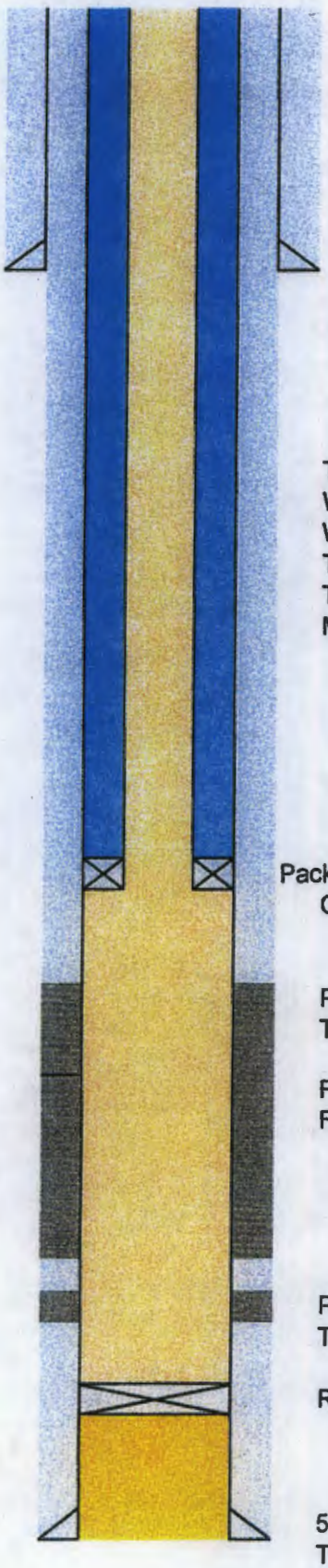
NO.: 30-045-29002

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

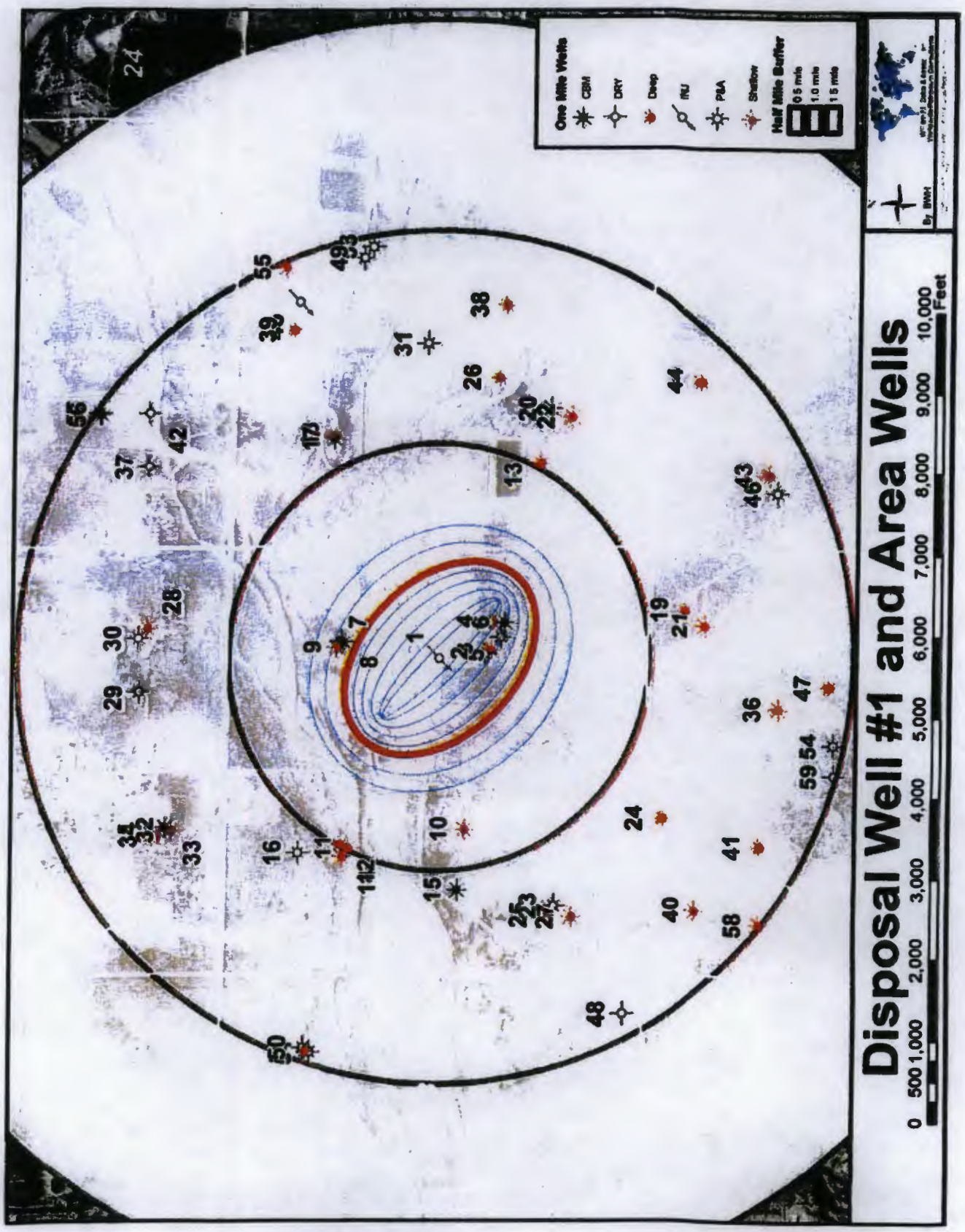

Disposal Well #1 and Area Wells
0 500 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000 Feet
One Mile Wells
CBM
DRY
Deep
PIU
PUA
Shallow
Half Mile Buffer
0.5 mile
1.0 mile
1.5 mile

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. 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. Ini. Zone
49	0.95	Sullivan	1X	30-045-29107			900	23-Jun-55	G-26-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
50	0.97	Madsen Selby Pooled Unit	2	30-045-07895			1600	05-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 Ini. 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: Carl J. Chavez 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/
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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 9-6-12 Operator San Juan Refining API # 30-0 45-29002

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. 960
Int. Casing Pres. N/A

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

REMARKS:
Packer set 3221
Top 3276 - 3208
Well was injecting when started - Chart clocked at 25 minutes - Started to rise & held at 500 lbs test 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/3district.htm

BRADENHEAD TEST REPORT

(submit 1 copy to above address)

Date of Test 9-6-12 Operator San Juan Cohmin API #30-0 45 29003

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

Well Status(Shut-In or Producing) Initial PSI: Tubing 90 Intermediate N/A Casing 120 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		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_____

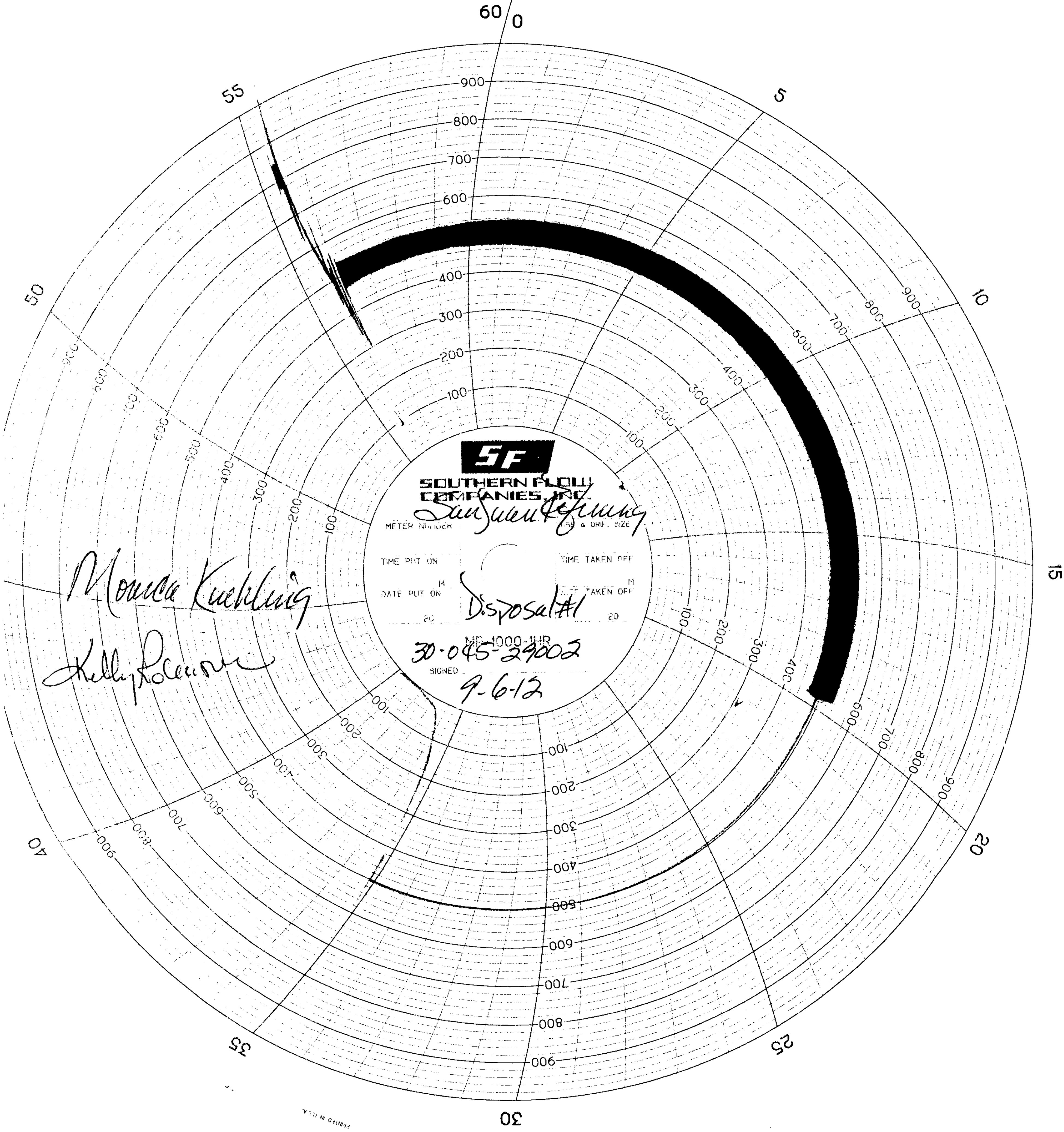
5 MINUTE SHUT-IN PRESSURE BRADENHEAD 0 INTERMEDIATE N/A

REMARKS: Dry Bubbles when opened.

By Kelly Adkins Witness Monica Kuehling

(Position)

E-mail address _____


SF
SOUTHERN FLOW COMPANIES, INC.
San Juan Refining
METER NUMBER
TUBE & ORIF. SIZE
TIME PUT ON
TIME TAKEN OFF
DATE PUT ON
DATE TAKEN OFF
Disposal #1
MP-1000-1HR
30-045-29002
SIGNED
9-6-12
PRINTED IN U.S.A.

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. **Client Sample ID:** Injection Well
Project: Injection Well 1st Qtr 1-17-12 **Collection Date:** 1/17/2012 8:30:00 AM
Lab ID: 1201473-001 **Matrix:** AQUEOUS **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.
Client Sample ID: Injection Well
Project: Injection Well 1st Qtr 1-17-12
Collection Date: 1/17/2012 8:30:00 AM
Lab ID: 1201473-001 **Matrix:** AQUEOUS **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:
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- H Holding times for preparation or analysis exceeded
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- 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.
Client Sample ID: Injection Well
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Collection Date: 1/17/2012 8:30:00 AM
Lab ID: 1201473-001 **Matrix:** AQUEOUS **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.	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.
Client Sample ID: Injection Well
Project: Injection Well 1st Qtr 1-17-12
Collection Date: 1/17/2012 8:30:00 AM
Lab ID: 1201473-001 **Matrix:** AQUEOUS **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:

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Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Client Sample ID: Injection Well
Project: Injection Well 1st Qtr 1-17-12
Collection Date: 1/17/2012 8:30:00 AM
Lab ID: 1201473-001
Matrix: AQUEOUS
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.	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		

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

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

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	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:

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

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
1112290IB-01	12/30/11	SOIL	ST		81°F
1112220230-01	12-30-11	OIL	ST		ND
1112280301-01	12-30-11	4	ST		ND
1201050339-001	1/9/12	4/5	ST		>200
-002		5			Room Temp
-003		5			>200
1201190901	2-2-2012	4	N/A		>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	~~22,7~~ 22,5	~~5,25~~ 5,37						4,02	~~7,87~~ 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			
120126018-001	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
1201241022-1 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		
1201190619-1	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 eff	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	-1ms	↓	↓	↓	↓		1mL	
13	-1msd						↓	
14	-LCS						↓	
15	-BL	↓						
16	120124035-3	WW eff						
17	-4	↓		↓	↓			
18	120124029-3			25mL	2x			
19	120126018-1			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

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

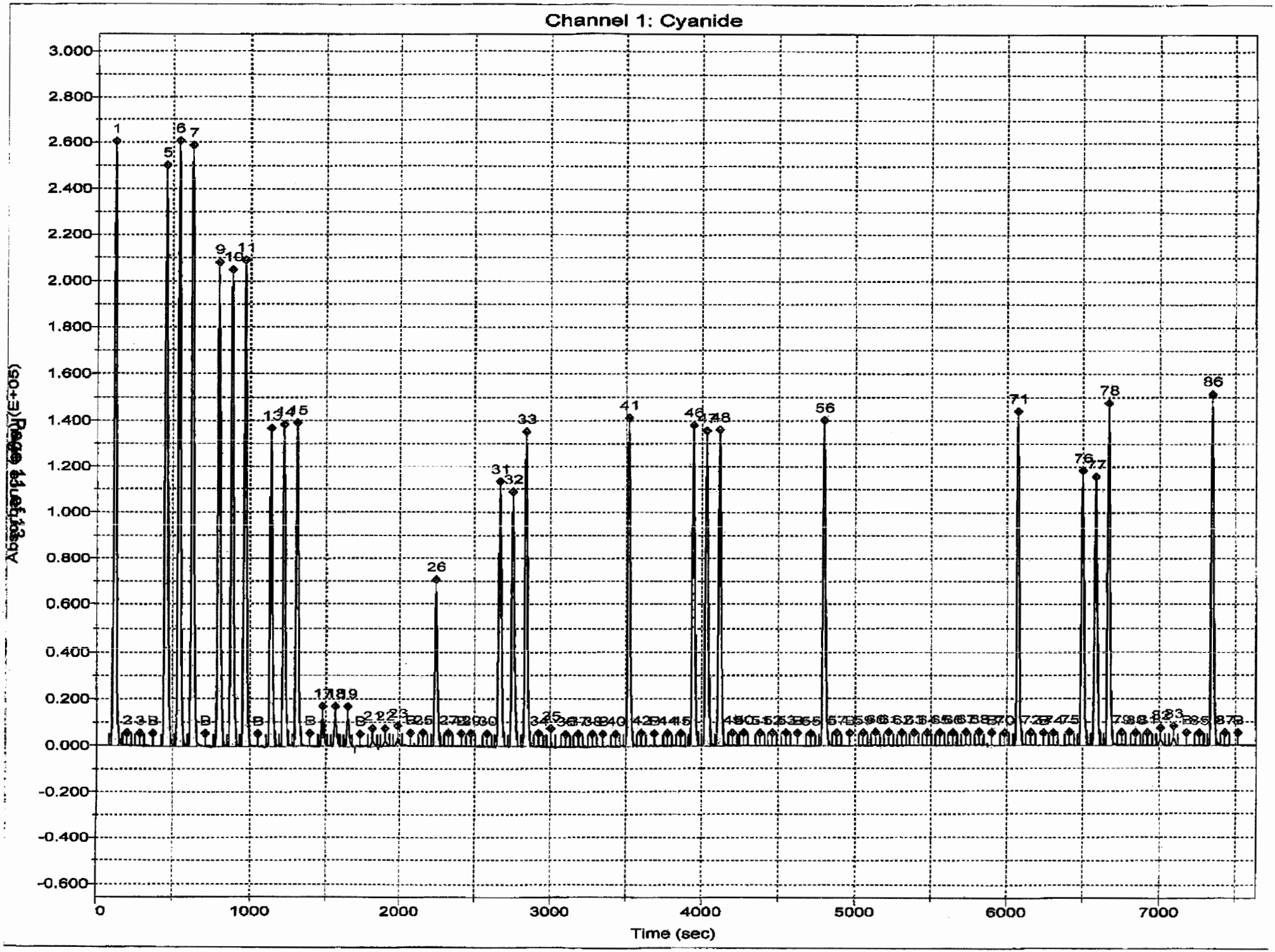
CRW 1/31/12

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	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Time (sec)
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2000
3000
4000
5000
6000
7000
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

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

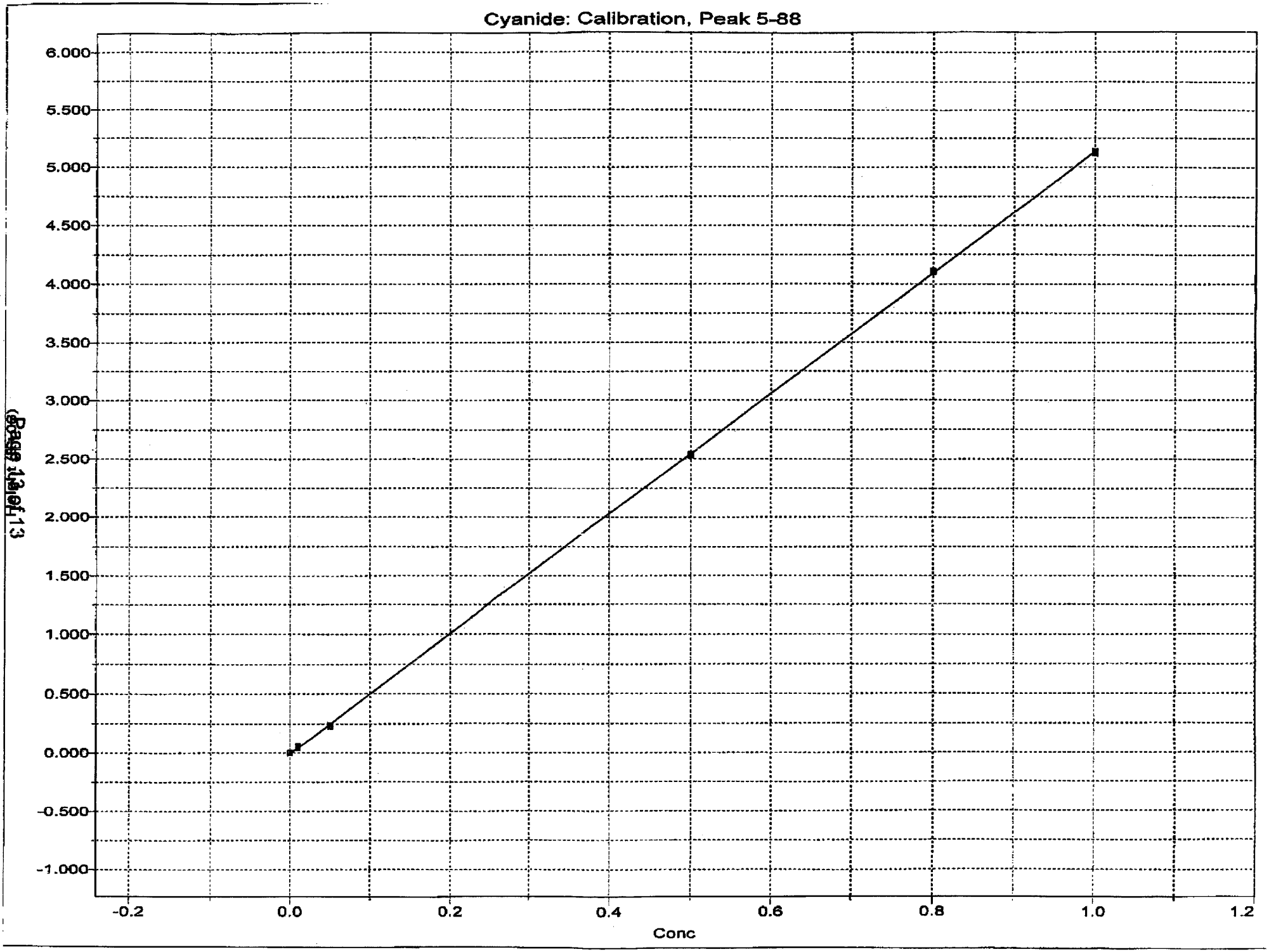
*	Name	Conc	Area
*	Cal 1.00 ppm	1.000000	5134414.000000
*	Cal 1.00 ppm	1.000000	5113915.000000
*	Cal 1.00 ppm	1.000000	5127215.000000
*	Cal 0.80 ppm	0.800000	4098498.500000
*	Cal 0.80 ppm	0.800000	4107171.750000
*	Cal 0.80 ppm	0.800000	4110518.500000
*	Cal 0.50 ppm	0.500000	2527943.750000
*	Cal 0.50 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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5.000
4.500
4.000
3.500
3.000
2.500
2.000
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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.	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-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.	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:	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

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	
1-17-12	8:30	H_2O	Injection Well	3-VOA	HCl	-1
				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

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)~~ 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	Ecoli, 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
1-17-12	3:00	Robert Erickson		01/18/12	0940
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

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. **Client Sample ID:** Injection Well
Project: Injection Well 2nd Qtr 4-3-12 **Collection Date:** 4/3/2012 1:20:00 PM
Lab ID: 1204158-001 **Matrix:** AQUEOUS **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.
Client Sample ID: Injection Well
Project: Injection Well 2nd Qtr 4-3-12
Collection Date: 4/3/2012 1:20:00 PM
Lab ID: 1204158-001 **Matrix:** AQUEOUS **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.
- 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.
Client Sample ID: Injection Well
Project: Injection Well 2nd Qtr 4-3-12
Collection Date: 4/3/2012 1:20:00 PM
Lab ID: 1204158-001 **Matrix:** AQUEOUS **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.
Client Sample ID: Injection Well
Project: Injection Well 2nd Qtr 4-3-12
Collection Date: 4/3/2012 1:20:00 PM
Lab ID: 1204158-001 **Matrix:** AQUEOUS **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.	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.
Client Sample ID: Trip Blank
Project: Injection Well 2nd Qtr 4-3-12
Collection Date:
Lab ID: 1204158-002 **Matrix:** AQUEOUS **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. **Client Sample ID:** Trip Blank
Project: Injection Well 2nd Qtr 4-3-12 **Collection Date:**
Lab ID: 1204158-002 **Matrix:** AQUEOUS **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 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 #:**	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

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: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
120408030-001	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:

Anatek Labs, Inc.

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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: 12:01 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 TEMP: 1.5 °C

☑ LABELS & CHAINS AGREE Tcc Y Seal N

☐ NO HEADSPACE

☐ PRESERVATIVE: NaOH zinc Acetate

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 ? _____

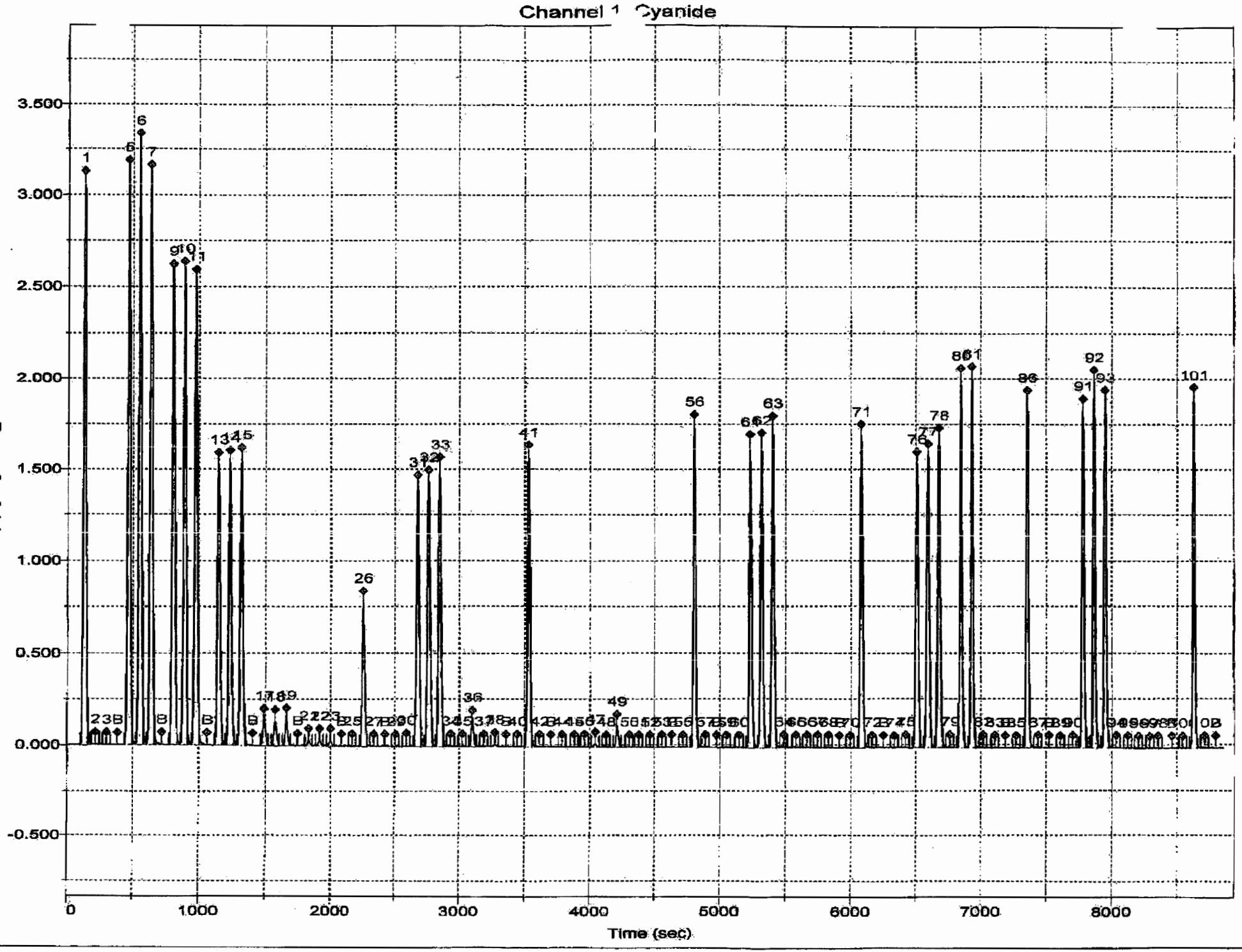
Peak Table: Cyanide

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	0.004803
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
70	1	Blank	BLNK	1	1	-1817	0.000959
71	4	CCV 0.5 ppm	CCV	1	1	3747205	0.507696
72	1	Blank	BLNK	1	1	-2994	0.000800
3	0	Read Baseline	RB	1	1	1278	0.001378
74	38	120406030-BL R	U	1	1	-3049	0.000793
75	39	120406030-001	U	1	1	5701	0.001976
76	40	120406030-001MS	U	1	1	3575297	0.484460
77	41	120406030-001MSD	U	1	1	3597145	0.487413
78	42	120406030-LCS	U	1	1	3866508	0.523821
79	43	120406011-001 SR	U	1	1	5924	0.002006
80	44	120406011-001MS	U	1	1	3678616	0.498425
81	45	120406011-001MSD	U	1	1	3678327	0.498386
82	46	120410034-007	U	1	1	5933	0.002007
83	47	120410034-008	U	1	1	4419	0.001802
3	0	Baseline	RB	1	1	215	0.001234
85	1	Blank	BLNK	1	1	-427	0.001147
86	4	CCV 0.5 ppm	CCV	1	1	3741463	0.506919
87	1	Blank	BLNK	1	1	-1737	0.000970
3	0	Read Baseline	RB	1	1	1272	0.001377
89	48	120406004-BL F	U	1	1	-2388	0.000882
90	49	120406004-001	U	1	1	-1760	0.000967
91	50	120406004-001MS	U	1	1	3604604	0.488421
92	51	120406004-001MSD	U	1	1	3904438	0.528948
93	52	120406004-LCS	U	1	1	3686414	0.499479
94	53	120405037-001	U	1	1	-2654	0.000846
95	54	120416009-001	U	1	1	-2148	0.000915
96	55	120416014-001	U	1	1	-6720	0.000297
97	56		U	1	1	-7727	0.000160
98	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

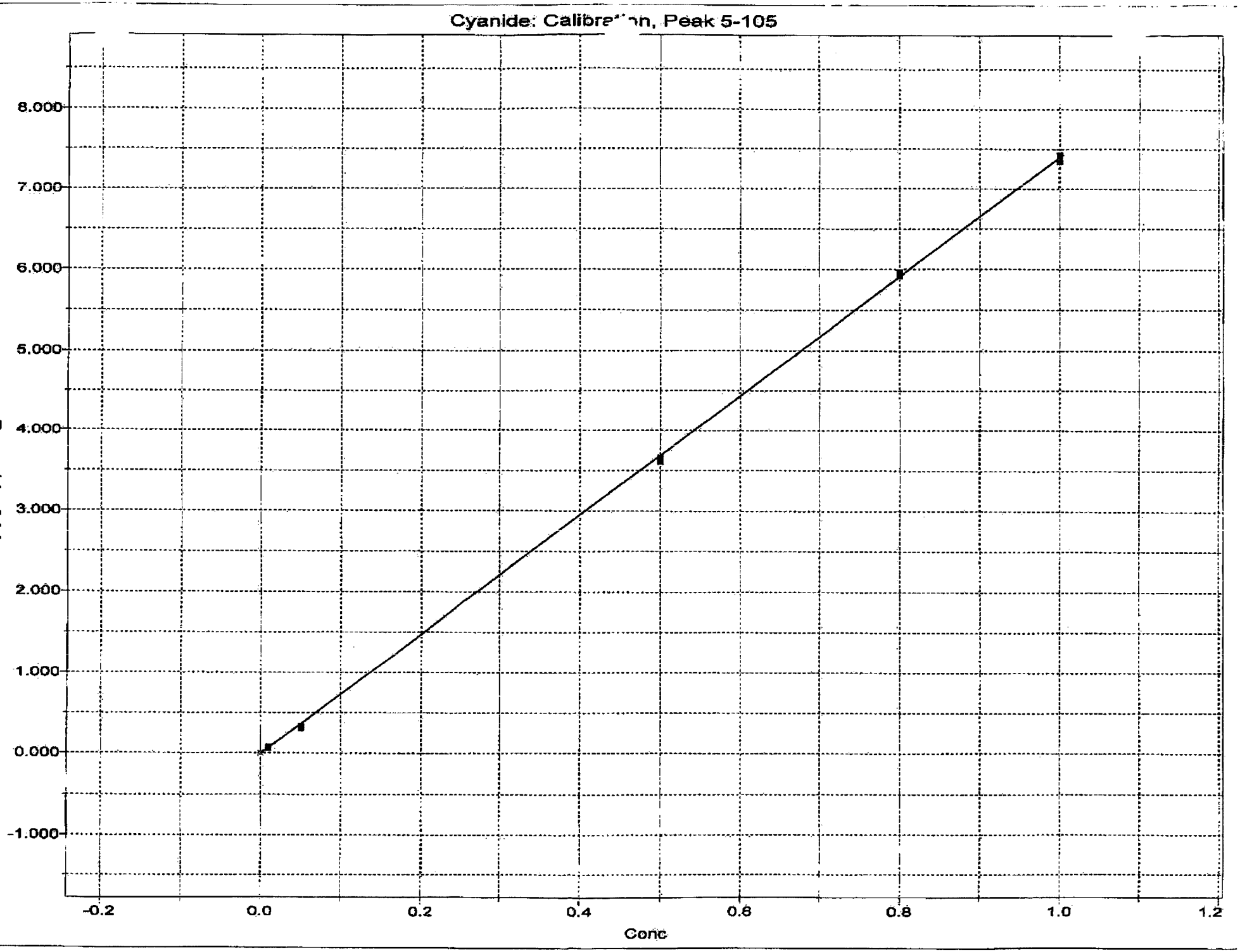
*	ms	Conc	Area
*	Cal 1.00 ppm	1.000000	7341324.500000
*	Cal 1.00 ppm	1.000000	7423772.000000
*	Cal 1.00 ppm	1.000000	7353090.000000
*	Cal 0.80 ppm	0.800000	5925124.500000
*	Cal 0.80 ppm	0.800000	5922325.500000
*	Cal 0.80 ppm	0.800000	5958631.000000
*	Cal 0.50 ppm	0.500000	3660840.750000
*	Cal 0.50 ppm	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
Height (counts)
-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
111229018-01	12/30/11	SOIL	ST		81°F
111222023-001	12-30-11	Oil	MH		ND
111228030-001	12-30-11	4	MH		ND
120105039-001	1/9/12	4/5	MH/ST		>200
-002		5			Room Temp
-002		5			>200
120119009-001	2-2-2012	4	MH		>200
120120010-001	2.7.12	4	E		>2
		4			
		4	E.		
120210036-001	2/28/12	5/Butter	MH		139°F
120223015-001	3/6/12	Water/4	MH		>200°F
-002					>200°F
120227016-001	3/7/12		MH		175°F
120228006-001	3/7/12	Liquid/5	MH		151°F
120302023-001	3/2/12	Water/4			149°F
120308037-001	3/14/12	Liquid/5	MH		>200°F
120308059-001		Liquid/5			>200°F
-004		Liquid/5			173°F
120313034-001		Liquid/5	MH/3		>200°F
120315059-001	3/27/12	4/H2O	MH		>200°F
-002					>200°F
-003					>200°F
120406030-001	4/9/12	4/H2O	MH		>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
Contiburette: 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	10,00	101,6	7,08	~~25~~								
-002	17,6	10,70					5gm 25mL								
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	~~100,5~~ 101,0	7,09	25mL								
120406030-001	20,7	6,58													
120410004-001	20,2	7,99													
~~120411019-001~~															
120409015-001	20,8	6,66					5gm 25mL								

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3/1

4/1

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

Analyst: JL

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
1203277021-1	979.1	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		
406030-1	49.1	500	200 0.200	4.07		
-1MS	"	900	360 0.360	7.33		

Comments 1204091125R

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.
- E Value above quantitation range
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- 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 **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:

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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:

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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:

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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:

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- 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:

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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-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:

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- 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-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.	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-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:	[illegible] 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:	[illegible]	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: [signature]

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

[redacted]

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	[redacted]	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	[redacted] TDS	[redacted] Back 4P	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	3x40ml	HCl	-002										X				
					~~unpres~~															

Date:	Time:	Relinquished by:	Received by:	Date	Time
4-3-12	3:00	Robert Kraker	[signature]	04/04/12	10:15
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.

CLIENT: Western Refining Southwest, Inc.
Client Sample ID: Injection Well
Project: Injection Well 3rd Qtr
Collection Date: 7/31/2012 1:30:00 PM
Lab ID: 1208093-001 **Matrix:** AQUEOUS **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
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- 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. **Client Sample ID:** Injection Well
Project: Injection Well 3rd Qtr **Collection Date:** 7/31/2012 1:30:00 PM
Lab ID: 1208093-001 **Matrix:** AQUEOUS **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:
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- ND Not Detected at the Reporting Limit
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- 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 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:

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- 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.
Client Sample ID: Injection Well
Project: Injection Well 3rd Qtr
Collection Date: 7/31/2012 1:30:00 PM
Lab ID: 1208093-001
Matrix: AQUEOUS
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.
Client Sample ID: Injection Well
Project: Injection Well 3rd Qtr
Collection Date: 7/31/2012 1:30:00 PM
Lab ID: 1208093-001 **Matrix:** AQUEOUS **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	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.		

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 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 #:**	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

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:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120806003
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1208093
Attn:	ANDY FREEMAN		

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	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:

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

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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
2						0	
3						0	
4						0	MLIBS
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: BY

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 43-001					< 63° F
-002	↓	↓			< 50° F
1208080 38-001	8/10/2012	5/ Liquid			>200° F
1208100 97-001	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	%
1208070650-001	19.4	6.48	4.01	10.04	101.2	7.10					0	0	0	0	
1208020012-001	18.8	7.25									0	0	0	0	
1208080027-001	19.4	6.45									0	0	0	0	
~~1208070757-001~~	~~20.3~~	~~7.00~~									0	0	0	0	
1208080241-001 ~~WET~~	18.7	7.32									0	0	0	0	
1208090049001	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	
1208100022-001	16.3	6.96									0	0	0	0	
-002	16.7	7.13													

Page 8 of 17

8-10-12 CLS

Analysis Date: 8/9/12 8/10/12

Analyst: AJT AJT

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
120731034-1 m: 52.0	50 mL	50	20 ug = 0.020mg	0.4 X52.0 = 20.8	8-13-12	XX
-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 ww	NaOH	50mL	1x			
2	-lms	↓	↓	↓	↓			
3	-lmsd							
4	120807045-1			10mL	5x			
5	-2							
6	120809018-1	reactive soil		50mL	51.1			
7	-2				52.7			
8	120809028-1	ww epa			1x			
9	-2							
10	17-1							
11	120803018-3	wad	~~NaOH~~	50mL	1x			
12	-3ms							
13	-3msd							
14	-LCS							
15	-BL							
16	120802038-1							
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 DMW

Analyst Initials/Date Analyzed: DMW 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	1207310 34-1	reactive soil	NaOH	50mL	52.0			
2	-1MS	↓	↓	↓	↓		1mL	
3	-1MSD				↓		↓	
4	-LCS				1x			
5	-BL				↓			
6	-2				52.4			
7	-3	↓			52.2			
8	1208010 23-1	WW eff			1x			
9	7042-1	↓			↓			
10	6002-1	↓	↓	↓	↓			
11	1208020 42-2	WW eff	NaOH	50mL	1x			
12	-3							
13	-3MS						1mL	
14	-3MSD						↓	
15	-LCS							
16	-BL							
17	-4							
18	1208030 18-3							
19	1208060 02-2							
20	1207310 42-1	↓	↓	↓	↓			

* 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

CRW 8/13/12

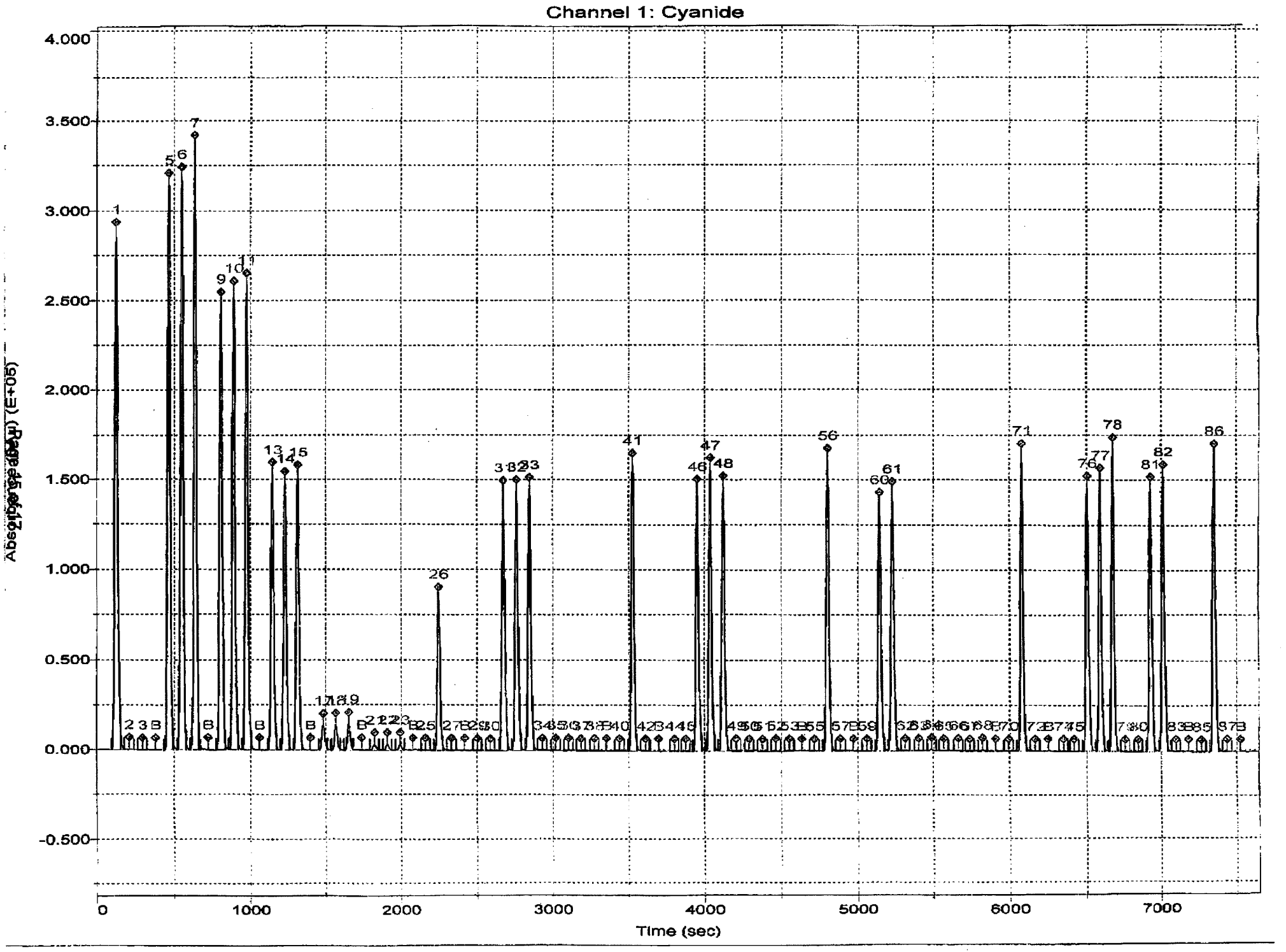
120810FIACNR

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	~~120803019-003WMP~~	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	120807042-006	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	
3	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
Absorbance (AU) (E+05)
Time (sec)
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

File name: T:\DATA1\FLOW4\2012\EPA335.4\081012CY.RST
Date: August 10, 2012
Operator: CRW

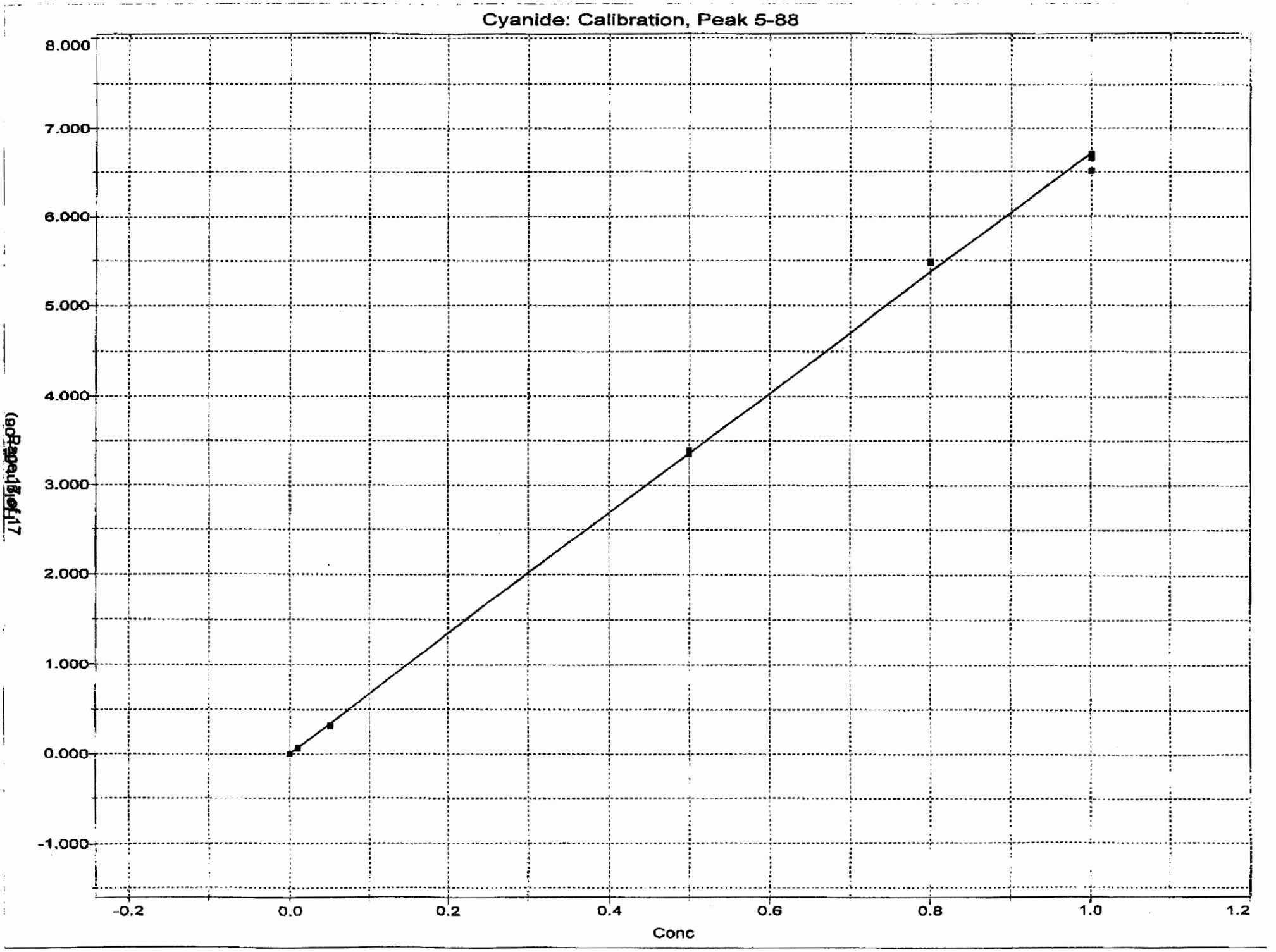
*	Name	Conc	Area
*	Cal 1.00 ppm	1.000000	6700923.000000
*	Cal 1.00 ppm	1.000000	6651245.000000
*	Cal 1.00 ppm	1.000000	6511306.500000
*	Cal 0.80 ppm	0.800000	5479693.000000
*	Cal 0.80 ppm	0.800000	5470805.000000
*	Cal 0.80 ppm	0.800000	5483462.500000
*	Cal 0.50 ppm	0.500000	3390537.500000
*	Cal 0.50 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
- 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: **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
- 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
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
- 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
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
- 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: **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
- 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-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	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-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)

17.	Was client notified of all discrepancies with this order?			NA ✔

Person Notified: Bibstrator Date:

By Whom: AT Via: eMail Phone X Fax In Person

Regarding: Sample temp

Client Instructions: proceed w/ analysis AT 08/02/12

18. Additional remarks:

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:

Sample Temperature:

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. 1208387	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, Alk, Cl	Eq. pH, SO4	Sulfides	Air Bubbles (Y or N)
7-31-12	1:30	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	NaOH													X			
				1-500ml	Zn Acetate															X	
				1-500ml	HNO_3								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.	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.
Client Sample ID: Injection Well
Project: Injection Well 10-11-12
Collection Date: 10/11/2012 9:00:00 AM
Lab ID: 1210682-001 **Matrix:** AQUEOUS **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.
Client Sample ID: Injection Well
Project: Injection Well 10-11-12
Collection Date: 10/11/2012 9:00:00 AM
Lab ID: 1210682-001 **Matrix:** AQUEOUS **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.
Client Sample ID: Injection Well
Project: Injection Well 10-11-12
Collection Date: 10/11/2012 9:00:00 AM
Lab ID: 1210682-001 **Matrix:** AQUEOUS **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:

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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.
Client Sample ID: Injection Well
Project: Injection Well 10-11-12
Collection Date: 10/11/2012 9:00:00 AM
Lab ID: 1210682-001 **Matrix:** AQUEOUS **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 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
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 121017011
Project Name: 1210682

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		10/25/2012	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

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

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Client: HALL ENVIRONMENTAL ANALYSIS LAB
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:

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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: 3:31 PM	Re
Relinquished By:	Date:	Time:	Re
Relinquished By:	Date:	Time:	Re

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 13:05 INSPECTED BY: BT

REPORT TRANSMITTAL DESIRED:

(via 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
1207270 18-001	7/30/2012	4/ H_2O			>200° F
1207270 25-001	8/5/2012	5/ Liquid			145° F
-002	↓	↓			141° F
[illegible]	[illegible]	[illegible]			[illegible]
[illegible]					[illegible]
-003	↓	↓			[illegible]
[illegible]	8/10/2012	5/ Liquid			>200°F
1208100 57-001	8/21/2012	4/ H_2O			[illegible]
1208290 03-001	8/29/2012	5/Liquid			>200°F
1208300 01-001	8/31/2012	4/ H_2O			>200°F
1208310 42-001	9/04/2012	5/Liquid			>200°F
1208310 43-001					<50°F
-002					>200°F
-003					>200°F
-004	↓	↓			~~>200°F~~ 115°F 4/4/12
1210020 54-002	10/04/2012	5/Liquid			85°F
1210041 01-001	↓	↓			<64°F
1210050 05-001	10/08/2012	5/Liquid			135°F
-002	↓	↓			150°F
1210170 11-001	10/25/2012	4/Water			>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				

								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	%
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: EBC

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%	

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

121024HZSR

Sample	Sample Volume	Iodine amount (50 uL increments)	Concentration (mg/sample)	Concentration (mg/L)	Date	Initials
12011062-#1	525	50	0.020	0.0381	10.24-12	[illegible]
-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		
-4C							
-5				29.9	29.9		
-6				30.4	30.4		
-7				28.9	28.9		
12101018-1							
12101064-2	ww/gen			1x	1x		
12101802A-1	reactive soil	NaOH	50mL	27.9	27.9		
-1ms						1mL	
-1msd							
-1S				1x	1x		
-1C							
25-1				28.7	28.7		
26-1				27.9	27.9		
12101701-1	ww reactive			1x	1x		
-1ms						1mL	
-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	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: MW 10/22/12

Analyst Initials/Date Analyzed: MW 10/22/12

File name: T:\DATA1\FLOW4\2012\EPA335.4\102212C2.RST
Date: October 22, 2012
Operator: 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	28.4	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

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	0	
	0	BL
	2	
	2	
	2	
	0	BL
	3	OL
	3	
	3	
	0	BL
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	4	
	4	
	0	BL
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	5	
	0	BL
	6	
	6	
	6	OL
	0	BL
	1	
	7	
	1	
	0	BL
	8	

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4      13
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2       1
        0    BL
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7      21
8      22
9      23
0      24
1      25
2      26
3      27
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6       4
7       1
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9      28
0      29
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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
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00      1
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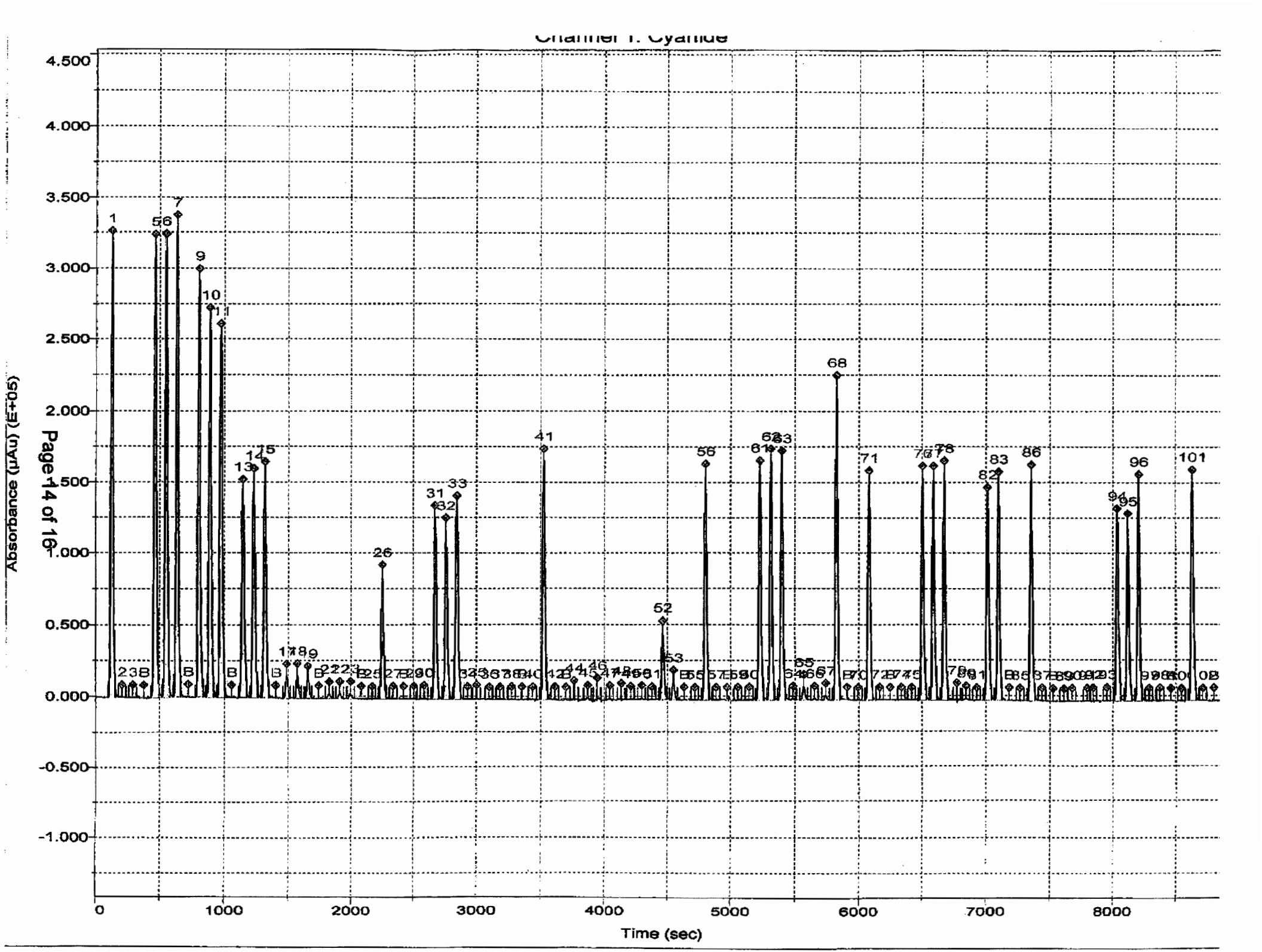
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Absorbance (uAU) (E+05)
Time (sec)
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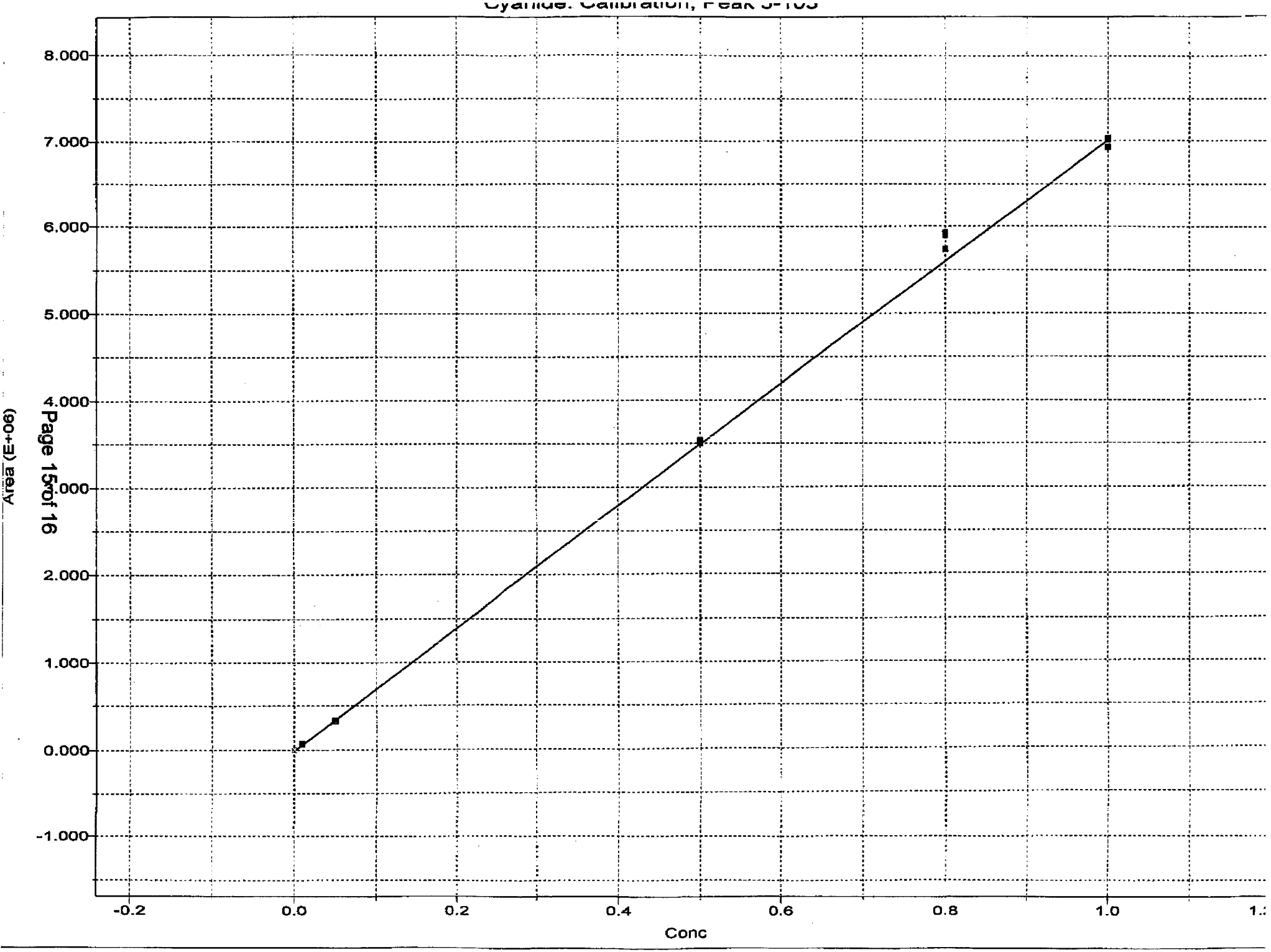
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
-0.500
-1.000
0
1000
2000
3000
4000
5000
6000
7000
8000


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.
- 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 **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.
- 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-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.
- 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 **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.
- 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-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 & Bob

On Ice: [redacted]

Sample Temperature: [redacted]

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.
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)	[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	

Date:	Time:	Relinquished by:	Received by:	Date	Time
10-11-12	3:00	Robert Krakow	[signature]	10/12/12	1030 1500
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

QUALITY ASSURANCE PLAN

Effective Date: July 2nd, 2012

Revision 9.5

www.hallenvironmental.com

Control Number: 00000120

Approved By:

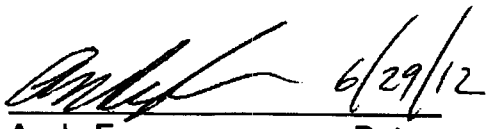
Andy Freeman — Date: 6/29/12
Laboratory Manager

Approved By:

Carolyn Swanson — Date: 6/29/2012
Quality Assurance/Quality Control Officer

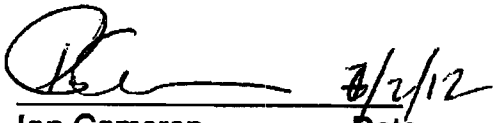
4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Approved By:



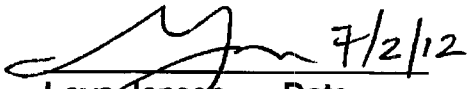
Andy Freeman Date
Organics Technical Director

Approved By:



Ian Cameron Date
Inorganics Technical Director

Approved By:



Leva Jensen Date
Microbiology Technical Director

Table of Contents

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3.0 Introduction

Purpose of Document

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

Objectives

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

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

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

The HEAL Quality Assurance/Quality Control Officer (QA/QCO) and upper management are responsible for supervising and administering this quality assurance program, and ensuring each individual is responsible for its proper implementation. All HEAL

management remains committed to the encouragement of excellence in analytical testing and will continue to provide the necessary resources and environment conducive to its achievement.

Policies

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

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

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

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

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

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

4.0 Organization and Responsibility

Company

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

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

Certifications

ORELAP – NELAC Oregon Primary accrediting authority.

TCEQ – NELAC Texas Secondary accrediting authority.

The Arizona Department of Health Services

The New Mexico Drinking Water Bureau

The New Mexico Department of Health

See the current Document Control Logbook for copies of current licenses and licensed parameters, or refer to our current list of certifications online at www.hallenvironmental.com.

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

Personnel

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

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

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

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

Laboratory Director

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

Laboratory Manager/Lead Technical Director

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

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

The Laboratory Manager is responsible for the daily operations of the laboratory. The Laboratory Manager is the lead technical director of the laboratory and, in conjunction

with the section technical directors, is responsible for coordinating activities within the laboratory with the overall goal of efficiently producing high quality data within a reasonable time frame.

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

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

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

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

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

Quality Assurance Quality Control Officer

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

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

minimum of a BS in a scientific or related field and a minimum of three years of related experience.

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

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

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

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

Project Manager

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

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

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

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

Technical Directors

Technical Directors are full-time members of the staff at HEAL who exercise day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results for their department within HEAL. A Technical Director's duties shall include, but not be limited to, monitoring standards of performance in quality

control and quality assurance, monitoring the validity of the analyses performed and the data generated in their sections to ensure reliable data, overseeing training and supervising departmental staff, scheduling incoming work for their sections, and monitoring laboratory personnel to ensure that proper procedures and techniques are being utilized. They supervise and implement new Quality Control procedures as directed by the QA/QCO, update and maintain quality control records including, but not limited to, training forms, IDOCs, ADOCPs, and MDLs, and evaluate laboratory personnel in their Quality Control activities. In addition, technical directors are responsible for upholding the spirit and intent of HEAL's data integrity procedures.

As Technical Directors of their associated section, they review analytical data to acknowledge that data meets all criteria set forth for good Quality Assurance practices. Someone with a minimum of 2 years of experience in the environmental analysis of representative analytes for which HEAL seeks or maintains accreditation and a bachelor's degree in a scientific or related discipline should fill this position.

Section Supervisors

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

As section supervisors, they review analytical data to acknowledge that data meets all criteria set forth for good Quality Assurance practices. Someone with a minimum of 2 years of experience in the environmental analysis of representative analytes for which HEAL seeks or maintains accreditation and a bachelor's degree, or equivalent experience in a scientific or related discipline should fill this position.

Health and Safety / Chemical Hygiene Officer

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 adrninistrative 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).

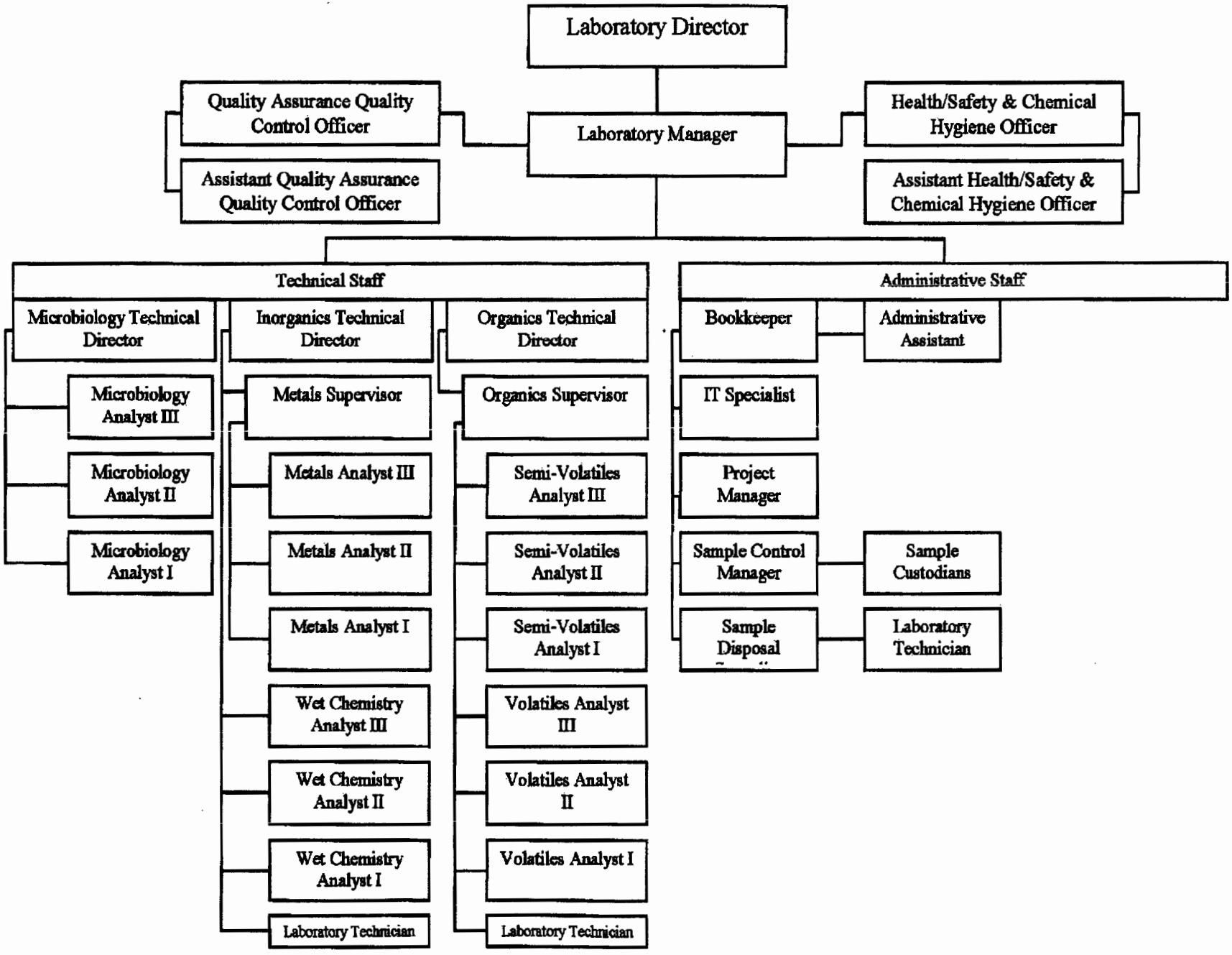
At least once per year an ADOCP must be completed. This is achieved by the acceptable performance of a blind sample (typically by using a PT sample, but can be a single blind (to the analyst) sample), by performing another IDOC, or by summarizing the data of four consecutive laboratory control samples 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
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 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, uohms at 25 ° C)"
180.1	DW NPW	"Turbidity (Nephelometric)"
200.2	DW NPW	"Sample Preparation Procedure For Spectrochemical Determination of Total Recoverable Elements"
200.7	DW NPW	"Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry"
200.8	DW NPW	"Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry."
245.1	DW NPW	"Mercury (Manual Cold Vapor Technique)"
300	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.

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

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 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)

$$\text{Percent Recovery} = \frac{\text{(Spike Sample Result – Sample Result)}}{\text{(Spike Added)}} \text{X100}$$

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:

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

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

Calibration Calculations

1. Response Factor or Calibration Factor:

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

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)

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

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

Dry Weight Concentration

$$\text{Dry Weight Concentration} = \frac{\text{Final Concentration Wet Weight}}{\text{Total Solids}}$$

Percent Difference

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

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 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)

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