AP - 111

Facility-Wide GW Monitoring Work Plan- Updates

2013

Western Refining
GALLUP

WNR LISTED NYSE

Certified Return Receipt: 7012 2920 0000 7606 4367

July 26, 2016

Mr. John Kieling, Chief
NMED - Hazardous Waste Bureau
2905 Rodeo Park Drive East, Bldg 1
Santa Fe, NM 87505-6303

RE: Approval with Modifications, Annual Facility Wide Ground Water Monitoring Report: Gallup Refinery - 2013
EPA ID # NMD000333211, HWB-WRG-14-006

Dear Mr. Kieling:

Western Refining, Gallup Refinery has prepared the following responses to the comments in your letter of May 18, 2016 regarding the above referenced report.

Comment 6

On Page 60 the Permittee reports that the analytical results for EP-2 inlet state that benzene was detected at 0.033 mg/L and DRO detected at 2.3 mg/L. The level of benzene reported for the EP-2 inlet should be non-detect since this water has been through both the waste water treatment plant and aerated in STP-1. There appears to be either a source for the benzene that bypasses the treatment system or the treatment system is not effectively treating the waste water. The Permittee must sample the EP-2 inlet on a quarterly basis to monitor the level of benzene being discharged from STP-1 to EP-2. In addition, the Permittee must provide NMED with information regarding any issues with the waste water treatment plant and STP-1 in the response letter. The Permittee revised Table 1 to require annual sampling of the inlet to STP-1 (previously, the pond inlets were sampled quarterly). The EP-2 inlet was sampled twice in 2013 and only one laboratory report is presented in the Report. In the response letter explain why the inlet sampling was modified to annual sampling and explain why EP-2 inlet was sampled twice but only one of the samples was sent to the analytical laboratory. No revision to the Report is required.

Response:

- *There is no indication of any RCRA listed hazardous waste or RCRA hazardous characteristics in the waste water being discharged from STP-1.*

- *The Waste Water Treatment system is in compliance with the conditions set forth in USEPA Docket No. RCRA-06-2009-0936, Compliant and Consent Agreement and Final Order (CAFO), filed September 1, 2010; Item J.*
- *Inlets to aeration lagoon 1, aeration lagoon 2 and Pond 1 were previously on a quarterly sampling schedule. In 2012 the aeration lagoons were taken out of service due to the startup of the Waste Water Treatment Plant (WWTP) and all flow was diverted into the new unit bypassing the lagoons. Pond 2 inlet at the time was receiving flow from Pond 1 and with the lagoon closure and startup of the WWTP, Pond 2 was now receiving flow from STP-1, therefore the sampling site name was changed to "STP-1 to EP-2" and sampling from this site began in August 2012. Sample frequency has always been on an annual basis*
- *There was only one sample collected on 9/5/2013 (Hall Report #1309181) from sample site STP-1 to EP-2. It is possible that two samples collected from sample site BW to EP-2 (5/28/13 and 10/15/13) were mistaken for EP-2 inlet.*

Comment 9

Appendix A, Separate Phase Hydrocarbons, "Year to Date Hydrocarbon Recovery Logs" RW-5 and RW-6 demonstrate decreasing amounts of product thickness while RW-1 demonstrated decreasing thickness in 2010 and 2011. However RW-1 now displays increasing levels of SPH (SPH level went from 0.53 ft, 0.39 ft, to 1.54 ft for the last several sampling events listed in the Appendix A table). The Permittee must address the apparent continued movement of the SPH plume and provide NMED and OCD with data regarding the tank farm and any inspections to address potential leaking tanks that may be contributing to increasing SPH levels in RW-1. The Permittee has an approved Work Plan for investigation at OW-14 that may address some issues in the tank farm area. Additionally, it appears that the reported product thicknesses for RW-1 in 2005 and 2008 are errors reported at 25.9 ft and 18 ft of measured product thickness respectively. Revise the table to address these errors.

Response: Response: *As noted by NMED, an Investigation Work Plan for the OW-14 Source Area, which includes the area near RW-1 and T-572, was recently approved by NMED. Western will address the SPH levels measured in RW-1 in the OW-14 Source Area Investigation Report, which will be prepared based on new information obtained during the upcoming investigation of the area near RW-1. Gallup implements routine inspection of tanks. Records were reviewed for tanks near RW-1. External and internal tank inspections were conducted in October 2015 for T-572 and June 2015 for T-571 and internal tank bottom inspections revealed no penetrations or potential for leaks. External and internal inspections were conducted on T-570 in March 2015 revealing no potential leaks. Six inch diameter sections from the four floor quadrants were removed and no LELs or stained soil was noted. External inspections of T-716 and T-569 were conducted in 2014 and were found in good condition.*

The Year to Date table reflects the total for each year. RW-1 (2005) YTD totals are correctly stated at 25.9 feet and 18 feet for 2008. No corrections required on this table in Appendix A.
The Year to Date table reflects the total for each year. RW-1 (2005) YTD totals are correctly stated at 25.9 feet and 18 feet for 2008. No corrections required on this table in Appendix A.

Comment 12

In Section 9 (Well Data DTW/DTB Measurements) there appear to be errors in the table presented in this section. See below:

a. OW-1 is reported with DTW of 0.0ft on 11/11/2013.
b. OW-10 is reported with DTW of 0.0ft on 11/11/2013. OW-10 also appears to have greatly fluctuating ground water measurements per quarter: 3.8 ft, 8.0 ft, 0.92 ft, 0 ft, respectively.
c. The table reports GWM-3 as "dry" for all quarters of 2013, but the log in Appendix C indicated the 1Q depth to ground water measurement was 4.85 ft.
d. The MKTF wells have fairly large fluctuations in reported DTW and ground water elevations. For example MKTF-01 from 2nd to 3rd quarter ground water elevation reported as 6913.23 ft and 6909.09 ft, respectively.

Revise the Section 9 table to accurately report field measurements. Also, explain any discrepancies in the response letter.

Response:

a) *Reported level of "0.0 ft" in OW-1 for depth to water indicates that the casing was full and no measurement was attainable. In future reports, an explanation of "0.0ft" is included in the definitions.*
b) *OW-10 fluctuating levels in the aquifer may be affected by seasonal precipitation.*
c) *This was a typo error, as technician used a pre-populated sheet and did not delete previous entry. (Section 9 Table – attached)*
d) *Fluctuating levels may be attributed to seasonal precipitation affecting the water table.*

Comment 13

There appears to be an error in Section 10, Table 1, where the last row reads "[a]ll wells including Recovery Wells." As per a discussion related to financial assurance, it is not clear where this requirement came from; therefore, remove the statement from Table 1 in future work plans and reports.

Response: *The statement will be removed from all future tables and this item was addressed in Western's response to NMED on April 21, 2016.*

Comment 14

Figure 8(S-N Section Westerly Plant Area) does not correlate to the information provided in Figure 6. For example, wells OW-05 and OW-03 and OW-24 are not shown on Figure 6. Provide updated figures that show the locations of all ground water monitoring wells. If the wells have been abandoned, note this on the figures. Where appropriate, provide replacement figures with the response letter.

***Response**: Figure 6 and Figure 8 have been revised with an explanation that wells OW-05, OW-03 and OW-24 are abandoned/closed wells and were only used for cross section lithology reference points only. (Revised Figures 6 and 8 attached)*

Comment 15

The Permittee must provide NMED and OCD with documentation of repairs to the NAPIS to demonstrate that the leaks evident from the sampling of the east and west LDUs have been addressed. Provide this information with the response letter. No revision to the Report is required.

Response:

- *Repairs to the NAPIS unit was addressed in Western's response to NMED on August 8, 2014, Disapproval, 2011 Facility Wide Ground water Monitoring Report and 2012 Facility Wide Ground Water Monitoring Report (attached). Repairs were made to the west bay with a plate installation in June 2014. The east bay was taken out of service in July 2014 and repairs were made. Both bays were hydro-tested before being placed back in service and showed no signs of leakage.*
- *Other repairs over the last two years have included calibration of bay level indicators and skimmer repair.*
- *Recent water column measurements on the west LDU indicate that the bay is leaking into the LDU. The east LDU also contains water but it has been out of service for the past year. Plans are to inspect the east bay, place it back into service and then take the west bay out of service for inspection. The LDUs are pumped out every few months and the maximum recharge to the LDUs takes place over a few weeks following water removal.*
- *The oil sump LDU continues to show no signs of leakage.*

If there are any questions regarding Western's response, please contact Mr. Ed Riege (505) 722-0217.

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Daniel J. Statile
Vice President - Refining

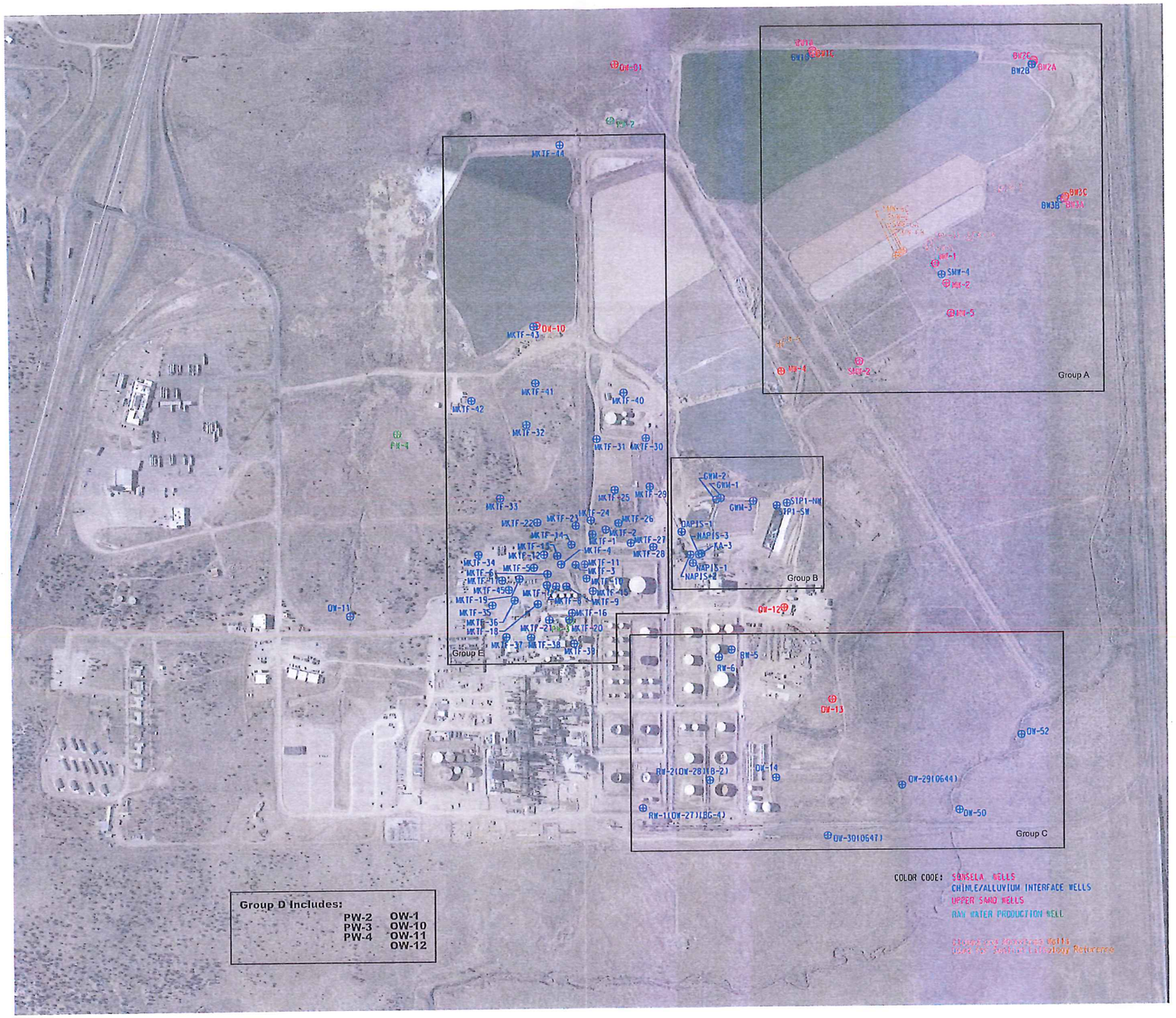
Ed Riege, Remediation Manager

cc: K. Van Horn, NMED HWB w/attachment
C. Chavez, NM-OCD w/attachment
E Riege, Western

ATTACHMENTS

SECTION 9.1 2013 WELL DATA DTB/DTW MEASUREMENTS - Continued

Date of Installation	Well ID Number	Inspection or Sample Date	Casing Diameter (Inch)	2011 Survey [1] Ground Level Elevations (ft)	2011 Survey [1] Well Casing Rim Elevations (ft)	2011 Survey [1] Ground Elevation Inside Steel Sleeve (ft)	Stick-up length (ft)	2011 Survey [1] Well Casing Bottom Elevations (ft)	Total Well Depth (ft)	Depth to SPH (ft)	SPH [2] Column Thickness (ft)	Depth to Water (ft)	Ground water Elevation [3] (ft)	Corrected Water Table [4] Elevation (factor 0.8) (ft)	Screened Interval Depth Top to Bottom (ft)	2012 Stratigraphic unit in which screen exists	Purge Volume = 3 Well Vol (gal)
11/10/2003	BW-1A	9/3/2013	2.00	6,874.10	6,876.68	6,872.30	2.58	6,839.06	37.62	N/A	N/A	DRY	DRY	N/A	30 - 35	Upper Sand	N/A
10/28/2003	BW-1B	9/3/2013	2.00	6,874.13	6,876.94	6,876.26	2.81	6,809.49	67.45	N/A	N/A	DRY	DRY	N/A	54.6 - 64.6	Chinle/Alluvium Interface	N/A
11/10/2003	BW-1C	9/3/2013	2.00	6,873.95	6,876.78	6,872.28	2.83	6,740.39	136.39	N/A	N/A	6.69	6,867.26	N/A	125 -135	Sonsela	63.37
11/10/2003	BW-2A	9/3/2013	2.00	6,871.88	6,874.69	6,870.45	2.81	6,807.12	67.57	N/A	N/A	32.09	6,839.79	N/A	55 - 65	Upper Sand	17.35
10/28/2003	BW-2B	9/3/2013	2.00	6,871.66	6,874.50	6,870.06	2.84	6,782.24	92.26	N/A	N/A	27.92	6,843.74	N/A	80 - 90	Chinle/Alluvium Interface	45.12
10/28/2003	BW-2C	9/3/2013	2.00	6,872.90	6,875.30	6,872.02	2.40	6,722.46	152.84	N/A	N/A	20.39	6,852.51	N/A	139.5 - 149.5	Sonsela	64.77
6/15/2004	BW-3A	9/3/2013	2.00	6,875.94	6,878.39	6,875.08	2.45	6,826.04	52.35	N/A	N/A	DRY	DRY	N/A	39.5 - 49.5	Upper Sand	N/A
10/15/2003	BW-3B	9/3/2013	2.00	6,876.16	6,878.59	6,875.41	2.43	6,809.19	69.40	N/A	N/A	33.01	6,843.15	N/A	63 - 73	Chinle/Alluvium Interface	17.79
7/20/2004	BW-3C	9/3/2013	2.00	6,875.72	6,877.95	6,875.27	2.23	6,723.40	154.55	N/A	N/A	8.15	6,867.57	N/A	144.5 - 154.5	Sonsela	71.59
9/25/1981	OW-11	9/3/2013	4.00	6,922.05	6,923.51	6,921.80	1.46	6,857.72	65.79	N/A	N/A	20.68	6,901.37	N/A	43 - 65	Sonsela	100.14
12/15/1980	OW-12	9/3/2013	4.00	6,939.57	6,940.69	6,939.04	1.12	6,811.84	128.85	N/A	N/A	47.80	6,891.77	N/A	117.8 - 137.8	Sonsela	179.93
10/14/1981	MW-1	9/3/2013	5.00	6,876.63	6,878.12	6,876.79	1.49	6,747.29	130.83	N/A	N/A	7.13	6,869.50	N/A	117.72 - 127.72	Sonsela	378.52
10/15/1981	MW-2	9/3/2013	5.00	6,878.39	6,880.30	6,878.41	1.91	6,742.82	137.48	N/A	N/A	9.44	6,868.95	N/A	112 - 122	Sonsela	391.8
10/16/1981	MW-4	9/3/2013	5.00	6,879.89	6,881.63	6,879.34	1.74	6,759.91	121.72	N/A	N/A	7.70	6,872.19	N/A	101 - 121	Sonsela	348.9
7/21/1986	MW-5	9/3/2013	4.00	6,880.20	6,882.83	6,881.77	2.63	6,752.00	130.83	N/A	N/A	11.49	6,868.71	N/A	115 - 125	Sonsela	365.18
9/26/1985	SMW-2	9/3/2013	2.00	6,881.63	6,883.97	6,879.07	2.34	6,831.17	52.80	N/A	N/A	25.34	6,856.29	N/A	34.31 - 54.31	Chinle/Alluvium and Upper Sand	13.43
9/25/1985	SMW-4	9/3/2013	2.00	6,877.63	6,879.52	6,875.72	1.89	6,809.84	69.68	N/A	N/A	29.24	6,848.39	N/A	51.7 - 71.7	Chinle/Alluvium Interface	19.78
10/5/2009	OW-50	9/3/2013	2.00	6,912.63	6,914.21	6,911.46	1.58	6,850.21	64.00	N/A	N/A	15.97	6,896.66	N/A	48 - 63	Chinle/Alluvium Interface	23.49
10/5/2009	OW-52	9/3/2013	2.00	6,906.53	6,907.68	6,905.31	1.15	6,829.94	77.74	N/A	N/A	17.02	6,889.51	N/A	64 - 79	Chinle/Alluvium Interface	29.69
1/5/1981	OW-1	3/19/2013	4.00	6,866.32	6,866.62	6,866.44	0.30	6,772.07	94.55	N/A	N/A	1.40	6,864.92	N/A	89.3 - 99.3	Sonsela	177.7
		6/12/2013	4.00	6,866.32	6,866.62	6,866.44	0.30	6,772.07	94.55	N/A	N/A	2.13	6,864.19	N/A	89.3 - 99.3	Sonsela	177.7
		9/3/2013	4.00	6,866.32	6,866.62	6,866.44	0.30	6,772.07	94.55	N/A	N/A	0.92	6,865.40	N/A	89.3 - 99.3	Sonsela	182.58
		11/11/2013	4.00	6,866.32	6,866.62	6,866.44	0.30	6,772.07	94.55	N/A	N/A	0.00	6,866.32	N/A	89.3 - 99.3	Sonsela	184.37
11/25/1980	OW-10	3/19/2013	4.00	6,873.67	6,874.91	6,872.59	1.24	6,814.58	60.33	N/A	N/A	3.80	6,869.87	N/A	40 - 60	Sonslea	125.5
		6/13/2013	4.00	6,873.67	6,874.91	6,872.59	1.24	6,814.58	60.33	N/A	N/A	8.00	6,865.67	N/A	40 - 60	Sonsela	116.7
		9/3/2013	4.00	6,873.67	6,874.91	6,872.59	1.24	6,814.58	60.33	N/A	N/A	0.92	6,872.75	N/A	40 - 60	Sonsela	131.89



psi
4601 Ripley
El Paso, Texas
79922
915-584-1317

1"=500'

Project #: 0625859

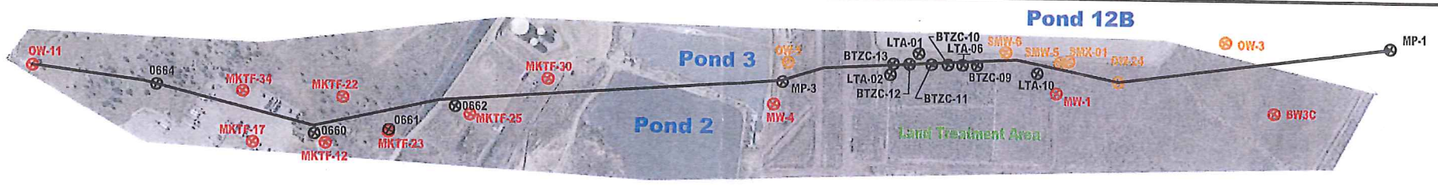
Figure 6

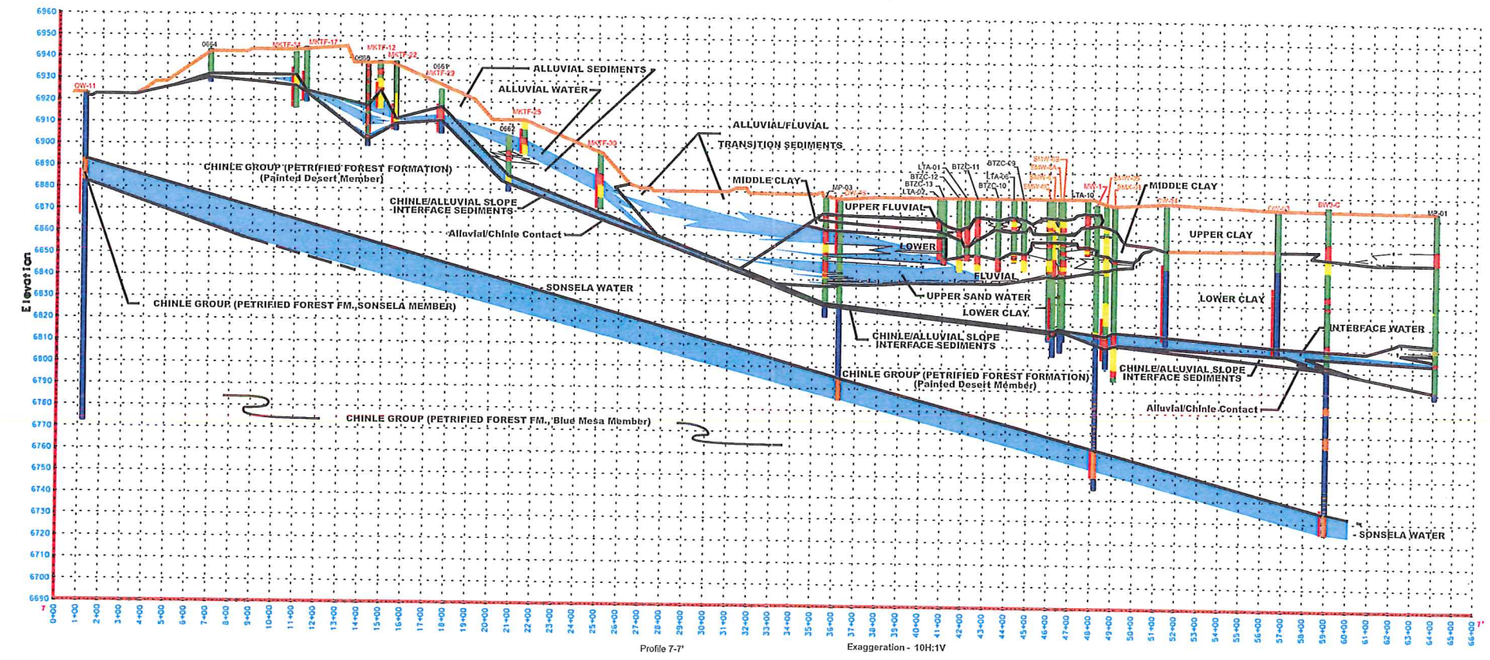
FACILITIES AND WELL GROUPS

WESTERN REFINING - GALLUP REFINERY

Western Refining - Gallup Refinery
92 Giant Crossing Road
Gallup, New Mexico 87301

Date: February 26, 2015
Rev 2: May 19, 2016





LEGEND

- CLAY
- SANDY CLAY OR CLAYEY SAND
- SAND
- SILT
- SHALE (CHINLE GROUP)
- SANDSTONE (NOT PART OF THE SONSELA)
- SONSELA SANDSTONE MEMBER (CHINLE GROUP)
- PROFILE LINE
- OW-XX — Closed and Abandoned Wells Logs Used for Lithology Reference
- WATER BEARING ZONE
- SCREENED INTERVAL
- OW-XX, MW-XX, MKTF-XX, BW3-C — ACTIVE MONITORING WELL
- LTA-10 — BORING REFERENCE

psi
4601 Ripley
El Paso, Texas
79922
915-584-1317

Project #: 0625859

Figure 8

S - N Section - Westerly Plant Area

WESTERN REFINING - GALLUP REFINERY

Western Refining - Gallup Refinery
92 Giant Crossing Road
Gallup, New Mexico 87301
Date: March 24, 2015
Rev 1: April 2, 2015
Rev 2: May 19, 2016

Certified Mail #7013 0600 0001 0294 8436

August 8, 2014

Mr. John E. Kieling, Chief
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Bldg 1
Santa Fe, New Mexico 87505-6303

RE: DISAPPROVAL, 2011 FACILITY WIDE GROUNDWATER MONITORING REPORT
AND 2012 FACILITY WIDE GROUNDWATER MONITORING REPORT
WESTERN REFINING SOUTHWEST INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-WRG-12-003 and HWB-WRG-13-003

Dear Mr. Kieling:

This letter was prepared pursuant to your letter dated May 12, 2014, specifically regarding comment 14 below.

NMED Comment 14

Section 6.3.4 (Leak Detection Units (LDU): East LDU, West LDU, Oil Sump LDU). In Section 7.2 (West Side Ground Water Monitoring) the permittee states, "[a]lso located at the NAPIS are three leak detection units which are inspected and if fluids are detected, samples are collected on a quarterly basis. All three leak detection units continue to have a fluid level." The paragraph goes on, "[q]uarterly analysis of fluid collected from these units and the continued presence of fluid indicate the potential that the fluid may be coming from the NAPIS." The permittee addressed this issue in a letter to NMED dated August 5, 2013 and are using a vacuum truck to remove water which is still present in the LDUs. The permittee must repair the leaks in the NAPIS unit within 90 days of receipt of this letter.

Response

The west bay was repaired with a plate installation in June. The bay was hydro-tested with florescent dye and no leaks were observed. The west LDU and Oil sump LDU were checked and showed no signs of leakage. The west bay was placed back into service on July 8, 2014. The west LDU and oil sump LDU were again checked on August 6, 2014 and continue to show no signs of leakage.

The east bay was taken out of service on July 22, 2014. Cleaning and repair of this unit are underway which could take another couple weeks. After repairs are made, the east bay will be hydro-tested and the east LDU checked to assure there are no leaks before placing this bay back into service.

If there are any questions regarding this response, please contact Mr. Ed Riege at (505) 722-0217.

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel property gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely, VR McDaniel for Billy McClain

Mr. Billy McClain
Refinery Manager
Western Refining Southwest, Inc. – Gallup Refinery

cc D. Cobrain NMED HWB email
N. Dhawan, NMED email
K. Van Horn, NMED email
C. Chavez, OCD email

Chavez, Carl J, EMNRD

From: VanHorn, Kristen, NMENV
Sent: Wednesday, May 18, 2016 9:02 AM
To: Riege, Ed
Cc: Hains, Allen (Allen.Hains@wnr.com); Johnson, Cheryl (Cheryl.Johnson@wnr.com); king.laurie@epa.gov; Cobrain, Dave, NMENV; Dhawan, Neelam, NMENV; Chavez, Carl J, EMNRD
Subject: RE: Approval with Modifications 2013 Faciility-wide Groundwater Monitoring Report
Attachments: ApprwMods_2013FWGWM_Report(May2016).pdf

Thanks, Ed. I forgot it.

From: VanHorn, Kristen, NMENV
Sent: Wednesday, May 18, 2016 8:38 AM
To: Riege, Ed
Cc: Hains, Allen (Allen.Hains@wnr.com); Johnson, Cheryl (Cheryl.Johnson@wnr.com); king.laurie@epa.gov; Cobrain, Dave, NMENV; Dhawan, Neelam, NMENV; Chavez, Carl J, EMNRD
Subject: Approval with Modifications 2013 Faciility-wide Groundwater Monitoring Report

Hi Ed,
Attached is the Approval with Modifications letter for the 2013 Facility Wide Groundwater Monitoring Report. We spoke about the submittal schedule at the end of the letter on the phone the other day.

The 2013 Report was presented very well, thank you.

Call or email me if you have any questions,
Kristen

Kristen Van Horn
NMED Hazardous Waste Bureau
2905 Rodeo Park Drive East
Building 1
Santa Fe, NM 87505
Phone: 505-476-6046
Email: *Kristen.VanHorn@state.nm.us*

NEW MEXICO
ENVIRONMENT DEPARTMENT

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SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

RYAN FLYNN
Cabinet Secretary
BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

May 18, 2016

Mr. Ed Riege
Environmental Manager
Western Refining Southwest Inc., Gallup Refinery
92 Giant Crossing Road
Gallup, New Mexico 87301

RE: APPROVAL WITH MODIFICATIONS
ANNUAL FACILITY-WIDE GROUND WATER MONITORING REPORT: GALLUP REFINERY – 2013
WESTERN REFINING SOUTHWEST INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-WRG-14-006

Dear Mr. Riege:

The New Mexico Environment Department (NMED) has reviewed the revised *Annual Ground Water Monitoring Report: Gallup Refinery – 2013* (Report), dated August 2014 submitted on behalf of Western Refining Southwest, Inc. Gallup Refinery (the Permittee). NMED hereby issues this Approval with Modifications. The Permittee must address the following comments provided by both NMED and the New Mexico Energy Minerals and Natural Resources Department Oil Conservation Division (OCD):

Comment 1

The Permittee has been including analysis of uranium in groundwater samples per an NMED comment in the December 12, 2012 *Approval with Modifications for the 2010 Facility-Wide Groundwater Monitoring Report*. While some crude oil may contain uranium, the refinery is likely not a source of uranium in groundwater. The Permittee may discontinue the analysis of uranium in groundwater samples. The Permittee must propose this change in the updated Facility-Wide Groundwater Monitoring Work Plan. No revision to the Report is necessary.

Comment 2
Groundwater analytical results for monitoring well OAPIS-1 demonstrate that "[b]enzene and [Methyl tert-butyl ether] MTBE have exceeded applicable standards in all four quarters of 2013 as well as chloride and [diesel range organics] DRO. High concentrations of arsenic, iron, manganese, uranium and cyanide were also detected in OAPIS-1. Only one organic compound, 1-Methylnaphthalene was detected in the first and fourth quarter of 2013." DRO levels appear to be increasing in OAPIS-1 from 1Q at 6.0 mg/L to 4Q at 23 mg/L. Benzene results are reported as increasing from 1Q to 4Q as well (1Q at 0.027 mg/L to 4Q at 0.089 mg/L). MTBE results remained fairly consistent throughout the year (1Q-4Q: 0.42 mg/L, 0.51 mg/L, 0.42 mg/L, and 0.43 mg/L). The above-referenced groundwater monitoring results indicate that there may be contaminant migration in the area of OAPIS-1; therefore, the Permittee must continue quarterly monitoring of OAPIS-1. A work plan for additional investigation at SWMU 1 and SWMU 14 is pending NMED review; additional groundwater investigation associated with the work plan may be required. No revision to the Report is required.

Comment 3
On page 7 the Permittee states that the, "2013 sampling results for PW-4 indicate no detectable concentration levels of [benzene, toluene, ethylbenzene, xylenes] BTEX and MTBE. Iron was detected above the applicable standard and low concentrations of three [volatile organic compound] VOCs (1,2-4-Trimethylbenzene, 1,3,5-Trimethylbenzene and n-Propylbenzene) were detected in 2013." Currently, PW-4 is scheduled for sampling every 3 years; however, because VOCs were detected for the first time in 2013 the Permittee must sample PW-4 during the next scheduled sampling event and then semi-annually thereafter in order to collect additional data. Please revise the Facility-Wide Groundwater Monitoring Work Plan as necessary. No revision to the Report is required.

Comment 4
Regarding the analytical results for OW-10, the Permittee states that a, "[l]ow concentration of MTBE has been detected in OW-10 since 2010 and gradually increasing over time. In the first and second quarter of 2013, MTBE exceeded the NMED Tap Water screening level of 0.125 mg/L. Uranium has also been detected in OW-10 at levels exceeding the WQCC standard of 0.03 mg/L since 2010. Low concentrations of three organic compounds (1,1-Dichloroethane, 1,2-Dichloroethane (EDC), and 1,1-Dichloroethane) have been detected in fourth quarter of 2012 , and in the first quarter of 2013 in OW-10." Since EDC is a lead scavenger, the Permittee must add analysis for 1,2-Dibromoethane (EDB) in all monitoring wells where EDC has been detected; this change must be incorporated into the updated Facility-Wide Groundwater Monitoring Work Plan. The Permittee must use an analytical method capable of detecting EDB at concentrations less than 0.004 micrograms per liter (e.g., EPA Method 8011). Additionally, EDC was detected in OW-29 in 2008 and in OW-30 in 2007. Since MTBE is increasing over time, OW-10 is likely detecting the leading edge of a contaminant plume. The data reported in Section 8.12 demonstrates that there was a spike in MTBE from 3/22/2012 through 9/4/2013.

The nearest downgradient well is OW-1. Currently, OW-1 is checked for water and if water is present it is sampled and analyzed for major cations and anions, VOC, DRO extended/gasoline range organics (GRO), and Water Quality Control Commission (WQCC) metals. The Permittee must include MTBE, EDC and EDB starting with the next round of quarterly sampling. Update the Facility-wide Groundwater Monitoring Plan as necessary. See also Comment 8. No revision to the Report is required.

Comment 5

In Section 6.2.2, NAPIS-1, NAPIS-2, NAPIS-3, KA-3, page 39 the Permittee states, "[d]uring quarterly inspections upon removing the cover, standing water was observed inside the vault of each well. The standing water was removed from each well and placed inside a container for proper disposal before well cap was removed to continue with quarterly sampling." This is the second time standing water was reported for the NAPIS wells. No later than September 30, 2016, the Permittee must repair the vault seals to ensure that surface water is prevented from entering the wells. No revision to the Report is required.

Comment 6

On page 60 the Permittee reports that the analytical results for EP-2 inlet state that benzene was detected at 0.033 mg/l and DRO detected at 2.3 mg/L. The level of benzene reported for the EP-2 inlet should be non-detect since this water has been through both the wastewater treatment plant and aerated in STP-1. There appears to be either a source for the benzene that bypasses the treatment system or the treatment system is not effectively treating the wastewater. The Permittee must sample the EP-2 inlet on a quarterly basis to monitor the level of benzene being discharged from STP-1 to EP-2. In addition, the Permittee must provide NMED with information regarding any issues with the wastewater treatment plant and STP-1 in the response letter. The Permittee revised Table 1 to require annual sampling of the inlet to EP-2 (previously, the pond inlets were sampled quarterly). The EP-2 inlet was sampled twice in 2013 and only one laboratory report is presented in the Report. In the response letter explain why the inlet sampling was modified to annual sampling and explain why EP-2 inlet was sampled twice but only one of the samples was sent to the analytical laboratory. No revision to the Report is required.

Comment 7

In Section 6.6, ADDITIONAL SAMPLING AND/OR CHANGES, page 63 the Permittee states, "[a] request was also made in the 2011 Work Plan Updates to change analytical sampling method 8021B to 8260B for a more detailed list of VOCs in GWM-2 and GWM-3 which may help in determining the source of the water found in these wells, (Pending approval from NMED)." NMED approved this request in the July 24, 2015 Approval with Modifications letter. No revision necessary.

Comment 8
In Section 7.4, GROUP D GROUND WATER MONITORING, page 70, the Permittee states, "OW-1 is an artesian well located on the west section of the refinery property. OW-1 is a relatively clean well. The only contaminant that has exceeded the WQCC standard since 2010 is uranium which is a naturally occurring element found in rock, soil and water. This particular well may require repair and/or re-location as the concrete base on this well has deep cracks. RECOMMENDATIONS: Continue with inspections/sampling plan. Replace and/or repair well." The Permittee must prepare a work plan for installation of a replacement well and propose to properly abandon OW-1. Additionally, because OW-1 is the only well downgradient from OW-10 (see also Comment 4) the Permittee must propose to install additional groundwater monitoring wells to track and delineate contaminant migration. No revision to the Report is necessary.

Comment 9
Appendix A, Separate Phase Hydrocarbons, "Year to Date Hydrocarbon Recovery Logs" RW-5 and RW-6 demonstrate decreasing amounts of product thickness while RW-1 demonstrated decreasing thickness in 2010 and 2011. However RW-1 now displays increasing levels of SPH (the SPH level went from 0.53ft, 0.39 ft, to 1.54 ft for the last several sampling events listed in the Appendix A table). The Permittee must address the apparent continued movement of the SPH plume and provide NMED and OCD with data regarding the tank farm and any inspections to address potential leaking tanks that may be contributing to increasing SPH levels in RW-1. The Permittee has an approved Work Plan for investigation at OW-14 that may address some issues in the tank farm area. Additionally, it appears that the reported product thicknesses for RW-1 in 2005 and 2008 are errors reported at 25.9 ft and 18 ft of measured product thickness, respectively. Revise the table to address these errors.

Comment 10
In Section 6.3.1, OW-13, OW-14, OW-29, OW-30, page 45, the Permittee discusses OW-29 and OW-30. MTBE concentrations are increasing in these wells. OW-29 and OW-30 are located on the northwest section of the facility. There are two downgradient wells (OW-50 and OW-52) however, it is not clear that those wells are effectively monitoring groundwater movement in relation to the locations of OW-29 and OW-30. On page 18 the Permittee states, "[s]hallow ground water located under refinery property generally flows along the upper contact of the Chinle Formation. Although the prevailing flow direction is from the southeast and toward the northwest; a subsurface ridge has been identified and is thought to deflect some flow in a northeasterly direction in the vicinity of the refinery tank farm." Figure 10 (Chinle GP/Alluvium Interface) also depicts groundwater movement. In Section 7.3, GROUP C GROUND WATER MONITORING, on page 58, the Permittee confirms this stating,

> "[d]own gradient from OW-14 is OW-29, and OW-30 and the analytical data from both of these wells indicates that MTBE is present in the ground water at concentration levels

> exceeding the NMED Tap Water standard of 0.125 mg/L since March of 2010 in OW-29 and December 2007 in OW-30. Analytical data for these four wells indicate a steady increase of MTBE concentration levels indicating that the MTBE plume is slowly migrating in a north, north-west direction down-gradient from RW-1 and RW-2. The stratigraphic units in which these wells exist are in what is known as the Chinle/Alluvium Interface. RECOMMENDATIONS: Continue with current sample schedule. MTBE plume is present between OW-13, OW-14, OW-29 and OW-30 and analytical data indicates a very slight increase in concentration levels over time. It was suspected that the migration of the MTBE plume may be in a northeast direction. As a result OW-50 and OW-52 were installed down gradient from these wells. After three years of sampling no contaminants have been detected in the ground water collected quarterly from these wells. It is possible that the MTBE plume may be migrating in a north northwest direction from OW-29 following the natural formation of the Chinle-Alluvium interface. Analytical data indicates that MTBE concentrations have been slowly increasing from year to year in OW-29 as well as OW-30."

Since OW-50 and OW-52 do not intersect contaminant migration in this area, the Permittee must submit a work plan to propose to install additional groundwater monitoring wells to the north-northwest of OW-30 to capture the plume path and demonstrate that the plume is not migrating off-site. No revision to the Report is required.

Comment 11

Appendix F (MKTF 1-18 – Survey, Boring Logs, Analytical Data) will be reviewed as part of the Permittee's *Hydrocarbon Seep Interim Measures Report*, dated July 2015. Continue to monitor and report on the MKTF wells in the Facility-wide Groundwater Monitoring Report. No revision necessary.

Comment 12

In Section 9 (Well Data DTW/DTB Measurements) there appear to be errors in the table presented in this section. See below:

- **a.** OW-1 is reported with DTW of 0.0ft on 11/11/2013.
- **b.** OW-10 is reported with DTW of 0.0ft on 11/11/2013. OW-10 also appears to have greatly fluctuating groundwater measurements per quarter: 3.8 ft, 8.0 ft, 0.92 ft, 0 ft, respectively.
- **c.** The table reports GWM-3 as "DRY" for all quarters of 2013, but the log in Appendix C indicated the 1Q depth to groundwater measurement was 4.85 ft.
- **d.** The MKTF wells have fairly large fluctuations in reported DTW and groundwater elevations. For example MKTF-01 from 2nd to 3rd quarter groundwater elevation reported as 6913.23 ft and 6909.09 ft, respectively.

Revise the Section 9 table to accurately report field measurements. Also, explain any discrepancies in the response letter.

Comment 13
There appears to be an error in Section 10, Table 1, where the last row reads "[a]ll wells including Recovery Wells." As per a discussion related to financial assurance, it is not clear where this requirement came from; therefore, remove the statement from Table 1 in future work plans and reports.

Comment 14
Figure 8 (S-N Section Westerly Plant Area) does not correlate to the information provided in Figure 6. For example, wells OW-05 and OW-03 and OW-24 are not shown on Figure 6. Provide updated figures that show the locations of all groundwater monitoring wells. If the wells have been abandoned, note this on the figures. Where appropriate, provide replacement figures with the response letter.

Comment 15
The Permittee must provide NMED and OCD with documentation of repairs to the NAPIS to demonstrate that the leaks evident from the sampling of the east and west LDUs have been addressed. Provide this information with the response letter. No revision to the Report is required.

Comment 16
Appendix H (Summary of Leaks, Spills, and Releases) contains C141 forms submitted to NMED and OCD regarding releases. The Permittee must include more specific information with these forms for future releases. For instance, the latitude and longitude provided are for the location of the Refinery; however, this information is not specific enough to determine where, within the refinery property, the release occurred. Since it is difficult to provide this information with the latitude and longitude, in all future spill reports, the Permittee must submit a figure with the C141 form that demonstrates where the release occurred.

The Permittee must address all of these comments in a response letter (specifically Comments 5, 7 and 13) and provide revised tables for Section 9 and Appendix A. The response letter and revised tables must be submitted to NMED by **August 8, 2016**.

To summarize the required changes to the Facility-wide Groundwater Monitoring Work Plan:

- The Permittee must sample PW-4 during the next scheduled sampling event and then semi-annually thereafter.
- Since EDC is a lead scavenger, the Permittee must add analysis for 1,2-Dibromoethane (EDB) in all monitoring wells where EDC has been detected.

- The Permittee must include analysis for MTBE, EDC and EDB at OW-1 starting with the next round of quarterly sampling.
- The Permittee must sample the EP-2 inlet on a quarterly basis.
- The Permittee may discontinue analysis for uranium in all wells.
- The Permittee must edit Table 1 to remove the statement "[a]ll wells including Recovery Wells."

The Permittee must submit work plans and/or additional information for the following:

- The Permittee must prepare a work plan for installation of a replacement well and propose to properly abandon OW-1. Additionally, the Permittee must submit a work plan to propose additional wells downgradient of the Evaporation Ponds per OCD's requirement, see Comment 8. The work plan must be submitted by **November 1, 2016.**
- The Permittee must submit a work plan to propose to install additional groundwater monitoring wells to the north-northwest of OW-30. The work plan must be submitted by **September 1, 2016.**

If you have questions regarding this Approval with Modifications, please contact Kristen Van Horn of my staff at 505-476-6046.

Sincerely,

John E. Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain NMED HWB
N. Dhawan NMED HWB
K. Van Horn NMED HWB
C. Chavez OCD
A. Hains WRG
C. Johnson WRG
L. King EPA Region 6

File: Reading File and WRG 2016 File
HWB-WRG-14-006

Western Refining
GALLUP

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Certified Return Receipt: #7011 2970 0003 9281 8138

March 31, 2014

Mr. John E. Kieling, Chief
NMED - Hazardous Waste Bureau
2905 Rodeo Park Drive East, Bldg 1
Santa Fe, NM 87505-6303

Re: 2013 Annual update to Site-Wide Ground Water Monitoring Work Plan
Western Refining Company Southwest Inc., Gallup Refinery

Dear Mr. Kieling:

Enclosed are the 2013 annual updates to the Site-Wide Ground Water Monitoring Work Plan. A redline version is also attached indicating changes made as well as sent electronically. The following changes were made in the work plan.

- Cover Page and Page ii – Submittal dates.
- Page iii – Refinery Manager
- Page v - updated pages in the Table of Contents
- Page vi - Updated Appendix C, added C-2.1; Update Appendix E
- Page 2 – Update mailing address
- Page 5 – Update first paragraph.
- Page 7 – Section 2.2 revisions.
- Page 10 – Section 2.4 revisions
- Page 16 – Section 4.1 revisions
- Page 26 - Section 5.1.1 Addition of new wells MKTF 01-18
- Page 28 – Section 5.3.1 – revisions to Sampling Plan.
- Appendix C - 2012 updates to well summary tables.
- Appendix D – Revised to reflect requested changes detailed in Section 5.3.1.
- Appendix E – MKTF 01-18 – new wells installation information (boring log & analytical information)
- Figures – Figure 3 Well Locations; Figure 5 Sonsela and Figure 6 Chinle/Alluvium are currently under revision and will be sent under separate cover as soon as revisions have been completed.

If you have any questions regarding Western's responses, please do not hesitate to contact Cheryl Johnson of my staff at (505) 722-0231.

Sincerely,

Ed Riege
Environmental Manager

cc: K. Van Horn, NMED HWB
C. Chavez, OCD
C. Johnson, Gallup

Facility Wide Ground Water Monitoring Work Plan – 2013 Updates

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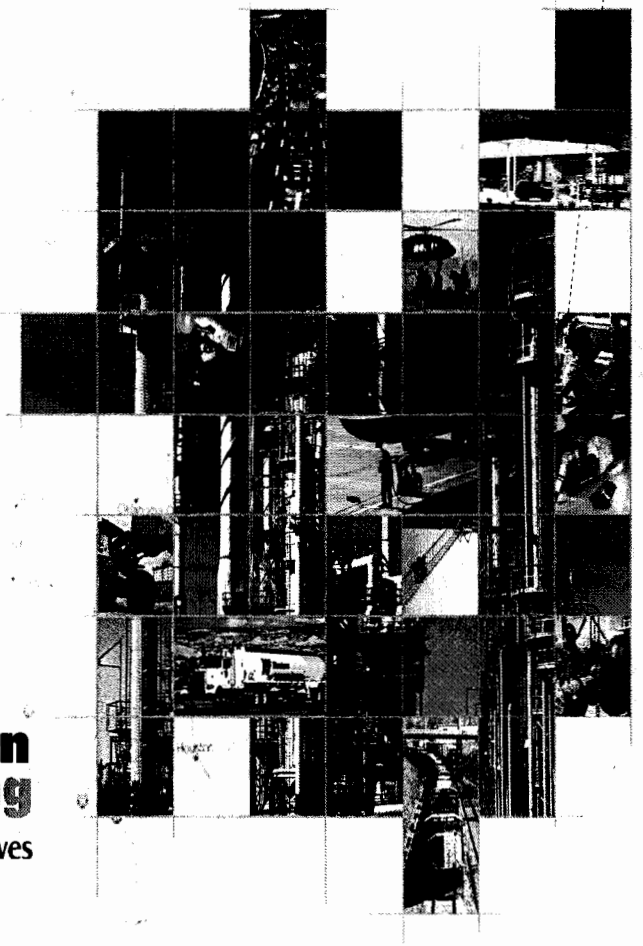

Western Refining

Fueling Our Lives

Western Refining Company
Gallup Refinery
92 Giant Crossing Road
Gallup, New Mexico 87301
505-722-3833

Submitted: March 31, 2014

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Western Refining

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CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

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William C. McClain, Jr. Date
Refinery Manager

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Prepared by:	Reviewed by:
Cheryl Johnson	Ed Riege, M.P.H.
Environmental Specialist	Environmental Manager

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Executive Summary

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Western Refining conducts quarterly, semi-annual and annual ground water monitoring at its Gallup facility on a site wide basis. The Ground Water Monitoring Work Plan (Plan) documents any additions or revisions in ground water monitoring and also details the sampling procedures used.

This Plan divides the facility into two areas for periodic monitoring: the East Side and the West Side. The East Side includes the refinery complex, recovery wells from which small quantities of free product has been continuously removed, and the northeast set of observation wells and monitoring wells. The West Side includes a cluster of wells in and around the waste water treatment system, boundary wells, shallow monitoring wells in and around land treatment areas, and produced/production water wells. This plan also includes sampling requirements for aeration lagoons, influents, and evaporation ponds located on the West Side. Designated wells and sample points in these two areas will be monitored on a quarterly, semi-annual and annual basis following the procedures presented in this Plan.

Gallup Refinery will periodically review facility-wide monitoring data, and assess the monitoring program presented in this Plan. Revisions to the Plan, as necessary, will then be presented annually for agency review and approval. These revisions may include, but not be limited to, a reduction or change in monitoring locations, monitoring frequency, and/or target chemicals to be analyzed.

We have created a monitoring work plan with quality assurance practices and controls as well as standard procedures for sampling, and a schedule of activities to monitor ground water at select locations of the Gallup Refinery. The persons responsible for the implementation and oversight of this plan are:

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Refinery Manager

- William C. McClain, Jr.

Environmental Manager
- Ed Riege

Environmental Specialist
- Cheryl Johnson
- Alvin Dorsey

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List of Figures

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List of Acronyms

AL	Aeration Lagoon
API	American Petroleum Institute
BMP	Best Management Practices
BS	Blank Spike
BSD	Blank Spike Duplicate
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CFR	Code of Federal Regulations
DQO	Data Quality Objective
DRO	Diesel Range Organics
DTB	Depth to Bottom
DTW	Depth to Water
EP	Evaporation Pond
EPA	Environmental Protection Agency
FT.	Foot
FWGWMP	Facility Wide Ground Water Monitoring Plan
GPM	Gallons per minute
GRO	Gasoline Range Organics
HNO3	Nitric Acid
HWB	Hazardous Waste Bureau
IDW	Investigation Derived Waste
LDU	Leak Detection Unit
LTU	Land Treatment Unit
ML	Milliliter
MCL	Maximum Contaminant Level
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MTBE	Methyl Tert Butyl Ether
NAIC	North American Industry Classification System

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List of Acronyms – Continued

NAPIS	New American Petroleum Institute Separator
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NOI	Notice of Intent
OAPIS	Old American Petroleum Institute Separator
OB	Observation Well
OCD	Oil Conservation Division
PPE	Personal Protective Equipment
PPM	Parts per million
PSTB	Petroleum Storage Tank Bureau
PW	Process Well
QA	Quality Assurance
QC	Quality Control
RW	Recovery Well
RCRA	Resource Conservation and Recovery Act
SIC	Standard Industrial Classification
SOP	Standard Operating Procedure
SPH	Separate Phase Hydrocarbon
SVOC	Semi-volatile Organic Compound
SWMU	Solid Waste Management Unit
SWPP	Storm Water Pollution Prevention Program
TOC	Total Organic Content
VOC	Volatile Organic Compound
WQCC	Water Quality Control Commission
WWTP	Waste water treatment plant

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1.0 Introduction

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This Facility-Wide Ground Water Monitoring Work Plan (Plan) has been prepared for the implementation of a ground water monitoring program at the Gallup Refinery owned by Western Refining ("Gallup Refinery" or "Facility").

1.1 Scope of Activities

This Plan has been prepared to collect data that will be used to characterize the nature and extent of potential impacts to ground water at the Gallup Refinery. The monitoring plan is also designed to make the facility quickly aware of any levels of contaminants that exceed compliance standards.

This Plan divides the facility into two areas for periodic monitoring: the East Side and the West Side. The East Side includes the refinery complex, recovery wells from which small quantities of free products have been continually removed, and the northeast set of observation wells and monitoring wells. The West Side includes a cluster of wells in and around the waste water treatment system, boundary wells, shallow monitoring wells in and around land treatment areas, and produced/production water wells. This plan also includes sampling requirements for aeration lagoons, influents, and evaporation ponds located in the West Side. Designated wells and sample points in these two areas will be monitored on a quarterly, semi-annual and annual basis following the procedures presented in this Plan.

Gallup Refinery will periodically review facility-wide monitoring data, and assess the monitoring program presented in this Plan. Annual revisions to the Plan will be presented for agency review and approval. These revisions may include, but not be limited to, a reduction or change in monitoring locations, monitoring frequency, and/or target chemicals to be analyzed.

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1.2 Facility Ownership and Operation

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This Plan pertains to the Western Refining Southwest Inc., Gallup Refinery located at Exit 39 on Interstate I-40. This refinery is known as the Gallup Refinery and is located at Jamestown, New Mexico, approximately 17 miles east of Gallup. Figure 1 shows the regional location of the Gallup Refinery.

The owner is:

Western Refining (Parent Corporation)
123 W. Mills Avenue
El Paso, TX 79901

Operator: Western Refining Southwest Inc (Postal Address)
92 Giant Crossing Road
Gallup, New Mexico 87301

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Western Refining Southwest Inc (physical address)
I-40, Exit 39 (17 Miles East of Gallup, NM)
Jamestown, New Mexico 87347

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The following regulatory identification and permit governs the Gallup Refinery:

- SIC code 2911 (petroleum refining) applies to the Gallup Refinery
- U.S. EPA ID Number NMD000333211
- OCD Discharge Case Number AP-111.

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The facility status is corrective action/compliance. Quarterly, semi-annual and annual ground water sampling is conducted at the facility to evaluate present contamination.

The refinery is situated on an 810 acre irregular shaped tract of land that is substantially located within the lower one quarter of Section 28 and throughout Section 33 of Township 15 North, Range 15 West of the New Mexico Prime Meridian. A small component of the property lies within the northeastern one quarter of Section 4 of Township 14 North, Range 15 West. Figure 2 is a topographic map showing the general layout of the refinery in comparison to the local topography.

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2.0 Background Information

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2.1 Historical and Current Site Use

Built in the 1950's, the Gallup Refinery is located within a rural and sparsely populated section of McKinley County in Jamestown, New Mexico, 17 miles east of Gallup, New Mexico. The setting is a high desert plain on the western slope of the Continental Divide. The nearest population centers are the Pilot (formerly Giant) Travel Center refueling plaza, the Interstate 40 highway corridor, and a small cluster of residential homes located on the south side of Interstate 40 approximately 2 miles southwest of the refinery (Jamestown). The surrounding land is comprised primarily of public lands and is used for cattle and sheep grazing at a density of less than six cattle or 30 sheep per section.

The refinery primarily receives crude oil via two 6 inch diameter pipelines; two pipelines from the Four Corners Area enter the refinery property from the north. In addition, the refinery also receives natural gasoline feed stocks via a 4-inch diameter pipeline that comes in from the west along the Interstate 40 corridor from the Conoco gas plant. Crude oil and other products also arrive at the site via railroad cars. These feed stocks are then stored in tanks until refined into products.

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The Gallup Refinery is a crude oil refining and petroleum products manufacturing facility. The Standard Industrial Classification (SIC) code is 2911 and the North American Industry Classification Code (NAIC) is 32411. There are no organic chemicals, plastics, or synthetic fibers manufactured that contribute to our process flow of waste water. We do not manufacture lubricating oils.

The refinery incorporates various processing units that convert crude oil and natural gasoline into finished products. These units are briefly described as follows.

- Crude Distillation Unit - separates crude oil into various fractions; including gas, naphtha, light oil, heavy oil, and residuum.

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- Fluidized Catalytic Cracking Unit (FCCU) - dissociates long-chain hydrocarbon molecules into smaller molecules, and essentially converts heavier oils into naphtha and lighter oils.
- Alkylation Unit - combines specific types of hydrocarbon molecules into a high octane gasoline blending component.
- Reforming Unit - breaks up and reforms low octane naphtha molecules to form high octane naphtha.
- Hydro-Treating Unit - removes undesirable sulfur and nitrogen compounds from intermediate feed stocks, and also saturates these feed stocks with hydrogen to make diesel fuel.
- Isomerization Unit - converts low octane hydrocarbon molecules into high octane molecules.
- Treater Unit - remove impurities from various intermediate and blending feed stocks to produce finished products that comply with sales specifications.
- Ammonium Thiosulfate Unit - accepts high H2S and ammonia containing gas streams from the Amine and the Sour Water Stripper units, and converts these into a useful fertilizer product, ammonium thiosulfate.
- Sulfur Recovery Unit - converts and recovers various sulfur compounds from the gases and liquids produced in other processing units to create a solid elemental sulfur byproduct. This unit only operates when the ammonium thiosulfate unit is inoperable or cannot handle incoming loads.

As a result of these processing steps, the refinery produces a wide range of petroleum products including propane, butane, unleaded gasoline, diesel, and residual fuel. In addition to the aforementioned processing units, various other equipment and systems support the operation of the refinery and are briefly described as follows.

Storage tanks are used throughout the refinery to hold and store crude oil, natural gasoline, intermediate feed stocks, finished products, chemicals, and water and are all located above ground. Capacity of these tanks range in size from 80,000 barrels to less than 1,000 barrels.

Pumps, valves, and piping systems are used throughout the refinery to transfer various liquids among storage tanks and processing units. A railroad spur track and a railcar loading rack are

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used to transfer feed stocks and products from refinery storage tanks into and out of railcars. Several tank truck loading racks are used at the refinery to load out finished products and also receive crude oil, other feed stocks, additives, and chemicals.

Gasoline is delivered to the Pilot Travel Center via tanker truck. An underground diesel pipeline exits between the refinery and the Pilot Travel Center. As a result of an off-refinery release, the pipeline was purged of product, filled with nitrogen and temporarily placed out of service. Gallup Refinery worked with the New Mexico Environment Department (NMED) Petroleum Storage Tank Bureau (PSTB) and the New Mexico Oil Conservation Division (NMED-OCD) to place this line back in service. In 2013 the underground diesel line from Gallup Refinery to the Pilot Travel Center was replaced. The replaced line runs above ground from the marketing area of the refinery for approximately 150 feet and continues underground to the Pilot Travel Center. The diesel line was commissioned and put back in service on February 3, 2014.

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A firefighting training facility is used to conduct employee firefighting training. Waste water from the facility, when training is conducted, is pumped into a tank which is then pumped out by a vacuum truck. The vacuum truck pumps the oily water into a process sewer leading to the New API Separator (NAPIS).

The process waste water system is a network of curbing, paving, catch basins, and underground piping used to collect waste water from various processing areas within the refinery. The waste water effluent then flows into the equalization tanks and the NAPIS where the oil is separated from water based on the principle that, given a quiet surface, oil will float to the water surface where it can be skimmed off. The skimmed slop is passed to a collection chamber where it is pumped back into the refinery process. The clarified water is routed to the new waste water treatment plant (WWTP) where benzene is removed and the treated water flows into the new pond STP-1. STP-1 consists of two bays, north and south and each bay is equipped with five aerators per bay. Effluent from STP-1 then flows into Evaporation Pond 2 and gravitated to the rest of the ponds.

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During episodes of unit upsets or major storm events, the waste water is held in one of the three equalization tanks, T-35, T-27 and T-28 which are used to handle large process and storm water flows allowing the flow to the NAPIS to be controlled. These tanks are also used to store waste water if problems are encountered with the downstream equipment, i.e., NAPIS and the WWTP.

The new WWTP was completed and put online in May of 2012 which resulted in the intermittent use of the benzene strippers during this period. In November of 2012, the benzene strippers were taken off line permanently and by January 2013, the benzene strippers were permanently dismantled and removed.

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The storm water system is a network of valves, gates, berms, embankments, culverts, trenches, ditches, natural arroyos, and retention ponds that collect, convey, control, and release storm water that falls within or passes through refinery property. Storm water that falls within the processing areas is considered equivalent to process waste water and is sent to tanks T-35, T-27 and T-28 when needed before it reaches the NAPIS, WWTP, STP-1 and into Evaporation Pond 2 where flow is gravitated to the rest of the ponds. Storm water discharge from the refinery is very infrequent due to the arid desert-like nature of the surrounding geographical area.

At the evaporation ponds, waste water is converted into vapor via solar and mechanical wind-effect evaporation. No waste water is discharged from the refinery to surface waters of the state.

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The Gallup Refinery currently operates under the Multi-Sector Permit 2008 (MSGP-2008). Gallup Refinery submitted a new Notice of Intent (NOI) for coverage under the new MSGP. The refinery maintains a Storm Water Pollution Prevention Plan (SWPPP) that includes Best Management Practices (BMPs) for effective storm water pollution prevention. The refinery has constructed several new berms in various areas and improved outfalls (installed barrier dams equipped with gate valves) to minimize the possibility of potentially impacted runoff leaving the refinery property.

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2.2 Potential Receptors

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Potential receptors at the facility also include those that may arise from future land uses. Currently, these include on-site workers, nearby residents, wildlife, and livestock.[1] The major route to exposure of humans would be from contaminants reaching a drinking water well. Other routes could be from showering, cooking, etc. with contaminated ground water, raising crops and vegetables with contaminated ground water, or getting exposed to or fishing in surface water that has commingled with shallow ground water. Exposure can also occur through contact with soils and/or plants that have become contaminated themselves through contact with contaminated ground water. However, drinking water wells remain the primary route of possible exposure.

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At this time, the nearest drinking water wells are located on-site at the southwest areas of the facility, at depths of approximately 3000 feet which are identified as process or production (PW) wells. These wells are designated as PW-2, PW-3 and PW-4 (See Figure 3 for location). These wells are operated by the facility to provide the refinery's process water, drinking water to nearby refinery-owned houses, to the refinery itself, and to the Pilot Travel Center. PW-2 and PW-4 are sampled every three years and PW-3 is on an annual sampling schedule which began in 2009 due to the detection of 2-methylnaphthalene and phenol during the 2007 annual sampling event conducted in January 2008. Annual sampling results from 2009 through 2013 have indicated no detection levels of volatile organic compounds (VOCs) or semi-volatile organic compounds (SVOCs). PW-3 sampling continues on an annual basis and Western has requested that this well be placed back on a 3 year schedule in Section 5.3.1H.

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Other than the on-site wells, there is no known drinking water wells located within a 4-mile radius of the site. The nearest drinking water wells that could be used by off-site residents are located to the northwest of the site at a distance slightly greater than 4-miles located within the Navajo community of Iyanbito (shown on the USGS Topographical Map - Gallup Quadrangle

[1] Note: There is extensive and regular patrolling by security personnel of the facility which operates 24-hours – therefore, we can discount the possibility of an inadvertent or deliberate intruder becoming exposed to contamination in groundwater that has reached the surface in some form.

(Revised 1980).) These wells are northwest of the South Fork of the Puerco River which heads towards the southwest from immediately north of the facility. As the shallowest ground water will generally flow in the direction of surface water flow, any possible shallow ground water contamination that left the facility either now or in the future would flow towards the southwest after leaving the facility and away from the community of Iyanbito. The Cibola National Forest lies in the south-east direction and there are no wells or residents in this protected area. Boundary monitoring wells along the southwest to northwest perimeter of the facility have not shown any evidence of contaminants in the wells except for BW-3B which had a detection of bis(2-ethylhexyl)phthalate in 2009, BW-3C in November 2011 and BW-1C in September 2013.

Artesian conditions at some locations of the site lead to the possibility of ground water emerging onto the surface and thus being able to affect wildlife. No surface water on the site is used for human consumption or primary contact, such as immersion, or secondary contact, such as recreation. The man-made ponds on the site are routinely monitored and are a part of this Plan. Therefore, if they are in contact with shallow ground water that has exhibited elevated levels of contaminants, the Plan will detect any commingling of ground water and surface waters.

Fluctuating ground water elevations can smear contaminants into subsurface soil and rocks, and there is a possibility that plant roots could reach such contaminated soils and bio-concentrate contaminants creating another route of exposure to potential receptors, such as birds and animals that eat the plants. No food crops are currently grown on the site.

2.3 Type and characteristics of the waste and contaminants and any known and possible sources

The types of waste likely include – volatile and semi-volatile organic compounds, primarily hydrocarbons, but could include various other industrial chemicals such as solvents; acids; spent caustic solutions; and heavy metals present in spent chemicals and waste water. These wastes could be in the form of waste water, spent chemicals destined for off-site shipping and disposal packed in drums, sludge, and dry solids. Dry wastes could stem from wind-blown metallic

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powders used as catalysts, and regular municipal solid wastes stored in covered containers destined for municipal landfills.

Most of the wastes and contaminants that could possibly reach ground water have the characteristic that they would biodegrade and naturally attenuate. However, any heavy metals present in dirt and sludge could possibly leach into ground water and would not attenuate. There is a possibility also that certain long-lived chemicals would not biodegrade, or, if they did, it would be at a very slow pace. Possible sources include leaks from buried pipes, tanks, surface spills, and historical dumping of wastes in remote areas of the site.

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All above-ground large tanks have leak detection or equivalent systems, such as radar gauges. Pumps that could leak hydrocarbons are within containment areas, and all tanks are located inside earthen bermed areas to contain spills. The NAPIS has double walls and a leak detection system installed.

Similarly, surface impoundments can serve as a source of possible ground water contamination. In the past, waste water from the railroad loading rack flowed to a settling and separation lagoon south of the rack and flow exited at the north end where water leaving the lagoon was distributed across a flat open site known as the fan-out area. The free flow of liquids led to subsurface soil contamination. This area has been identified as SWMU No. 8 and has recently been cleaned up for a corrective action complete with controls status. Disposal of waste water into open fields is not practiced at the Gallup Refinery.

There are fourteen Sold Waste Management Units (SWMU) identified at the Gallup Refinery, and one closed land treatment Area.

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RCRA (Resource Conservation and Recovery Act) Regulated Units

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- Land Treatment Unit (LTU)

SWMUs

- SWMU 1 – Aeration Basin
- SWMU 2 – Evaporation Ponds
- SWMU 3 – Empty Container Storage Area
- SWMU 4 – Old Burn Pit
- SWMU 5 – Landfill Areas
- SWMU 6 – Tank Farm
- SWMU 7 – Fire Training Area
- SWMU 8 – Railroad Rack Lagoon
- SWMU 9 – Drainage Ditch and the Inactive Land farm
- SWMU 10 – Sludge Pits
- SWMU 11 – Secondary Oil Skimmer
- SWMU 12 – Contact Wastewater Collection System
- SWMU 13 – Drainage Ditch between North and South Evaporation Ponds
- SWMU 14 – API Separator

Existing ground water monitoring wells effectively surround all of these SWMUs.

2.4 Summary of contaminant releases that could contribute to possible ground water contamination

Spills and leaks are known to have occurred on the site in various locations. Although most hydrocarbons are rapidly picked up for recovery and contaminated soil is removed, some of the liquids present in a spill enter the subsurface. With precipitation, there is a possibility that some of the contaminants could leach and reach ground water.

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Separate Phase Hydrocarbons (SPH) floating on shallow ground water has been found at the northeast end of the facility. A series of recovery wells were installed and SPH has been pumped out for several years. Recovery through hand-bailing continues on a quarterly basis indicating that the volume of SPH has continued to drop substantially from year to year in several of these recovery wells. In 2013, only Recovery Well (RW-1) had measureable levels of hydrocarbons. Trace levels of benzene have also been found in the wells in this area possibly linked to past spills. Recovery wells are listed as follows:

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Recovery Wells

- RW-1
- RW-2
- RW-5
- RW-6

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Years ago a small tank that held Methyl Tert Butyl Ether (MTBE) leaked and created a plume of MTBE in the shallow ground water at the northeast end of the refinery. This tank is no longer in service and was removed. MTBE has not been used at the refinery since April 2006. Several monitoring wells were installed at various depths to monitor SPH and MTBE contaminant plumes from historical contamination. These observation wells (OW) are located downstream on the northeast section of the plant and are designated as follows.

Observation Wells

- OW-29
- OW-30
- OW-13
- OW-14
- OW-50
- OW-52

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A unit at the southwest end of the facility that is used to recover and recycle oil back into the process has also – through leakage and spills – caused some MTBE and hydrocarbon contamination in shallow ground water. This unit is known as the NAPIS and was put into service in October 2004. The NAPIS has one up-gradient well NAPIS-1, located on the east side and three down-gradient shallow monitoring wells, NAPIS-2, NAPIS-3 and KA-3 which are located along the west side.

The Aeration Basin, which is designated as SWMU No. 1 in the facility's RCRA Post-Closure Care Permit includes three cells, known as AL-1, AL-2 and holding pond 1 which is currently referred to as EP-1, although it is not an evaporation pond and is not part of the area covered by SWMU No. 2 – Evaporation Ponds. Western has experienced intermittent discharges of oil and oily water into the lagoons and spills to ground surface. Most of these occurrences were the result of unit upsets and or large storm events affecting the old API Separator.

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Two ground water monitoring wells (GWM-1, GWM-2)were installed immediately down gradient of the aeration lagoons in 2004 and 2005 in order to detect potential leakage from the aeration basin. GWM-3 was also installed in 2005 on the northwest corner of pond 1 (EP-1).

Analysis of ground water samples collected at GWM-1 and GWM-2 have indicated several organic constituents at concentrations above the screening levels in ground water which would indicate a potential for historical releases from the lagoons. GWM-2 and 3 upon installation in 2005 were found to be dry. Water was first detected in GWM-2 in the first quarter of 2008 and in GWM-3 in the third quarter of 2010. 24-hour notification of the finding was given to NMED and OCD respectively. Analysis of ground water samples collected from GWM-2 and GWM-3 have detected the presence of several constituents at concentration levels above applicable water quality standards such as fluoride, chloride, nitrates, and sulfates. No VOCs have been detected in GWM-2 or GWM-3.

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Quarterly inspections in 2011 and 2012 continued to indicate an increase in measurable water levels in GWM-2 and GWM-3; however water levels began to decrease in late 2012. In 2013 no water was detected in GWM-3. Ground water samples collected have indicated non-detectable and/or concentration levels below the screening levels for BTEX constituents since 2010. Fluoride, chloride and sulfate concentration levels are above the screening levels for years 2010 thru 2013. Method 8260B analysis run on the ground water samples have indicated non-detectable levels for 2013. A request was made to NMED in the 2012 Updates to change analytical requirements from 8021B to 8260B + MTBE for a more detailed list of volatile organic compounds and currently awaiting approval for this change.

Both GWM-2 and GWM-3 have been included in the Aeration Basin Corrective Action Work Plan which began investigative soil and water sampling near the aeration basin in the third quarter of 2012 to support selection of a remedy for SWMU NO. 1 and determine the source of water detected in GWM-2 and GWM-3. Figure 3 shows the location of all of the active monitoring wells on the facility.

In February of 2012, Western submitted a "Revised Investigation Work Plan Solid Waste Management Unit (SWMU) No. 1 Aeration Basin to include sampling of soils and ground water surrounding the Aeration Basin to determine if there has been a release to the environment and to delineate any such release. In addition, information was collected to help determine the source of ground water that had been observed in monitoring wells GWM-2 and GWM-3. The work plan also included SWMU No. 14 Old API Separator soil and ground water sampling. A new well OAPIS-1 (SWMU 14-2) was installed on the northwest corner where the benzene strippers were located on July 17, 2012 by Enviro-Drill Inc. OAPIS-1 (SWMU 14-2) has been added to the 2014 Monitoring Schedule to be sampled on a quarterly basis.

In February of 2013, the influent to the aeration lagoons was routed to the new Waste Water Treatment Plant (WWTP). The aeration lagoons are no longer in service receiving no influent and are being investigated as described above. Pilot sanitary effluent was also routed to the WWTP in June of 2013.

In June of 2013 during a routine inspection a hydrocarbon seep was discovered in an isolated area approximately 100 yards west of Tank 101/102. A series of excavations were completed in the area of the seep including installation of six (6) temporary sumps for weekly hydrocarbon recovery. To date a total of 211,329 gallons of liquid (hydrocarbon and ground water) have been recovered from the site. There were a total of five (5) hand auger and 22 soil borings with temporary well completions completed at the start of the site investigation. An additional 13 soil borings with temporary wells were completed in late 2013 and to date 18 temporary wells have been converted to permanent flush mount and/or stick up monitoring wells. Western continues to further characterize potential source areas, recovery of liquids from the temporary sumps, and additional soil borings/monitoring wells will be installed for characterization and delineation purposes. A copy of the Well Installation (boring logs) are included in this report in Appendix E as well as the professional engineer's survey report. All 18 wells will be added to the 2014 Ground Water Monitoring Schedule (see Appendix D).

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3.0 Site Conditions

The Gallup Refinery is located within a rural and sparsely populated section of McKinley County. It is situated in the high desert plain on the western flank of the Continental Divide approximately 17 miles east of Gallup. The surrounding land is comprised primarily of public lands and is used for cattle and sheep grazing at low densities[2].

3.1 Current site topography and location of natural and manmade structures

Local topography consists of a gradually inclined down-slope from high ground in the southeast to a lowland fluvial plain in the northwest. The highest point on refinery property is located at the southeast corner boundary (elevation approximately 7,040 feet) and the lowest point is located at the northwest corner boundary (elevation approximately 6,860 feet). The refinery processing facility is located on a flat man-made terrace at an elevation of approximately 6,950 feet.

3.2 Drainages

Surface water in this region consists of the man-made evaporation ponds and aeration basins located within the refinery, a livestock watering pond (Jon Myer's Pond) located east of the refinery, two small unnamed spring fed ponds located south of the refinery, and the South Fork of the Puerco River and its tributary arroyos. The various ponds and basins typically contain water consistently throughout the year. The South Fork of the Puerco River and its tributaries are intermittent and generally contain water only during, and immediately after, the occurrence of precipitation.

3.3 Vegetation types

Surface vegetation consists of native xerophytic vegetation including grasses, shrubs, small junipers, and some prickly pear cacti. Average rainfall at the refinery is less than 7 inches per year, although it can vary to slightly higher levels elsewhere in the county depending on elevation.

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Monitoring well GWM-1 was installed in July 2004 down gradient of the aeration basin in order to detect potential leakage from the aeration basin. Monitoring of this well has indicated several organic constituents at concentrations above the screening levels in ground water which would indicate a potential for historical releases in the area. ¶
Two new shallow ground water monitoring wells were installed in the early fall of 2005 to the north of GWM-1 identified as GWM-3 located on the southwest corner of EP-1. GWM-2 was placed at the NW corner of EP-1. GWM-2 and GWM-3 were placed to determine whether there is any evidence of leakage from the aeration basin. GWM-2 and GWM-3 were dry wells when it was installed in 2005. Water was first detected in GWM-2 in the first quarter of 2008 and 24-hour notification of the finding was given to NMED and OCD respectively. In 2010 during the second quarter inspections, GWM-2 and GWM-3 were found to have a water level of 1.5 feet in GWM-2 and 0.88 feet in GWM-3. At the request of NMED, weekly inspections were done to monitor recharge rate. Weekly inspections were ceased as recharge rate was not significant enough to continue with weekly gauging. ¶
¶
Quarterly inspections in 2011 and 2012 continued to indicate an increase in measurable water levels in both GWM-2 and GWM-3. Ground water samples collected have indicated non-detectable and/or concentration levels below the screening levels for BTEX constituents since 2010. Fluoride, chloride and sulfate concentration levels are above the screening levels for years 2010 thru 2012. Method 8021B analysis is required for ground water detected in GWM-2 and GWM-3 and Western would like to change method 8021B analysis to Method 8260B + MTBE for a more detailed list of volatile organic compounds.¶
Both GWM-2 and GWM-3 have been included in the Aeration Basin Corrective Action Work Plan which began investigative soil and water sampling in the aeration basin in the third quarter of 2012 to determine the source of water detected in GWM-2 and GWM-3. Figure 3 shows the location of all of the active monitoring wells on the facility.¶

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[2] See, for example, the web site of McKinley County at http://www.co.mckinley.nm.us/

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On alluvial fans on valley sides and drainage ways, the existing vegetation is usually alkali sacaton, western wheatgrass, Indian rice grass, blue grama, bottlebrush squirreltail, broom snakeweed, fourwing saltbush, threeawn, winterfat, mat muhly and spike muhly. On fan remnants on valley sides we usually find blue grama, western wheatgrass, Indian ricegrass, big sagebrush, galleta, bottlebrush squirreltail, fourwing saltbrush, needleandthread, oneseed juniper, sand dropseed, spineless horsebrush, rabbitbrush, and twoneedle pinyon.

3.4 Erosion features

The impacts of historic overgrazing are visible at the north-side of the facility, in the form of arroyos that formed when surface run-off cut through the ground and washed away soils that were not able to hold water with their ground cover lost to overgrazing. Now that the facility is fenced and no livestock grazing occurs on the site, vegetation has recovered in these areas. With the facility helping to bring back vegetation in its undeveloped areas the formation and deepening of erosion features on its land has decreased.

3.5 Subsurface conditions

3.5.1 Soil types and associations

Most of the soils found at the surface in the locations where wells are located consist of the Mentmore-Gish complex.[3] These soils occur in alluvial fans on valley sides and fan remnants on valley sides. The parent material for these soils is slope and fan alluvium derived from sandstone and shale. These are well drained soils with moderately slow (0.2 in/hr) to slow permeability (0.06 in/hr). In this association, the Gish and similar soils make up about 45 percent, the Mentmore and similar soils 35 percent, and minor components 20 percent. These minor components are - Berryhill and similar soils 10 percent, and Anodize and similar soils 10 percent. The typical profile for these soils is – 0 to 2 inches fine sandy loam, 2 to 72 inches of various kinds of clay loam.

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[3] Soil Survey of McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties, Natural Resources Conservation Service (NRCS), US Department of Agriculture, available at - http://soildatamart.nrcs.usda.gov/Manuscripts/NM692/0/McKinley_Area%20NM.pdf

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Drill logs for various wells have been provided electronically to the NMED/HWB. From these well logs we can infer that the soils in the subsurface are generally composed of clays starting at the immediate subsurface, interbedded with narrow sand and silt layers. At about 100 to 150 feet, layers of mudstone, sandstone (from the Chinle formation, Petrified Forest group) and siltstone start to appear. Figure 4 shows a generalized relationship of soils in and around the Gallup Refinery.

3.5.2 Stratigraphy

The 810 acre refinery property site is located on a layered geologic formation. Surface soils generally consist of fluvial and alluvial deposits; primarily clay and silt with minor inter-bedded sand layers. Below this surface layer is the Chinle Formation, which consists of low permeability clay stones and siltstones that comprise the shale of this formation. As such, the Chinle Formation effectively serves as an aquiclude. Inter-bedded within the Chinle Formation is the Sonsela Sandstone bed, which represents the uppermost potential aquifer in the region.

The Sonsela Sandstone bed lies within and parallels the dip of the Chinle Formation. As such, its high point is located southeast of the refinery and it slopes downward to the northwest as it passes under the refinery. Due to the confinement of the Chinle Formation aquiclude, the Sonsela Sandstone bed acts as a water-bearing reservoir and is artesian at its lower extremis. Artesian conditions exist through much of the central and western portions of the refinery property.

3.5.3 Presence and flow direction of ground water

Ground water flow within the Chinle Formation is extremely slow and typically averages less than 10^{-10} centimeters per second (less than 0.01 feet per year). Ground water flow within the surface soil layer above the Chinle Formation is highly variable due to the presence of complex and irregular stratigraphy; including sand stringers, cobble beds, and dense clay layers. As such, hydraulic conductivity may range from less than 10^{-2} centimeters per second in the gravelly sands immediately overlying the Chinle Formation up to 10^{-8} centimeters per second in the clay soil layers located near the surface.

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Shallow ground water located under refinery property generally flows along the upper contact of the Chinle Formation. The prevailing flow direction is from the southeast and toward the northwest. In the past, a subsurface ridge has been identified that was thought to deflect some flow in a northeast direction in the vicinity of the refinery tank farm. This is not clear from the present data.

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4.0 Investigation Methods

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The purpose of this section is to describe the types of activities that will be conducted and the methods that will be used as part of this Plan. Appendix B provides more detailed information on actual sampling procedures that will be used.

4.1 Ground water Sampling Methodology

All monitoring wells scheduled for sampling during a ground water sampling event will be sampled within 15 working days of the start of the monitoring and sampling event.

Appendix C contains the well data summary tables for 2013. C-1 provides the annual and quarterly DTW (depth to water) and DTB (depth to bottom) measurements for 2013 as well as corrected water table elevation with respect to wells that have separate phase hydrocarbon levels; C-2 provides the corrected well elevation summary table for 2013 which includes date of establishment, ground elevation, top of casing elevation, well casing stick-up length, well depth, screening levels, and stratigraphic units in which the wells are located. Appendix C-3 includes well elevations for the artesian wells also known as Process or Production wells (PW). Information provided for the artesian wells was gathered from well boring logs. These wells are encased and therefore measurement for depth to bottom was not field verified.

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4.1.1 Well Gauging

At the beginning of each quarterly, semi-annual, or annual sampling event, all monitoring and recovery wells listed in Appendix D, Ground Water Monitoring Schedule, will be gauged to record the depth to SPH (if present), the DTW and the DTB of the well. The gauging will be performed using an oil/water interface probe attached to a measuring tape capable of recording

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measurements to the nearest 0.01 foot. All measurements will be made relative to the same datum for all wells.

Gauging measurements will be recorded on a field gauging form. Data obtained from the gauging will be reported in the annual ground water monitoring report. The data will be used to develop groundwater contour maps and SPH thickness isopleths which will also be included in the annual report.

4.1.2 Well Purging

Each monitoring well will be purged by removing ground water prior to sampling in order to ensure that formation water is being sampled. Generally, at least three well volumes (or a minimum of two if the well has low recharge rate) will be purged from each well prior to sampling. Field water quality measurements must stabilize for a minimum of three consecutive readings before purging will be discontinued. Field water quality measurements will include pH, electrical conductivity, temperature, and dissolved oxygen (DO) %. Field water quality measurement stability will be determined when field parameter readings stabilize to within ten percent between readings for three consecutive measurements. Once the readings are within ten percent, purging will stop and the well is ready for sample collection. The volume of ground water purged, the instruments used, and the readings obtained at each interval will be recorded on the field-monitoring log. Well purging and sampling will be performed using 1 inch x 3 foot disposable polyethylene bailers for ground water sampling and/or appropriately decontaminated portable sampling pumps.

4.2 Ground water Sample Collection

Ground water samples will be obtained from each well within 24 hours of the completion of well purging. Sample collection methods will be documented in the field monitoring reports. The samples will be transferred to the appropriate, clean, laboratory-prepared containers provided by the analytical laboratory. Sample handling and chain-of-custody (COC) procedures are described in more detail in Appendix B. Decontamination procedures for reusable water sampling equipment are described in Appendix B.

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All purged ground water and decontamination water from monitoring wells will be drained into the refinery waste water treatment system upstream of the NAPIS. The procedures for disposing materials are described in Appendix B.

Ground water samples intended for metals analysis will be submitted to the laboratory as total metals samples. Ground water samples obtained for dissolved metals analysis will be filtered through disposable filters with a 0.45 micrometers mesh size.

4.2.1 Sample Handling

All sample containers are supplied by the contracted analytical laboratory and shipped to Western in sealed coolers. Chemical preservation is also provided by the laboratory through pre-preserved bottle ware. Collection of containerized ground water samples are in the order of most volatile to least volatile, such as: VOCs, SVOCs, metals, phenols, cyanide, sulfate, chloride, and nitrates. Immediately after the samples are collected, they will be stored in a cooler with ice or other appropriate storage method until they are delivered to the analytical laboratory. Standard COC procedures as detailed in Appendix B will be followed for all samples collected. All samples will be submitted to the laboratory as soon as possible to allow the laboratory to conduct the analyses within the specified method holding times. Details of the general sample handling procedures are provided in Appendix B.

The following shipping procedures will be performed during each sampling event:

- Individual sample containers will be packed to prevent breakage and transported in a sealed cooler with ice or other suitable coolant or other EPA or industry-wide accepted method. The drainage hole at the bottom of the cooler will be sealed and secured in case of sample container leakage.
- Each cooler or other container will be delivered directly to the analytical laboratory.
- Glass bottles will be separated in the shipping container by cushioning material to prevent breakage.
- Plastic containers will be protected from possible puncture during shipping using cushioning material.
- The COC form and sample request form will be shipped inside the sealed storage container to be delivered to the laboratory.

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- Signed and dated COC seals will be applied to each cooler prior to transport of samples from the site.

4.3 Analytical Methods

Ground water and surface water samples collected during the monitoring events will be analyzed for the constituents listed in Appendix D. In addition, for various locations the list of metals is modified to either be the Skinner list of the NM Water Quality Control Commission list or RCRA 8 metals list. Appendix D provides a summary of target analytes for each EPA analytical method.

4.4 Quality Assurance Procedures

Contract analytical laboratories will maintain internal quality assurance programs in accordance with EPA and industry accepted practices and procedures. At a minimum, the laboratories will use a combination of standards, blanks, surrogates, duplicates, matrix spike/matrix spike duplicates (MS/MSD), blank spike/blank spike duplicates (BS/BSD), and laboratory control samples to demonstrate analytical Quality Assurance/Quality Control (QA/QC). The laboratories will establish control limits for individual chemicals or groups of chemicals based on the long-term performance of the test methods. In addition, the laboratories will establish internal QA/QC that meets EPA's laboratory certification requirements. The specific procedures to be completed are identified in the following sections.

4.4.1 Equipment Calibration Procedures and Frequency

The laboratory's equipment calibration procedures, calibration frequency, and calibration standards will be in accordance with the EPA test methodology requirements and documented in the laboratory's quality assurance (QA) and Standard Operating Procedures (SOP) manuals. All instruments and equipment used by the laboratory will be operated, calibrated, and maintained according to the manufacturers' guidelines and recommendations. Operation, calibration, and maintenance will be performed by personnel who have been properly trained in these procedures. A routine schedule and record of instrument calibration and maintenance will be kept on file at the laboratory.

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4.4.2 Field QA/QC Samples

Field duplicates and trip blanks may be obtained for quality assurance during sampling activities. The samples will be handled as described in Section 4.4.3.

Trip blanks will accompany laboratory sample bottles and shipping and storage containers intended for VOC analyses. Trip blanks will consist of a sample of analyte free de-ionized water placed in an appropriate sample container. Trip blanks will be analyzed at a frequency of one for each shipping event involving twenty or more samples. Generally, a trip blank will only be placed in one of the containers, if more than one container is used to ship the set of samples.

4.4.3 Laboratory QA/QC Samples

Analytical procedures will be evaluated by analyzing reagent or method blanks, surrogates, MS/MSDs, BS/BSDs and/or laboratory duplicates, as appropriate for each method. The laboratory QA/QC samples and frequency of analysis to be completed will be documented in the cited EPA or other test methodologies. At a minimum, the laboratory will analyze laboratory blanks, MS/MSDs, BS/BSDs and laboratory duplicates at a frequency of one in twenty for all batch runs requiring EPA test methods and a frequency of one in ten for non-EPA test methods. Laboratory batch QA/QC samples will be project specific.

4.4.4 Laboratory Deliverables

The analytical data package will be prepared in accordance with EPA-established Level II analytical support protocol which will include:

- Transmittal letter, including information about the receipt of samples, the testing methodology performed, any deviations from the required procedures, any problems encountered in the analysis of the samples, any data quality exceptions, and any corrective actions taken by the laboratory relative to the quality of the data contained in the report;
- Sample analytical results, including sampling date; date of sample extraction or preparation; date of sample analysis; dilution factors and test method identification; water sample results in consistent units (milligrams per liter or micrograms per liter (µg/L)); and detection limits for undetected analytes. Results will be reported for all field samples, including field duplicates and blanks, submitted for analysis;

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- Method blank results, including reporting limits for undetected analytes;
- Surrogate recovery results and corresponding control limits for samples and method blanks (organic analyses only);
- Laboratory duplicate results for inorganic analyses, including relative percent differences and corresponding control limits;
- Sample COC documentation;
- Holding times and conditions;
- Conformance with required analytical protocol(s);
- Instrument calibration;
- Blanks;
- Detection/quantitative limits;
- Recoveries of surrogates and/or matrix spikes (MS/MSDs);
- Variability for duplicate analyses;
- Completeness;
- Data report formats;

Data deliverables provided by the laboratory that include analysis of organic compounds will also include the following:

- A cover letter referencing the procedure used and discussing any analytical problems, deviations, and modifications, including signature from authority representative certifying to the quality and authenticity of data as reported;
- A report of sample collection, extraction, and analysis dates, including sample holding conditions,
- Tabulated results for samples in units as specified, including data qualification in conformance with EPA protocol, and definition of data descriptor codes;
- Final extract volumes (and dilutions required), sample size, wet-to-dry weight ratios, and instrument practical detection/quantitative limit for each analyte,
- Analyte concentrations with reporting units identified, including data qualification and a description of the qualifiers,
- Quantification of analytes in all blank analyses, as well as identification of method blank associated with each sample,
- Recovery assessments and a replicate sample summary, including all surrogate spike recovery data with spike levels/concentrations for each sample and all MS/MSD results (recoveries and spike amounts).

4.4.5 Review of Field and Laboratory QA/QC Data

The sample data, field, and laboratory QA/QC results will be evaluated for acceptability with respect to the data quality objectives (DQOs). Each group of samples will be compared with the DQOs and evaluated using data validation guidelines contained in EPA guidance documents:

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Guidance Document for the Assessment of RCRA Environmental Data Quality, National Functional Guidelines for Organic Data Review, and Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, and the most recent version of SW-846, and industry-accepted QA/QC methods and procedures.

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The laboratory will notify the Gallup Refinery Project Manager of data quality exceptions within one business day of identifying the data quality exception in order to allow for sample re-analysis, if possible. The Gallup Refinery Project Manager will contact NMED within one business day of receipt of laboratory notification of data quality exceptions in order to discuss the implementations and determine whether the data will still be considered acceptable, or if sample re-analysis or re-sampling is necessary.

4.4.6 Blanks, Field Duplicates, Reporting Limits and Holding Times

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4.4.6.1 Blanks

The analytical results of field blanks and field rinsate blanks will be reviewed to evaluate the adequacy of the equipment decontamination procedures and the possibility of cross-contamination caused by decontamination of sampling equipment. The analytical results of trip blanks will be reviewed to evaluate the possibility for contamination resulting from the laboratory-prepared sample containers or the sample transport containers. The analytical results of laboratory blanks will be reviewed to evaluate the possibility of contamination caused by the analytical procedures. If contaminants are detected in field or laboratory blanks, the sample data will be qualified, as appropriate.

4.4.6.2 Field Duplicates

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Field duplicates will consist of two samples either split from the same sample device or collected sequentially. Field duplicate ground water samples will be collected at a frequency of one per ten regular samples and will be analyzed for the full set of analyses used for the regular sample collected. At a minimum, one duplicate sample per sampling day must always be obtained.

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4.4.6.3 Method Reporting Limits

Method reporting limits for sample analyses will be established at the lowest level practicable for the method and analyte concentrations and will not exceed ground water or surface water cleanup standards and screening levels. Detection limits that exceed established standards or screening levels and are reported as "not detected" will be considered data quality exceptions and an explanation for its acceptability for use will be provided.

4.4.6.4 Holding Times

Per EPA protocol the sampling, extraction, and analysis dates will be reviewed to confirm that extraction and analyses were completed within the recommended holding times. Appropriate data qualifiers will be noted if holding times are exceeded.

4.4.7 Representativeness and Comparability

4.4.7.1 Representativeness

Representativeness is a qualitative parameter related to the degree to which the sample data represent the relevant specific characteristics of the media sampled. Procedures will be implemented to assure representative samples are collected and analyzed, such as repeated measurements of the same parameter at the same location over several distinct sampling events. Any procedures or variations that may affect the collection or analysis of representative samples will be noted and the data will be qualified.

4.4.7.2 Comparability

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Comparability is a qualitative parameter related to whether similar sample data can be compared. To assure comparability, analytical results will be reported in appropriate units for comparison with other data (past studies, comparable sites, screening levels, and cleanup standards), and standard collection and analytical procedures will be implemented. Any procedure or variation that may affect comparability will be noted and the data will be qualified.

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4.4.8 Laboratory Reporting, Documentation, Data Reduction, and Corrective Action

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Upon receipt of each laboratory data package, data will be evaluated against the criteria outlined in the previous sections. Any deviation from the established criteria will be noted and the data will be qualified. A full review and discussion of analytical data QA/QC and all data qualifiers will be submitted as appendices or attachments to the ground water monitoring reports. Data validation procedures for all samples will include checking the following, when appropriate:

- Holding times
- Detection limits
- Field equipment rinsate blanks
- Field blanks
- Field Duplicates
- Trip blanks
- Reagent blanks
- Laboratory duplicates
- Laboratory blanks
- Laboratory matrix spikes
- Laboratory matrix spike duplicates
- Laboratory blank spikes
- Laboratory blank spike duplicates
- Surrogate recoveries

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If significant quality assurance problems are encountered, appropriate corrective action will be implemented. All corrective action will be reported and the corrected data will be qualified.

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5.0 Monitoring and Sampling Program

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The primary objective of ground water monitoring is to provide data which will be used to assess ground water quality at and near the facility. Ground water elevation data will also be collected to evaluate ground water flow conditions. The ground water monitoring program for the facility will consist of sample collection and analysis from a series of monitoring wells, recovery wells, outfalls, and evaporation pond locations.

The monitoring network is divided into two investigation areas (East Side and West Side). The sampling frequency, analyses and target analytes will vary for each investigation area and well/outfall/evaporation pond location. The combined data from these investigation areas will be used to assess ground water quality beneath and immediately down-gradient of the facility, and evaluate local ground water flow conditions.

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Samples will not be collected from monitoring wells that have measurable SPH. For wells that are purged dry, samples will be collected if recharge volume is sufficient for sample collection within 24 hours. Wells not sampled due to insufficient recharge will be documented in the field log.

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The following sections outline the monitoring program for each investigation area.

5.1 East Side

5.1.1 Sampling Locations

The location of the East Side monitoring and recovery wells are shown in Figure 3. The following wells will be sampled (as described in Appendix D) within the East Side area:

Recovery wells

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- RW-1
- RW-2
- RW-5
- RW-6

Monitoring wells

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- OW-29
- OW-30
- OW-13
- OW-14
- OW-50
- OW-52

5.2 West Side

5.2.1 Sampling Locations

The locations of wells on the West Side are shown in Figure 3. The following wells, outfalls, and ponds will be sampled (as described in Appendix D, Table 1) within the West Side area. (Note: these outfalls are from one section of the waste water treatment system to another – they do not discharge to any location outside the facility.)

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List of Sections

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RW-1
RW-2
RW-5
RW-6

Monitoring wells

OW-29
OW-30
OW-13
OW-14
OW-50
OW-52

5.2 West Side

5.2.1 Sampling Locations

The locations of wells on the West Side are shown in Figure 3. The following wells, outfalls, and ponds will be sampled (as described in Appendix D, Table 1) within the West Side area. (Note: these outfalls are from one section of the waste water treatment system to another – they do not discharge to any location outside the facility.)

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Any temporary pond containing liquid

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This new well is scheduled to be surveyed by a licensed professional surveyor for horizontal and vertical positions of the top of the well casing and ground surface and will be added to Figure 3. Horizontal positions will be measured to the nearest 0.1 foot and vertical elevations will be measured to the nearest 0.01 foot. See Appendix E for well drilling logs and Hall laboratory analysis.

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Wells OW-13, OW-14, OW_29, OW-30 and OW-12, WQCC metals (total and dissolved) analysis will be added for sampling per NMED's Comment 12, Approval With Modifications Annual Ground Water Monitoring Report: Gallup Refinery 2010, Revision 1, dated December 12, 2012 to monitor wells up gradient from NAPIS-1, NAPIS-2, NAPIS-3, KA-3, OW-1, OW-10 and OW-11 for metals.

Influent to AL-1, Influent to AL-2, effluent from AL-2 to EP-1 and the NAPIS effluent have all been removed from the Outfall section. The influent and effluents are now routed to the new waste water treatment plant via the NAPIS and the levels in the lagoons are slowly dropping. There is no more flow at these sample points in the outfalls except for the Pilot Effluent which continues to flow into AL-1.

Monitoring wells

- NAPIS 1
- NAPIS 2
- NAPIS 3
- KA-3
- GWM-1
- GWM-2
- GWM-3
- OAPIS-1
- SMW-2
- SMW-4
- MW-1
- MW-2
- MW-4
- MW-5
- OW-1
- OW-10
- OW-11
- OW-12
- BW-1A
- BW-1B
- BW-1C
- BW-2A
- BW-2B
- BW-2C
- BW-3A
- BW-3B
- BW-3C
- PW-2
- PW-3
- PW-4

New Wells

- MKTF-01
- MKTF-02
- MKTF-03
- MKTF-04
- MKTF-05
- MKTF-06
- MKTF-07
- MKTF-08
- MKTF-09
- MKTF-10
- MKTF-11
- MKTF-12
- MKTF-13
- MKTF-14
- MKTF-15
- MKTF-16
- MKTF-17
- MKTF-18

Outfalls

- Influent to EP-2 from STP-1
- Boiler Water Inlet to EP-2

Ponds

- EP-1
- EP-2
- EP-3
- EP-4
- EP-5
- EP-6
- EP-7
- EP-8
- EP-9
- EP-11
- EP-12A
- EP-12B
- Any temporary pond containing liquid Containment

NAPIS secondary containment (Leak Detection Units -LDU)

- East LDU
- West LDU
- Oil Sump LDU

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Monitoring wells¶
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5.2 West Side¶
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5.2.1 Sampling Locations¶
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The locations of wells on the West Side are shown in Figure 3. The following wells, outfalls, and po ... [6]
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5.3 Monitoring Program Revisions

Upon review of the analytical results from the monitoring events under this Plan, historic facility-wide monitoring data, available soil boring data, and other related information Western Refining will assess the monitoring program presented in this Plan. Revisions to the Plan, as necessary, will then be presented for agency review and approval on an annual basis. These revisions may include, but not be limited to, a reduction or change in monitoring locations, monitoring frequency, and/or target analytes.

5.3.1 Request for Modifications to Sampling Plan

A. Gallup Refinery has added eighteen (18) new monitoring wells to the sampling plan identified as:

- MKTF-01
- MKTF-02
- MKTF-03
- MKTF-04
- MKTF-05
- MKTF-06
- MKTF-07
- MKTF-08
- MKTF-09
- MKTF-10
- MKTF-11
- MKTF-12
- MKTF-13
- MKTF-14
- MKTF-15
- MKTF-16
- MKTF-17
- MKTF-18

These wells will be added to the Facility Wide Ground Water Monitoring Plan (FWGWMP) for 2014. Sampling/inspection frequency will be on a quarterly basis and sampling will be analyzed for VOCs, SVOCs, Water Quality Control Commission (WQCC) metals (total and dissolved), gasoline range organics (GRO), diesel range organics (DRO) extended, and major cations and anions. Sampling will be conducted for four (4) consecutive sampling events in order to establish a base line before Western may propose to modify the sampling frequency. Samples will not be collected from monitoring wells that have a measureable separate phase hydrocarbon (SPH) level.

B. Gallup Refinery proposes the following changes:

OW-1 and OW-10: Change the quarterly analytical sampling analytes to: VOCs, and Major Cations/Anions, Arsenic and Uranium. Annual sampling requirement will not change. Recent installations of wells listed in 5.3.1A above are all up-gradient from these two wells. There are also the boundary wells which are monitored annually.

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C. BW-1A, BW-1B, BW-1C, BW-2A, BW-2B, BW-2C, BW-3A, BW-3B, BW-3C: Change to RCRA metals (total and dissolved) and drop SVOCs. Only the analyte bis-2-ethylhexylphthalate was detected (Possible lab contaminant).

D. OW-11: Reduce analyses to only major cations/anions and WQCC Metals (total and dissolved). No detections of VOCs or SVOCs with exception of single hit of bis-2-ethylhexylphthalate (possible lab contaminant).

E. OW-50 and OW-52: Reduce analyses to only VOCs and WQCC metals (total and dissolved).

F. SMW-2: Reduce analyses to only VOCs and WQCC Metals.

G. RW-1, RW-2, RW-5 and RW-6: Remove from annual sampling schedule as these wells are hydrocarbon recovery wells. These wells will continue to be inspected on a quarterly basis.

H. PW-3: Return to 3 year sampling schedule beginning in 2016. No VOCs or SVOCs have been detected since August 2008 to present.

These additions and revisions have been incorporated into Table 1: Ground Water Monitoring Schedule in Appendix D pending approval from NMED and OCD.

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Influent to AL-1, Influent to AL-2, effluent from AL-2 to EP-1 and the NAPIS effluent have all been removed from the Outfall section. The influent and effluents are now routed to the new waste water treatment plant via the NAPIS and the level … [12]
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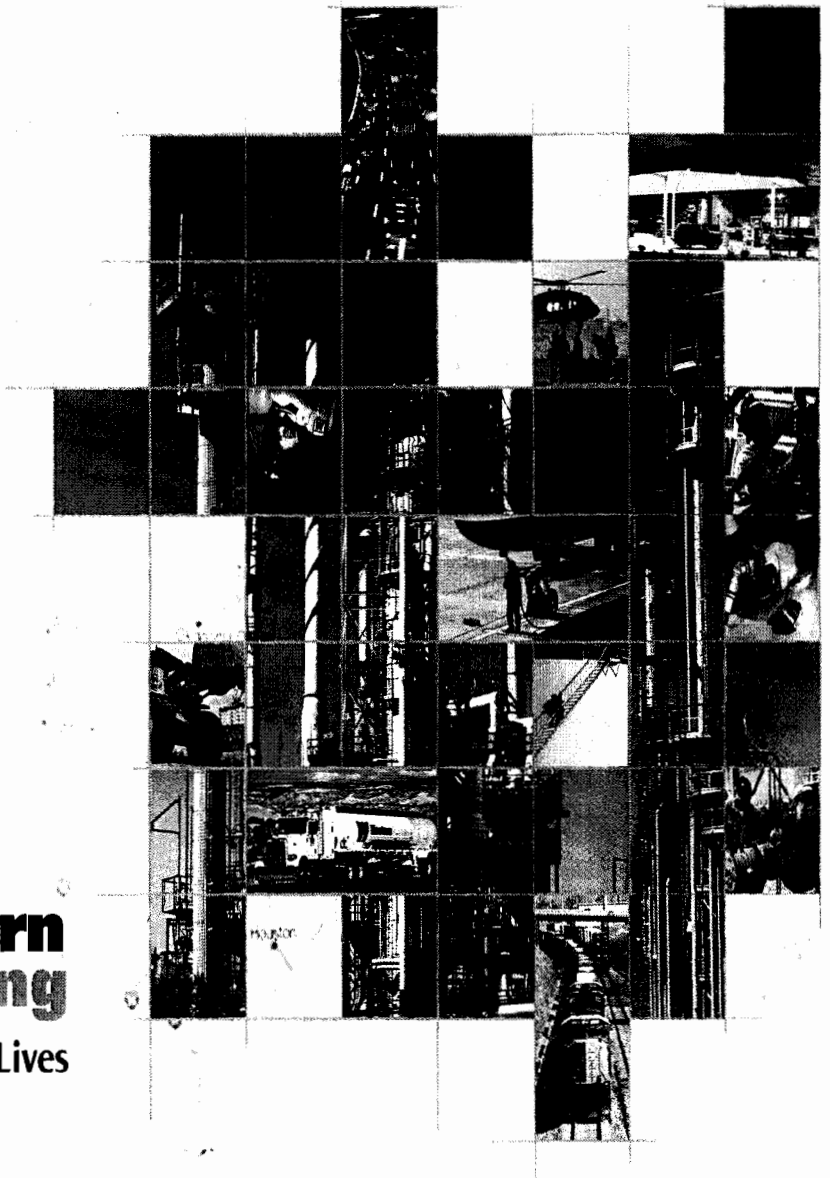
Facility Wide Ground Water Monitoring Work Plan – 2013 Updates



Western Refining

Fueling Our Lives

Western Refining Company
Gallup Refinery
92 Giant Crossing Road
Gallup, New Mexico 87301
505-722-3833

Submitted: March 31, 2014

Western Refining

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

William C. McClain, Jr.
Refinery Manager

March 31, 2014
Date

Prepared by:

Cheryl Johnson
Environmental Specialist

Reviewed by:

Ed Riege, M.P.H.
Environmental Manager

Executive Summary

Western Refining conducts quarterly, semi-annual and annual ground water monitoring at its Gallup facility on a site wide basis. The Ground Water Monitoring Work Plan (Plan) documents any additions or revisions in ground water monitoring and also details the sampling procedures used.

This Plan divides the facility into two areas for periodic monitoring: the East Side and the West Side. The East Side includes the refinery complex, recovery wells from which small quantities of free product has been continuously removed, and the northeast set of observation wells and monitoring wells. The West Side includes a cluster of wells in and around the waste water treatment system, boundary wells, shallow monitoring wells in and around land treatment areas, and produced/production water wells. This plan also includes sampling requirements for aeration lagoons, influents, and evaporation ponds located on the West Side. Designated wells and sample points in these two areas will be monitored on a quarterly, semi-annual and annual basis following the procedures presented in this Plan.

Gallup Refinery will periodically review facility-wide monitoring data, and assess the monitoring program presented in this Plan. Revisions to the Plan, as necessary, will then be presented annually for agency review and approval. These revisions may include, but not be limited to, a reduction or change in monitoring locations, monitoring frequency, and/or target chemicals to be analyzed.

We have created a monitoring work plan with quality assurance practices and controls as well as standard procedures for sampling, and a schedule of activities to monitor ground water at select locations of the Gallup Refinery. The persons responsible for the implementation and oversight of this plan are:

Refinery Manager

- William C. McClain, Jr.

Environmental Manager

- Ed Riege

Environmental Specialist

- Cheryl Johnson
- Alvin Dorsey

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List of Acronyms

AL	Aeration Lagoon
API	American Petroleum Institute
BMP	Best Management Practices
BS	Blank Spike
BSD	Blank Spike Duplicate
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CFR	Code of Federal Regulations
DQO	Data Quality Objective
DRO	Diesel Range Organics
DTB	Depth to Bottom
DTW	Depth to Water
EP	Evaporation Pond
EPA	Environmental Protection Agency
FT.	Foot
FWGWMP	Facility Wide Ground Water Monitoring Plan
GPM	Gallons per minute
GRO	Gasoline Range Organics
HNO3	Nitric Acid
HWB	Hazardous Waste Bureau
IDW	Investigation Derived Waste
LDU	Leak Detection Unit
LTU	Land Treatment Unit
ML	Milliliter
MCL	Maximum Contaminant Level
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MTBE	Methyl Tert Butyl Ether
NAIC	North American Industry Classification System

List of Acronyms – Continued

NAPIS	New American Petroleum Institute Separator
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NOI	Notice of Intent
OAPIS	Old American Petroleum Institute Separator
OB	Observation Well
OCD	Oil Conservation Division
PPE	Personal Protective Equipment
PPM	Parts per million
PSTB	Petroleum Storage Tank Bureau
PW	Process Well
QA	Quality Assurance
QC	Quality Control
RW	Recovery Well
RCRA	Resource Conservation and Recovery Act
SIC	Standard Industrial Classification
SOP	Standard Operating Procedure
SPH	Separate Phase Hydrocarbon
SVOC	Semi-volatile Organic Compound
SWMU	Solid Waste Management Unit
SWPP	Storm Water Pollution Prevention Program
TOC	Total Organic Content
VOC	Volatile Organic Compound
WQCC	Water Quality Control Commission
WWTP	Waste water treatment plant

1.0 Introduction

This Facility-Wide Ground Water Monitoring Work Plan (Plan) has been prepared for the implementation of a ground water monitoring program at the Gallup Refinery owned by Western Refining ("Gallup Refinery" or "Facility").

1.1 Scope of Activities

This Plan has been prepared to collect data that will be used to characterize the nature and extent of potential impacts to ground water at the Gallup Refinery. The monitoring plan is also designed to make the facility quickly aware of any levels of contaminants that exceed compliance standards.

This Plan divides the facility into two areas for periodic monitoring: the East Side and the West Side. The East Side includes the refinery complex, recovery wells from which small quantities of free products have been continually removed, and the northeast set of observation wells and monitoring wells. The West Side includes a cluster of wells in and around the waste water treatment system, boundary wells, shallow monitoring wells in and around land treatment areas, and produced/production water wells. This plan also includes sampling requirements for aeration lagoons, influents, and evaporation ponds located in the West Side. Designated wells and sample points in these two areas will be monitored on a quarterly, semi-annual and annual basis following the procedures presented in this Plan.

Gallup Refinery will periodically review facility-wide monitoring data, and assess the monitoring program presented in this Plan. Annual revisions to the Plan will be presented for agency review and approval. These revisions may include, but not be limited to, a reduction or change in monitoring locations, monitoring frequency, and/or target chemicals to be analyzed.

1.2 Facility Ownership and Operation

This Plan pertains to the Western Refining Southwest Inc., Gallup Refinery located at Exit 39 on Interstate I-40. This refinery is known as the Gallup Refinery and is located at Jamestown, New Mexico, approximately 17 miles east of Gallup. Figure 1 shows the regional location of the Gallup Refinery.

The owner is:

Western Refining (Parent Corporation)
123 W. Mills Avenue
El Paso, TX 79901

Operator: Western Refining Southwest Inc (Postal Address)
92 Giant Crossing Road
Gallup, New Mexico 87301

Western Refining Southwest Inc (physical address)
I-40, Exit 39 (17 Miles East of Gallup, NM)
Jamestown, New Mexico 87347

The following regulatory identification and permit governs the Gallup Refinery:

- SIC code 2911 (petroleum refining) applies to the Gallup Refinery
- U.S. EPA ID Number NMD000333211
- OCD Discharge Case Number AP-111.

The facility status is corrective action/compliance. Quarterly, semi-annual and annual ground water sampling is conducted at the facility to evaluate present contamination.

The refinery is situated on an 810 acre irregular shaped tract of land that is substantially located within the lower one quarter of Section 28 and throughout Section 33 of Township 15 North, Range 15 West of the New Mexico Prime Meridian. A small component of the property lies within the northeastern one quarter of Section 4 of Township 14 North, Range 15 West. Figure 2 is a topographic map showing the general layout of the refinery in comparison to the local topography.

2.0 Background Information

2.1 Historical and Current Site Use

Built in the 1950's, the Gallup Refinery is located within a rural and sparsely populated section of McKinley County in Jamestown, New Mexico, 17 miles east of Gallup, New Mexico. The setting is a high desert plain on the western slope of the Continental Divide. The nearest population centers are the Pilot (formerly Giant) Travel Center refueling plaza, the Interstate 40 highway corridor, and a small cluster of residential homes located on the south side of Interstate 40 approximately 2 miles southwest of the refinery (Jamestown). The surrounding land is comprised primarily of public lands and is used for cattle and sheep grazing at a density of less than six cattle or 30 sheep per section.

The refinery primarily receives crude oil via two 6 inch diameter pipelines; two pipelines from the Four Corners Area enter the refinery property from the north. In addition, the refinery also receives natural gasoline feed stocks via a 4-inch diameter pipeline that comes in from the west along the Interstate 40 corridor from the Conoco gas plant. Crude oil and other products also arrive at the site via railroad cars. These feed stocks are then stored in tanks until refined into products.

The Gallup Refinery is a crude oil refining and petroleum products manufacturing facility. The Standard Industrial Classification (SIC) code is 2911 and the North American Industry Classification Code (NAIC) is 32411. There are no organic chemicals, plastics, or synthetic fibers manufactured that contribute to our process flow of waste water. We do not manufacture lubricating oils.

The refinery incorporates various processing units that convert crude oil and natural gasoline into finished products. These units are briefly described as follows.

- Crude Distillation Unit - separates crude oil into various fractions; including gas, naphtha, light oil, heavy oil, and residuum.

- Fluidized Catalytic Cracking Unit (FCCU) - dissociates long-chain hydrocarbon molecules into smaller molecules, and essentially converts heavier oils into naphtha and lighter oils.

- Alkylation Unit - combines specific types of hydrocarbon molecules into a high octane gasoline blending component.

- Reforming Unit - breaks up and reforms low octane naphtha molecules to form high octane naphtha.

- Hydro-Treating Unit - removes undesirable sulfur and nitrogen compounds from intermediate feed stocks, and also saturates these feed stocks with hydrogen to make diesel fuel.

- Isomerization Unit - converts low octane hydrocarbon molecules into high octane molecules.

- Treater Unit - remove impurities from various intermediate and blending feed stocks to produce finished products that comply with sales specifications.

- Ammonium Thiosulfate Unit - accepts high H2S and ammonia containing gas streams from the Amine and the Sour Water Stripper units, and converts these into a useful fertilizer product, ammonium thiosulfate.

- Sulfur Recovery Unit - converts and recovers various sulfur compounds from the gases and liquids produced in other processing units to create a solid elemental sulfur byproduct. This unit only operates when the ammonium thiosulfate unit is inoperable or cannot handle incoming loads.

As a result of these processing steps, the refinery produces a wide range of petroleum products including propane, butane, unleaded gasoline, diesel, and residual fuel. In addition to the aforementioned processing units, various other equipment and systems support the operation of the refinery and are briefly described as follows.

Storage tanks are used throughout the refinery to hold and store crude oil, natural gasoline, intermediate feed stocks, finished products, chemicals, and water and are all located above ground. Capacity of these tanks range in size from 80,000 barrels to less than 1,000 barrels.

Pumps, valves, and piping systems are used throughout the refinery to transfer various liquids among storage tanks and processing units. A railroad spur track and a railcar loading rack are

used to transfer feed stocks and products from refinery storage tanks into and out of railcars. Several tank truck loading racks are used at the refinery to load out finished products and also receive crude oil, other feed stocks, additives, and chemicals.

Gasoline is delivered to the Pilot Travel Center via tanker truck. An underground diesel pipeline exits between the refinery and the Pilot Travel Center. As a result of an off-refinery release, the pipeline was purged of product, filled with nitrogen and temporarily placed out of service. Gallup Refinery worked with the New Mexico Environment Department (NMED) Petroleum Storage Tank Bureau (PSTB) and the New Mexico Oil Conservation Division (NMED-OCD) to place this line back in service. In 2013 the underground diesel line from Gallup Refinery to the Pilot Travel Center was replaced. The replaced line runs above ground from the marketing area of the refinery for approximately 150 feet and continues underground to the Pilot Travel Center. The diesel line was commissioned and put back in service on February 3, 2014.

A firefighting training facility is used to conduct employee firefighting training. Waste water from the facility, when training is conducted, is pumped into a tank which is then pumped out by a vacuum truck. The vacuum truck pumps the oily water into a process sewer leading to the New API Separator (NAPIS).

The process waste water system is a network of curbing, paving, catch basins, and underground piping used to collect waste water from various processing areas within the refinery. The waste water effluent then flows into the equalization tanks and the NAPIS where the oil is separated from water based on the principle that, given a quiet surface, oil will float to the water surface where it can be skimmed off. The skimmed slop is passed to a collection chamber where it is pumped back into the refinery process. The clarified water is routed to the new waste water treatment plant (WWTP) where benzene is removed and the treated water flows into the new pond STP-1. STP-1 consists of two bays, north and south and each bay is equipped with five aerators per bay. Effluent from STP-1 then flows into Evaporation Pond 2 and gravitated to the rest of the ponds.

During episodes of unit upsets or major storm events, the waste water is held in one of the three equalization tanks, T-35, T-27 and T-28 which are used to handle large process and storm water flows allowing the flow to the NAPIS to be controlled. These tanks are also used to store waste water if problems are encountered with the downstream equipment, i.e., NAPIS and the WWTP.

The new WWTP was completed and put online in May of 2012 which resulted in the intermittent use of the benzene strippers during this period. In November of 2012, the benzene strippers were taken off line permanently and by January 2013, the benzene strippers were permanently dismantled and removed.

The storm water system is a network of valves, gates, berms, embankments, culverts, trenches, ditches, natural arroyos, and retention ponds that collect, convey, control, and release storm water that falls within or passes through refinery property. Storm water that falls within the processing areas is considered equivalent to process waste water and is sent to tanks T-35, T-27 and T-28 when needed before it reaches the NAPIS, WWTP, STP-1 and into Evaporation Pond 2 where flow is gravitated to the rest of the ponds. Storm water discharge from the refinery is very infrequent due to the arid desert-like nature of the surrounding geographical area.

At the evaporation ponds, waste water is converted into vapor via solar and mechanical wind-effect evaporation. No waste water is discharged from the refinery to surface waters of the state.

The Gallup Refinery currently operates under the Multi-Sector Permit 2008 (MSGP-2008). Gallup Refinery submitted a new Notice of Intent (NOI) for coverage under the new MSGP. The refinery maintains a Storm Water Pollution Prevention Plan (SWPPP) that includes Best Management Practices (BMPs) for effective storm water pollution prevention. The refinery has constructed several new berms in various areas and improved outfalls (installed barrier dams equipped with gate valves) to minimize the possibility of potentially impacted runoff leaving the refinery property.

2.2 Potential Receptors

Potential receptors at the facility also include those that may arise from future land uses. Currently, these include on-site workers, nearby residents, wildlife, and livestock.[1] The major route to exposure of humans would be from contaminants reaching a drinking water well. Other routes could be from showering, cooking, etc. with contaminated ground water, raising crops and vegetables with contaminated ground water, or getting exposed to or fishing in surface water that has commingled with shallow ground water. Exposure can also occur through contact with soils and/or plants that have become contaminated themselves through contact with contaminated ground water. However, drinking water wells remain the primary route of possible exposure.

At this time, the nearest drinking water wells are located on-site at the southwest areas of the facility, at depths of approximately 3000 feet which are identified as process or production (PW) wells. These wells are designated as PW-2, PW-3 and PW-4 (See Figure 3 for location). These wells are operated by the facility to provide the refinery's process water, drinking water to nearby refinery-owned houses, to the refinery itself, and to the Pilot Travel Center. PW-2 and PW-4 are sampled every three years and PW-3 is on an annual sampling schedule which began in 2009 due to the detection of 2-methylnaphthalene and phenol during the 2007 annual sampling event conducted in January 2008. Annual sampling results from 2009 through 2013 have indicated no detection levels of volatile organic compounds (VOCs) or semi-volatile organic compounds (SVOCs). PW-3 sampling continues on an annual basis and Western has requested that this well be placed back on a 3 year schedule in Section 5.3.1H.

Other than the on-site wells, there is no known drinking water wells located within a 4-mile radius of the site. The nearest drinking water wells that could be used by off-site residents are located to the northwest of the site at a distance slightly greater than 4-miles located within the Navajo community of Iyanbito (shown on the USGS Topographical Map - Gallup Quadrangle

[1] Note: There is extensive and regular patrolling by security personnel of the facility which operates 24-hours – therefore, we can discount the possibility of an inadvertent or deliberate intruder becoming exposed to contamination in groundwater that has reached the surface in some form.

(Revised 1980).) These wells are northwest of the South Fork of the Puerco River which heads towards the southwest from immediately north of the facility. As the shallowest ground water will generally flow in the direction of surface water flow, any possible shallow ground water contamination that left the facility either now or in the future would flow towards the southwest after leaving the facility and away from the community of Iyanbito. The Cibola National Forest lies in the south-east direction and there are no wells or residents in this protected area. Boundary monitoring wells along the southwest to northwest perimeter of the facility have not shown any evidence of contaminants in the wells except for BW-3B which had a detection of bis(2-ethylhexyl)phthalate in 2009, BW-3C in November 2011 and BW-1C in September 2013.

Artesian conditions at some locations of the site lead to the possibility of ground water emerging onto the surface and thus being able to affect wildlife. No surface water on the site is used for human consumption or primary contact, such as immersion, or secondary contact, such as recreation. The man-made ponds on the site are routinely monitored and are a part of this Plan. Therefore, if they are in contact with shallow ground water that has exhibited elevated levels of contaminants, the Plan will detect any commingling of ground water and surface waters.

Fluctuating ground water elevations can smear contaminants into subsurface soil and rocks, and there is a possibility that plant roots could reach such contaminated soils and bio-concentrate contaminants creating another route of exposure to potential receptors, such as birds and animals that eat the plants. No food crops are currently grown on the site.

2.3 Type and characteristics of the waste and contaminants and any known and possible sources

The types of waste likely include – volatile and semi-volatile organic compounds, primarily hydrocarbons, but could include various other industrial chemicals such as solvents; acids; spent caustic solutions; and heavy metals present in spent chemicals and waste water. These wastes could be in the form of waste water, spent chemicals destined for off-site shipping and disposal packed in drums, sludge, and dry solids. Dry wastes could stem from wind-blown metallic

powders used as catalysts, and regular municipal solid wastes stored in covered containers destined for municipal landfills.

Most of the wastes and contaminants that could possibly reach ground water have the characteristic that they would biodegrade and naturally attenuate. However, any heavy metals present in dirt and sludge could possibly leach into ground water and would not attenuate. There is a possibility also that certain long-lived chemicals would not biodegrade, or, if they did, it would be at a very slow pace. Possible sources include leaks from buried pipes, tanks, surface spills, and historical dumping of wastes in remote areas of the site.

All above-ground large tanks have leak detection or equivalent systems, such as radar gauges. Pumps that could leak hydrocarbons are within containment areas, and all tanks are located inside earthen bermed areas to contain spills. The NAPIS has double walls and a leak detection system installed.

Similarly, surface impoundments can serve as a source of possible ground water contamination. In the past, waste water from the railroad loading rack flowed to a settling and separation lagoon south of the rack and flow exited at the north end where water leaving the lagoon was distributed across a flat open site known as the fan-out area. The free flow of liquids led to subsurface soil contamination. This area has been identified as SWMU No. 8 and has recently been cleaned up for a corrective action complete with controls status. Disposal of waste water into open fields is not practiced at the Gallup Refinery.

There are fourteen Sold Waste Management Units (SWMU) identified at the Gallup Refinery, and one closed land treatment Area.

RCRA (Resource Conservation and Recovery Act) Regulated Units

- Land Treatment Unit (LTU)

SWMUs

- SWMU 1 – Aeration Basin
- SWMU 2 – Evaporation Ponds
- SWMU 3 – Empty Container Storage Area
- SWMU 4 – Old Burn Pit
- SWMU 5 – Landfill Areas
- SWMU 6 – Tank Farm
- SWMU 7 – Fire Training Area
- SWMU 8 – Railroad Rack Lagoon
- SWMU 9 – Drainage Ditch and the Inactive Land farm
- SWMU 10 – Sludge Pits
- SWMU 11 – Secondary Oil Skimmer
- SWMU 12 – Contact Wastewater Collection System
- SWMU 13 – Drainage Ditch between North and South Evaporation Ponds
- SWMU 14 – API Separator

Existing ground water monitoring wells effectively surround all of these SWMUs.

2.4 Summary of contaminant releases that could contribute to possible ground water contamination

Spills and leaks are known to have occurred on the site in various locations. Although most hydrocarbons are rapidly picked up for recovery and contaminated soil is removed, some of the liquids present in a spill enter the subsurface. With precipitation, there is a possibility that some of the contaminants could leach and reach ground water.

Separate Phase Hydrocarbons (SPH) floating on shallow ground water has been found at the northeast end of the facility. A series of recovery wells were installed and SPH has been pumped out for several years. Recovery through hand-bailing continues on a quarterly basis indicating that the volume of SPH has continued to drop substantially from year to year in several of these recovery wells. In 2013, only Recovery Well (RW-1) had measureable levels of hydrocarbons. Trace levels of benzene have also been found in the wells in this area possibly linked to past spills. Recovery wells are listed as follows:

Recovery Wells

- RW-1
- RW-2
- RW-5
- RW-6

Years ago a small tank that held Methyl Tert Butyl Ether (MTBE) leaked and created a plume of MTBE in the shallow ground water at the northeast end of the refinery. This tank is no longer in service and was removed. MTBE has not been used at the refinery since April 2006. Several monitoring wells were installed at various depths to monitor SPH and MTBE contaminant plumes from historical contamination. These observation wells (OW) are located downstream on the northeast section of the plant and are designated as follows.

Observation Wells

- OW-29
- OW-30
- OW-13
- OW-14
- OW-50
- OW-52

A unit at the southwest end of the facility that is used to recover and recycle oil back into the process has also – through leakage and spills – caused some MTBE and hydrocarbon contamination in shallow ground water. This unit is known as the NAPIS and was put into service in October 2004. The NAPIS has one up-gradient well NAPIS-1, located on the east side and three down-gradient shallow monitoring wells, NAPIS-2, NAPIS-3 and KA-3 which are located along the west side.

The Aeration Basin, which is designated as SWMU No. 1 in the facility's RCRA Post-Closure Care Permit includes three cells, known as AL-1, AL-2 and holding pond 1 which is currently referred to as EP-1, although it is not an evaporation pond and is not part of the area covered by SWMU No. 2 – Evaporation Ponds. Western has experienced intermittent discharges of oil and oily water into the lagoons and spills to ground surface. Most of these occurrences were the result of unit upsets and or large storm events affecting the old API Separator.

Two ground water monitoring wells (GWM-1, GWM-2)were installed immediately down gradient of the aeration lagoons in 2004 and 2005 in order to detect potential leakage from the aeration basin. GWM-3 was also installed in 2005 on the northwest corner of pond 1 (EP-1).

Analysis of ground water samples collected at GWM-1 and GWM-2 have indicated several organic constituents at concentrations above the screening levels in ground water which would indicate a potential for historical releases from the lagoons. GWM-2 and 3 upon installation in 2005 were found to be dry. Water was first detected in GWM-2 in the first quarter of 2008 and in GWM-3 in the third quarter of 2010. 24-hour notification of the finding was given to NMED and OCD respectively. Analysis of ground water samples collected from GWM-2 and GWM-3 have detected the presence of several constituents at concentration levels above applicable water quality standards such as fluoride, chloride, nitrates, and sulfates. No VOCs have been detected in GWM-2 or GWM-3.

Quarterly inspections in 2011 and 2012 continued to indicate an increase in measurable water levels in GWM-2 and GWM-3; however water levels began to decrease in late 2012. In 2013 no water was detected in GWM-3. Ground water samples collected have indicated non-detectable and/or concentration levels below the screening levels for BTEX constituents since 2010. Fluoride, chloride and sulfate concentration levels are above the screening levels for years 2010 thru 2013. Method 8260B analysis run on the ground water samples have indicated non-detectable levels for 2013. A request was made to NMED in the 2012 Updates to change analytical requirements from 8021B to 8260B + MTBE for a more detailed list of volatile organic compounds and currently awaiting approval for this change.

Both GWM-2 and GWM-3 have been included in the Aeration Basin Corrective Action Work Plan which began investigative soil and water sampling near the aeration basin in the third quarter of 2012 to support selection of a remedy for SWMU NO. 1 and determine the source of water detected in GWM-2 and GWM-3. Figure 3 shows the location of all of the active monitoring wells on the facility.

In February of 2012, Western submitted a "Revised Investigation Work Plan Solid Waste Management Unit (SWMU) No. 1 Aeration Basin to include sampling of soils and ground water surrounding the Aeration Basin to determine if there has been a release to the environment and to delineate any such release. In addition, information was collected to help determine the source of ground water that had been observed in monitoring wells GWM-2 and GWM-3. The work plan also included SWMU No. 14 Old API Separator soil and ground water sampling. A new well OAPIS-1 (SWMU 14-2) was installed on the northwest corner where the benzene strippers were located on July 17, 2012 by Enviro-Drill Inc. OAPIS-1 (SWMU 14-2) has been added to the 2014 Monitoring Schedule to be sampled on a quarterly basis.

In February of 2013, the influent to the aeration lagoons was routed to the new Waste Water Treatment Plant (WWTP). The aeration lagoons are no longer in service receiving no influent and are being investigated as described above. Pilot sanitary effluent was also routed to the WWTP in June of 2013.

In June of 2013 during a routine inspection a hydrocarbon seep was discovered in an isolated area approximately 100 yards west of Tank 101/102. A series of excavations were completed in the area of the seep including installation of six (6) temporary sumps for weekly hydrocarbon recovery. To date a total of 211,329 gallons of liquid (hydrocarbon and ground water) have been recovered from the site. There were a total of five (5) hand auger and 22 soil borings with temporary well completions completed at the start of the site investigation. An additional 13 soil borings with temporary wells were completed in late 2013 and to date 18 temporary wells have been converted to permanent flush mount and/or stick up monitoring wells. Western continues to further characterize potential source areas, recovery of liquids from the temporary sumps, and additional soil borings/monitoring wells will be installed for characterization and delineation purposes. A copy of the Well Installation (boring logs) are included in this report in Appendix E as well as the professional engineer's survey report. All 18 wells will be added to the 2014 Ground Water Monitoring Schedule (see Appendix D).

3.0 Site Conditions

The Gallup Refinery is located within a rural and sparsely populated section of McKinley County. It is situated in the high desert plain on the western flank of the Continental Divide approximately 17 miles east of Gallup. The surrounding land is comprised primarily of public lands and is used for cattle and sheep grazing at low densities[2].

3.1 Current site topography and location of natural and manmade structures

Local topography consists of a gradually inclined down-slope from high ground in the southeast to a lowland fluvial plain in the northwest. The highest point on refinery property is located at the southeast corner boundary (elevation approximately 7,040 feet) and the lowest point is located at the northwest corner boundary (elevation approximately 6,860 feet). The refinery processing facility is located on a flat man-made terrace at an elevation of approximately 6,950 feet.

3.2 Drainages

Surface water in this region consists of the man-made evaporation ponds and aeration basins located within the refinery, a livestock watering pond (Jon Myer's Pond) located east of the refinery, two small unnamed spring fed ponds located south of the refinery, and the South Fork of the Puerco River and its tributary arroyos. The various ponds and basins typically contain water consistently throughout the year. The South Fork of the Puerco River and its tributaries are intermittent and generally contain water only during, and immediately after, the occurrence of precipitation.

3.3 Vegetation types

Surface vegetation consists of native xerophytic vegetation including grasses, shrubs, small junipers, and some prickly pear cacti. Average rainfall at the refinery is less than 7 inches per year, although it can vary to slightly higher levels elsewhere in the county depending on elevation.

[2] See, for example, the web site of McKinley County at http://www.co.mckinley.nm.us/

On alluvial fans on valley sides and drainage ways, the existing vegetation is usually alkali sacaton, western wheatgrass, Indian rice grass, blue grama, bottlebrush squirreltail, broom snakeweed, fourwing saltbush, threeawn, winterfat, mat muhly and spike muhly. On fan remnants on valley sides we usually find blue grama, western wheatgrass, Indian ricegrass, big sagebrush, galleta, bottlebrush squirreltail, fourwing saltbrush, needleandthread, oneseed juniper, sand dropseed, spineless horsebrush, rabbitbrush, and twoneedle pinyon.

3.4 Erosion features

The impacts of historic overgrazing are visible at the north-side of the facility, in the form of arroyos that formed when surface run-off cut through the ground and washed away soils that were not able to hold water with their ground cover lost to overgrazing. Now that the facility is fenced and no livestock grazing occurs on the site, vegetation has recovered in these areas. With the facility helping to bring back vegetation in its undeveloped areas the formation and deepening of erosion features on its land has decreased.

3.5 Subsurface conditions

3.5.1 Soil types and associations

Most of the soils found at the surface in the locations where wells are located consist of the Mentmore-Gish complex.[3] These soils occur in alluvial fans on valley sides and fan remnants on valley sides. The parent material for these soils is slope and fan alluvium derived from sandstone and shale. These are well drained soils with moderately slow (0.2 in/hr) to slow permeability (0.06 in/hr). In this association, the Gish and similar soils make up about 45 percent, the Mentmore and similar soils 35 percent, and minor components 20 percent. These minor components are - Berryhill and similar soils 10 percent, and Anodize and similar soils 10 percent. The typical profile for these soils is – 0 to 2 inches fine sandy loam, 2 to 72 inches of various kinds of clay loam.

[3] Soil Survey of McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties, Natural Resources Conservation Service (NRCS), US Department of Agriculture, available at - http://soildatamart.nrcs.usda.gov/Manuscripts/NM692/0/McKinley.Area%20NM.pdf

Drill logs for various wells have been provided electronically to the NMED/HWB. From these well logs we can infer that the soils in the subsurface are generally composed of clays starting at the immediate subsurface, interbedded with narrow sand and silt layers. At about 100 to 150 feet, layers of mudstone, sandstone (from the Chinle formation, Petrified Forest group) and siltstone start to appear. Figure 4 shows a generalized relationship of soils in and around the Gallup Refinery.

3.5.2 Stratigraphy

The 810 acre refinery property site is located on a layered geologic formation. Surface soils generally consist of fluvial and alluvial deposits; primarily clay and silt with minor inter-bedded sand layers. Below this surface layer is the Chinle Formation, which consists of low permeability clay stones and siltstones that comprise the shale of this formation. As such, the Chinle Formation effectively serves as an aquiclude. Inter-bedded within the Chinle Formation is the Sonsela Sandstone bed, which represents the uppermost potential aquifer in the region.

The Sonsela Sandstone bed lies within and parallels the dip of the Chinle Formation. As such, its high point is located southeast of the refinery and it slopes downward to the northwest as it passes under the refinery. Due to the confinement of the Chinle Formation aquiclude, the Sonsela Sandstone bed acts as a water-bearing reservoir and is artesian at its lower extremis. Artesian conditions exist through much of the central and western portions of the refinery property.

3.5.3 Presence and flow direction of ground water

Ground water flow within the Chinle Formation is extremely slow and typically averages less than 10^{-10} centimeters per second (less than 0.01 feet per year). Ground water flow within the surface soil layer above the Chinle Formation is highly variable due to the presence of complex and irregular stratigraphy; including sand stringers, cobble beds, and dense clay layers. As such, hydraulic conductivity may range from less than 10^{-2} centimeters per second in the gravelly sands immediately overlying the Chinle Formation up to 10^{-8} centimeters per second in the clay soil layers located near the surface.

Shallow ground water located under refinery property generally flows along the upper contact of the Chinle Formation. The prevailing flow direction is from the southeast and toward the northwest. In the past, a subsurface ridge has been identified that was thought to deflect some flow in a northeast direction in the vicinity of the refinery tank farm. This is not clear from the present data.

4.0 Investigation Methods

The purpose of this section is to describe the types of activities that will be conducted and the methods that will be used as part of this Plan. Appendix B provides more detailed information on actual sampling procedures that will be used.

4.1 Ground water Sampling Methodology

All monitoring wells scheduled for sampling during a ground water sampling event will be sampled within 15 working days of the start of the monitoring and sampling event.

Appendix C contains the well data summary tables for 2013. C-1 provides the annual and quarterly DTW (depth to water) and DTB (depth to bottom) measurements for 2013 as well as corrected water table elevation with respect to wells that have separate phase hydrocarbon levels; C-2 provides the corrected well elevation summary table for 2013 which includes date of establishment, ground elevation, top of casing elevation, well casing stick-up length, well depth, screening levels, and stratigraphic units in which the wells are located. Appendix C-3 includes well elevations for the artesian wells also known as Process or Production wells (PW). Information provided for the artesian wells was gathered from well boring logs. These wells are encased and therefore measurement for depth to bottom was not field verified.

4.1.1 Well Gauging

At the beginning of each quarterly, semi-annual, or annual sampling event, all monitoring and recovery wells listed in Appendix D, Ground Water Monitoring Schedule, will be gauged to record the depth to SPH (if present), the DTW and the DTB of the well. The gauging will be performed using an oil/water interface probe attached to a measuring tape capable of recording

measurements to the nearest 0.01 foot. All measurements will be made relative to the same datum for all wells.

Gauging measurements will be recorded on a field gauging form. Data obtained from the gauging will be reported in the annual ground water monitoring report. The data will be used to develop groundwater contour maps and SPH thickness isopleths which will also be included in the annual report.

4.1.2 Well Purging

Each monitoring well will be purged by removing ground water prior to sampling in order to ensure that formation water is being sampled. Generally, at least three well volumes (or a minimum of two if the well has low recharge rate) will be purged from each well prior to sampling. Field water quality measurements must stabilize for a minimum of three consecutive readings before purging will be discontinued. Field water quality measurements will include pH, electrical conductivity, temperature, and dissolved oxygen (DO) %. Field water quality measurement stability will be determined when field parameter readings stabilize to within ten percent between readings for three consecutive measurements. Once the readings are within ten percent, purging will stop and the well is ready for sample collection. The volume of ground water purged, the instruments used, and the readings obtained at each interval will be recorded on the field-monitoring log. Well purging and sampling will be performed using 1 inch x 3 foot disposable polyethylene bailers for ground water sampling and/or appropriately decontaminated portable sampling pumps.

4.2 Ground water Sample Collection

Ground water samples will be obtained from each well within 24 hours of the completion of well purging. Sample collection methods will be documented in the field monitoring reports. The samples will be transferred to the appropriate, clean, laboratory-prepared containers provided by the analytical laboratory. Sample handling and chain-of-custody (COC) procedures are described in more detail in Appendix B. Decontamination procedures for reusable water sampling equipment are described in Appendix B.

All purged ground water and decontamination water from monitoring wells will be drained into the refinery waste water treatment system upstream of the NAPIS. The procedures for disposing materials are described in Appendix B.

Ground water samples intended for metals analysis will be submitted to the laboratory as total metals samples. Ground water samples obtained for dissolved metals analysis will be filtered through disposable filters with a 0.45 micrometers mesh size.

4.2.1 Sample Handling

All sample containers are supplied by the contracted analytical laboratory and shipped to Western in sealed coolers. Chemical preservation is also provided by the laboratory through pre-preserved bottle ware. Collection of containerized ground water samples are in the order of most volatile to least volatile, such as: VOCs, SVOCs, metals, phenols, cyanide, sulfate, chloride, and nitrates. Immediately after the samples are collected, they will be stored in a cooler with ice or other appropriate storage method until they are delivered to the analytical laboratory. Standard COC procedures as detailed in Appendix B will be followed for all samples collected. All samples will be submitted to the laboratory as soon as possible to allow the laboratory to conduct the analyses within the specified method holding times. Details of the general sample handling procedures are provided in Appendix B.

The following shipping procedures will be performed during each sampling event:

- Individual sample containers will be packed to prevent breakage and transported in a sealed cooler with ice or other suitable coolant or other EPA or industry-wide accepted method. The drainage hole at the bottom of the cooler will be sealed and secured in case of sample container leakage.
- Each cooler or other container will be delivered directly to the analytical laboratory.
- Glass bottles will be separated in the shipping container by cushioning material to prevent breakage.
- Plastic containers will be protected from possible puncture during shipping using cushioning material.
- The COC form and sample request form will be shipped inside the sealed storage container to be delivered to the laboratory.

- Signed and dated COC seals will be applied to each cooler prior to transport of samples from the site.

4.3 Analytical Methods

Ground water and surface water samples collected during the monitoring events will be analyzed for the constituents listed in Appendix D. In addition, for various locations the list of metals is modified to either be the Skinner list of the NM Water Quality Control Commission list or RCRA 8 metals list. Appendix D provides a summary of target analytes for each EPA analytical method.

4.4 Quality Assurance Procedures

Contract analytical laboratories will maintain internal quality assurance programs in accordance with EPA and industry accepted practices and procedures. At a minimum, the laboratories will use a combination of standards, blanks, surrogates, duplicates, matrix spike/matrix spike duplicates (MS/MSD), blank spike/blank spike duplicates (BS/BSD), and laboratory control samples to demonstrate analytical Quality Assurance/Quality Control (QA/QC). The laboratories will establish control limits for individual chemicals or groups of chemicals based on the long-term performance of the test methods. In addition, the laboratories will establish internal QA/QC that meets EPA's laboratory certification requirements. The specific procedures to be completed are identified in the following sections.

4.4.1 Equipment Calibration Procedures and Frequency

The laboratory's equipment calibration procedures, calibration frequency, and calibration standards will be in accordance with the EPA test methodology requirements and documented in the laboratory's quality assurance (QA) and Standard Operating Procedures (SOP) manuals. All instruments and equipment used by the laboratory will be operated, calibrated, and maintained according to the manufacturers' guidelines and recommendations. Operation, calibration, and maintenance will be performed by personnel who have been properly trained in these procedures. A routine schedule and record of instrument calibration and maintenance will be kept on file at the laboratory.

4.4.2 Field QA/QC Samples

Field duplicates and trip blanks may be obtained for quality assurance during sampling activities. The samples will be handled as described in Section 4.4.3.

Trip blanks will accompany laboratory sample bottles and shipping and storage containers intended for VOC analyses. Trip blanks will consist of a sample of analyte free de-ionized water placed in an appropriate sample container. Trip blanks will be analyzed at a frequency of one for each shipping event involving twenty or more samples. Generally, a trip blank will only be placed in one of the containers, if more than one container is used to ship the set of samples.

4.4.3 Laboratory QA/QC Samples

Analytical procedures will be evaluated by analyzing reagent or method blanks, surrogates, MS/MSDs, BS/BSDs and/or laboratory duplicates, as appropriate for each method. The laboratory QA/QC samples and frequency of analysis to be completed will be documented in the cited EPA or other test methodologies. At a minimum, the laboratory will analyze laboratory blanks, MS/MSDs, BS/BSDs and laboratory duplicates at a frequency of one in twenty for all batch runs requiring EPA test methods and a frequency of one in ten for non-EPA test methods. Laboratory batch QA/QC samples will be project specific.

4.4.4 Laboratory Deliverables

The analytical data package will be prepared in accordance with EPA-established Level II analytical support protocol which will include:

- Transmittal letter, including information about the receipt of samples, the testing methodology performed, any deviations from the required procedures, any problems encountered in the analysis of the samples, any data quality exceptions, and any corrective actions taken by the laboratory relative to the quality of the data contained in the report;
- Sample analytical results, including sampling date; date of sample extraction or preparation; date of sample analysis; dilution factors and test method identification; water sample results in consistent units (milligrams per liter or micrograms per liter (µg/L)); and detection limits for undetected analytes. Results will be reported for all field samples, including field duplicates and blanks, submitted for analysis;

- Method blank results, including reporting limits for undetected analytes;
- Surrogate recovery results and corresponding control limits for samples and method blanks (organic analyses only);
- Laboratory duplicate results for inorganic analyses, including relative percent differences and corresponding control limits;
- Sample COC documentation;
- Holding times and conditions;
- Conformance with required analytical protocol(s);
- Instrument calibration;
- Blanks;
- Detection/quantitative limits;
- Recoveries of surrogates and/or matrix spikes (MS/MSDs);
- Variability for duplicate analyses;
- Completeness;
- Data report formats;

Data deliverables provided by the laboratory that include analysis of organic compounds will also include the following:

- A cover letter referencing the procedure used and discussing any analytical problems, deviations, and modifications, including signature from authority representative certifying to the quality and authenticity of data as reported;
- A report of sample collection, extraction, and analysis dates, including sample holding conditions,
- Tabulated results for samples in units as specified, including data qualification in conformance with EPA protocol, and definition of data descriptor codes;
- Final extract volumes (and dilutions required), sample size, wet-to-dry weight ratios, and instrument practical detection/quantitative limit for each analyte,
- Analyte concentrations with reporting units identified, including data qualification and a description of the qualifiers,
- Quantification of analytes in all blank analyses, as well as identification of method blank associated with each sample,
- Recovery assessments and a replicate sample summary, including all surrogate spike recovery data with spike levels/concentrations for each sample and all MS/MSD results (recoveries and spike amounts).

4.4.5 Review of Field and Laboratory QA/QC Data

The sample data, field, and laboratory QA/QC results will be evaluated for acceptability with respect to the data quality objectives (DQOs). Each group of samples will be compared with the DQOs and evaluated using data validation guidelines contained in EPA guidance documents:

Guidance Document for the Assessment of RCRA Environmental Data Quality, National Functional Guidelines for Organic Data Review, and Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, and the most recent version of SW-846, and industry-accepted QA/QC methods and procedures.

The laboratory will notify the Gallup Refinery Project Manager of data quality exceptions within one business day of identifying the data quality exception in order to allow for sample re-analysis, if possible. The Gallup Refinery Project Manager will contact NMED within one business day of receipt of laboratory notification of data quality exceptions in order to discuss the implementations and determine whether the data will still be considered acceptable, or if sample re-analysis or re-sampling is necessary.

4.4.6 Blanks, Field Duplicates, Reporting Limits and Holding Times

4.4.6.1 Blanks

The analytical results of field blanks and field rinsate blanks will be reviewed to evaluate the adequacy of the equipment decontamination procedures and the possibility of cross-contamination caused by decontamination of sampling equipment. The analytical results of trip blanks will be reviewed to evaluate the possibility for contamination resulting from the laboratory-prepared sample containers or the sample transport containers. The analytical results of laboratory blanks will be reviewed to evaluate the possibility of contamination caused by the analytical procedures. If contaminants are detected in field or laboratory blanks, the sample data will be qualified, as appropriate.

4.4.6.2 Field Duplicates

Field duplicates will consist of two samples either split from the same sample device or collected sequentially. Field duplicate ground water samples will be collected at a frequency of one per ten regular samples and will be analyzed for the full set of analyses used for the regular sample collected. At a minimum, one duplicate sample per sampling day must always be obtained.

4.4.6.3 Method Reporting Limits

Method reporting limits for sample analyses will be established at the lowest level practicable for the method and analyte concentrations and will not exceed ground water or surface water cleanup standards and screening levels. Detection limits that exceed established standards or screening levels and are reported as "not detected" will be considered data quality exceptions and an explanation for its acceptability for use will be provided.

4.4.6.4 Holding Times

Per EPA protocol the sampling, extraction, and analysis dates will be reviewed to confirm that extraction and analyses were completed within the recommended holding times. Appropriate data qualifiers will be noted if holding times are exceeded.

4.4.7 Representativeness and Comparability

4.4.7.1 Representativeness

Representativeness is a qualitative parameter related to the degree to which the sample data represent the relevant specific characteristics of the media sampled. Procedures will be implemented to assure representative samples are collected and analyzed, such as repeated measurements of the same parameter at the same location over several distinct sampling events. Any procedures or variations that may affect the collection or analysis of representative samples will be noted and the data will be qualified.

4.4.7.2 Comparability

Comparability is a qualitative parameter related to whether similar sample data can be compared. To assure comparability, analytical results will be reported in appropriate units for comparison with other data (past studies, comparable sites, screening levels, and cleanup standards), and standard collection and analytical procedures will be implemented. Any procedure or variation that may affect comparability will be noted and the data will be qualified.

4.4.8 Laboratory Reporting, Documentation, Data Reduction, and Corrective Action

Upon receipt of each laboratory data package, data will be evaluated against the criteria outlined in the previous sections. Any deviation from the established criteria will be noted and the data will be qualified. A full review and discussion of analytical data QA/QC and all data qualifiers will be submitted as appendices or attachments to the ground water monitoring reports. Data validation procedures for all samples will include checking the following, when appropriate:

- Holding times
- Detection limits
- Field equipment rinsate blanks
- Field blanks
- Field Duplicates
- Trip blanks
- Reagent blanks
- Laboratory duplicates
- Laboratory blanks
- Laboratory matrix spikes
- Laboratory matrix spike duplicates
- Laboratory blank spikes
- Laboratory blank spike duplicates
- Surrogate recoveries

If significant quality assurance problems are encountered, appropriate corrective action will be implemented. All corrective action will be reported and the corrected data will be qualified.

5.0 Monitoring and Sampling Program

The primary objective of ground water monitoring is to provide data which will be used to assess ground water quality at and near the facility. Ground water elevation data will also be collected to evaluate ground water flow conditions. The ground water monitoring program for the facility will consist of sample collection and analysis from a series of monitoring wells, recovery wells, outfalls, and evaporation pond locations.

The monitoring network is divided into two investigation areas (East Side and West Side). The sampling frequency, analyses and target analytes will vary for each investigation area and well/outfall/evaporation pond location. The combined data from these investigation areas will be used to assess ground water quality beneath and immediately down-gradient of the facility, and evaluate local ground water flow conditions.

Samples will not be collected from monitoring wells that have measurable SPH. For wells that are purged dry, samples will be collected if recharge volume is sufficient for sample collection within 24 hours. Wells not sampled due to insufficient recharge will be documented in the field log.

The following sections outline the monitoring program for each investigation area.

5.1 East Side

5.1.1 Sampling Locations

The location of the East Side monitoring and recovery wells are shown in Figure 3. The following wells will be sampled (as described in Appendix D) within the East Side area:

Recovery wells

- RW-1
- RW-2
- RW-5
- RW-6

Monitoring wells

- OW-29
- OW-30
- OW-13
- OW-14
- OW-50
- OW-52

5.2 West Side

5.2.1 Sampling Locations

The locations of wells on the West Side are shown in Figure 3. The following wells, outfalls, and ponds will be sampled (as described in Appendix D, Table 1) within the West Side area. (Note: these outfalls are from one section of the waste water treatment system to another – they do not discharge to any location outside the facility.)

Monitoring wells

- NAPIS 1
- NAPIS 2
- NAPIS 3
- KA-3
- GWM-1
- GWM-2
- GWM-3
- OAPIS-1
- SMW-2
- SMW-4
- MW-1
- MW-2
- MW-4
- MW-5
- OW-1
- OW-10
- OW-11
- OW-12
- BW-1A
- BW-1B
- BW-1C
- BW-2A
- BW-2B
- BW-2C
- BW-3A
- BW-3B
- BW-3C
- PW-2
- PW-3
- PW-4

New Wells

- MKTF-01
- MKTF-02
- MKTF-03
- MKTF-04
- MKTF-05
- MKTF-06
- MKTF-07
- MKTF-08
- MKTF-09
- MKTF-10
- MKTF-11
- MKTF-12
- MKTF-13
- MKTF-14
- MKTF-15
- MKTF-16
- MKTF-17
- MKTF-18

Outfalls

- Influent to EP-2 from STP-1
- Boiler Water Inlet to EP-2

Ponds

- EP-1
- EP-2
- EP-3
- EP-4
- EP-5
- EP-6
- EP-7
- EP-8
- EP-9
- EP-11
- EP-12A
- EP-12B
- Any temporary pond containing liquid Containment

NAPIS secondary containment (Leak Detection Units -LDU)

- East LDU
- West LDU
- Oil Sump LDU

5.3 Monitoring Program Revisions

Upon review of the analytical results from the monitoring events under this Plan, historic facility-wide monitoring data, available soil boring data, and other related information Western Refining will assess the monitoring program presented in this Plan. Revisions to the Plan, as necessary, will then be presented for agency review and approval on an annual basis. These revisions may include, but not be limited to, a reduction or change in monitoring locations, monitoring frequency, and/or target analytes.

5.3.1 Request for Modifications to Sampling Plan

A. Gallup Refinery has added eighteen (18) new monitoring wells to the sampling plan identified as:

- MKTF-01
- MKTF-02
- MKTF-03
- MKTF-04
- MKTF-05
- MKTF-06
- MKTF-07
- MKTF-08
- MKTF-09
- MKTF-10
- MKTF-11
- MKTF-12
- MKTF-13
- MKTF-14
- MKTF-15
- MKTF-16
- MKTF-17
- MKTF-18

These wells will be added to the Facility Wide Ground Water Monitoring Plan (FWGWMP) for 2014. Sampling/inspection frequency will be on a quarterly basis and sampling will be analyzed for VOCs, SVOCs, Water Quality Control Commission (WQCC) metals (total and dissolved), gasoline range organics (GRO), diesel range organics (DRO) extended, and major cations and anions. Sampling will be conducted for four (4) consecutive sampling events in order to establish a base line before Western may propose to modify the sampling frequency. Samples will not be collected from monitoring wells that have a measureable separate phase hydrocarbon (SPH) level.

B. Gallup Refinery proposes the following changes:
OW-1 and OW-10: Change the quarterly analytical sampling analytes to: VOCs, and Major Cations/Anions, Arsenic and Uranium. Annual sampling requirement will not change. Recent installations of wells listed in 5.3.1A above are all up-gradient from these two wells. There are also the boundary wells which are monitored annually.

C. BW-1A, BW-1B, BW-1C, BW-2A, BW-2B, BW-2C, BW-3A, BW-3B, BW-3C: Change to RCRA metals (total and dissolved) and drop SVOCs. Only the analyte bis-2-ethylhexylphthalate was detected (Possible lab contaminant).

D. OW-11: Reduce analyses to only major cations/anions and WQCC Metals (total and dissolved). No detections of VOCs or SVOCs with exception of single hit of bis-2-ethylhexylphthalate (possible lab contaminant).

E. OW-50 and OW-52: Reduce analyses to only VOCs and WQCC metals (total and dissolved).

F. SMW-2: Reduce analyses to only VOCs and WQCC Metals.

G. RW-1, RW-2, RW-5 and RW-6: Remove from annual sampling schedule as these wells are hydrocarbon recovery wells. These wells will continue to be inspected on a quarterly basis.

H. PW-3: Return to 3 year sampling schedule beginning in 2016. No VOCs or SVOCs have been detected since August 2008 to present.

These additions and revisions have been incorporated into Table 1: Ground Water Monitoring Schedule in Appendix D pending approval from NMED and OCD.

Appendix A

Approval with Modifications

Appendix A: Approval with Modifications, dated 9-24-12, from NMED – HWB.

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

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DAVE MARTIN
Secretary

BUTCH TONGATE
Deputy Secretary

JAMES H. DAVIS, Ph.D.
Director
Resource Protection Division

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

September 24, 2012

Mr. Ed Riege
Environmental Superintendent
Western Refining, Southwest Inc., Gallup Refinery
Route 3, Box 7
Gallup, New Mexico 87301

RE: APPROVAL WITH MODIFICATIONS
REQUIREMENT TO RESURVEY GROUNDWATER MONITORING WELLS AND RECOVERY WELLS
WESTERN REFINING COMPANY, SOUTHWEST, INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-WRG-11-003

Dear Mr. Riege:

The New Mexico Environment Department (NMED) has received Western Refining Company, Southwest Inc., Gallup Refinery's (Permittee) submittal titled, *Requirement to Resurvey Ground Water Monitoring Wells and Recovery Wells* (Report), dated June 12, 2012. NMED has reviewed the Report and hereby issues this Approval with the following modifications.

Comment 1

In Comment 3 of NMED's May 18, 2012 Third Notice of Disapproval (NOD), the Permittee was required to verify that all horizontal data from the June 2011 survey was correct and represented the actual locations of the monitoring wells surveyed. The Permittee cross referenced survey data from Sterling & Mataya Engineers collected on May 13, 1991 (May 1991) and data acquired

by Lynn Engineering and Surveying collected on June 21, 2007 (June 2007) to verify the monitoring well locations. Survey data from the May 1991 survey was converted from NAD27 to NAD83; however, the Permittee did not provide conversions for all of the May 1991 survey data. Provide revised coordinate verification worksheets that include all monitoring wells from the May 1991 survey. In addition, there is a typographical error in the reported elevation for the OW-11 monitoring well conversion. The Permittee reports an elevation of 6923.59 feet and the May 1991 reports it as 6923.89 feet. Correct the typographical errors in revised coordinate verification worksheets.

Comment 2

In the *2011 Corrected Well Elevation Summary Table – Revision 3 (June 12, 2012)*, the Permittee did not report a stick-up length measurement for BW-1B in the "2011 Survey Stick-up Length (feet)" column. In addition, the Permittee did not define the asterisk from the OW-1 "2011 Measuring Point Description" column. Define the symbol in the "Notes" section or remove it from the revised data table. The Permittee is reminded that all data tables must be reviewed and corrected for errors prior to submission. Correct the typographical errors and provide a revised data table.

Comment 3

Comments 8 and 11 of NMED's September 24, 2012 Disapproval letter for the *Facility-Wide Ground Water Monitoring Work Plan - 2011 Updates* requires the Permittee to resubmit the tables in Appendix C with the approved survey data in the revised Work Plan. The Permittee must review these tables and ensure the correct information from this Report is incorporated into the final version of the tables in the revised Work Plan.

Western Refining

Ed Riege
September 24, 2012
Page 3 of 3

The Permittee must submit the revised data tables, replacement pages, and response letter with the required information addressing all the comments from this Approval with modifications to NMED by **October 9, 2012**.

If you have questions regarding this letter please contact Leona Tsinnajinnie of my staff at (505) 476-6057.

Sincerely,

John E. Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
K. Van Horn, NMED HWB
L. Tsinnajinnie, NMED HWB
C. Chavez, OCD
T. Larson, Western Refining Company, Gallup Refinery
C. Johnson, Western Refining Company, Gallup Refinery
A. Haines, Western Refining Company, El Paso, Texas

File: Reading File and WRG 2012 File
HWB-WRG-11-003

Appendix B

Gallup Field Sampling Collection and Handling Standard

Appendix B: Gallup Field Sampling Collection and Handling Standard Procedures

Field Data Collection: Elevation and Purging

All facility monitoring wells and recovery wells are gauged as required through the year. Gallup does not have any recovery well pumps that need to be shut off and removed prior to water elevation measurements.

Each monitoring well is field verified with the well number on the well casing or adjacent to the well to ensure that samples are collected at the correct well location. Wells also have a permanent marked reference point on the well casing from which ground water levels and well depths are measured. The portable pump intake is lowered to the midpoint of the listed screened interval for each specific well using the markings identified on the pump hose which are set every ten feet. In wells with dedicated pumps, the pumps have been installed at the midpoint of the screened interval.

All water/product levels are measured to an accuracy of the nearest 0.01 foot using an electrical conductivity based meter, the Heron Instruments 100 ft. DipperT electric water depth tape complying with US GGG-T-106E, EEC Class II. After determining water levels, well volumes are calculated using the appropriate conversion factors for a given well based on its internal diameter. Volume is equal to the height of the liquid column times the internal cross-sectional area of the well.

Generally, at least three well volumes (or a minimum of two if the well has low recharge) are purged from each well prior to sampling. Field water quality parameters measured during purging (pH, electrical conductivity, temperature, and dissolved oxygen), must stabilize to within 10% for a minimum of three consecutive measurements before collection of ground water samples from each well.

Before sample collection can begin, the water collected from each monitoring well must be fresh aquifer water. Well evacuation replaces stagnant well water with fresh aquifer water. The water

level in the well, total depth of well and thickness of floating product (if any) will be measured using the DipperT electric water depth tape. If product is present, a ground water sample is typically not obtained.

If a well is pumped or bailed dry before two or three well volumes can be evacuated, it requires only that sufficient time elapse for an adequate volume of water to accumulate for the sampling event. The first sample will be tested for pH, temperature, specific conductivity and dissolved oxygen (%). The well will be retested for pH, temperature, specific conductivity and dissolved oxygen (%) after sampling as a measure of purging efficiency and as a check on the stability of the water samples over time. All well evacuation information will be recorded in a log book.

Wells MW-1, MW-2, MW-4, MW-5, BW-1C, BW-2A, BW-2B, BW-3B, SMW-4, OW-1, OW-10, OW13, OW14, OW29 and OW30 are each equipped with a dedicated electrical pump. The remaining wells are purged using a portable Grundfos pump. Recovery wells and NAPIS-1, NAPIS-2, NAPIS-3 and KA-3 are hand-bailed as well as GWM1, GWM2, GWM3 and OAPIS-1 is hand-bailed if the presence of water is detected.

Purged well water from wells is collected in fifty-five gallon drums and drained to the process sewer upstream of the NAPIS. The water is treated in the refinery's waste water treatment system.

Sampling Equipment at Gallup

The following sampling equipment is maintained at Gallup and used by the sampling personnel:

- Heron Instruments 100 ft. DipperT electric water depth tape complying with US GGG-T-106E, EEC Class II.
- Pall Corporation Acro 50A 0.45 micron disposable filter used with 60 ml. disposable syringes for filtering water in the field.
- YSI pH/Conductivity meter Model 63, calibrated with a one-point, two-point, or three-point calibration procedure using pH standards of 7, 4 and 10.

- IQ Scientific Instruments, pH/Temperature/Conductivity/ Dissolved Oxygen meter, Model IQ1806LP.
- Grundfos 2-inch pumps with Grundfos 115-volt AC–to-DC converter.

Calibration and maintenance procedures will be performed according to the manufacturer's specifications.

Order of Collection

Samples will be collected in the order listed below:

Parameter	Bottle Type
VOC, SVOC	40 ml VOA vials, (H2SO4)
TOC	1 liter glass jar, H2SO4
Extractable Organics	1 liter glass jar with Teflon™ cap
Metals* Total and Dissolved	500 ml, 125 ml plastic, HNO3
Phenols, Cyanide	1 liter glass jar
Chloride, Sulfate, Nitrates	1 liter plastic, no preservative

* Prefiltration bottle for dissolved metals which is subsequently filtered in the field and transferred to a pint plastic bottle with HNO3 preservative.

Filtration

Ground water samples are filtered prior to dissolve metals analysis. For dissolved metals, sample water is poured into a jar and then extracted with a syringe. The syringe is then used to force the sample water through a 0.45 micron pore filter paper filter into the proper sample bottle to collect dissolved metals samples. Filtration must be performed within two hours of sample collection. Pour the filtrate into a sample bottle containing HNO3 preservative.

For samples destined for total metals analysis, do not filter the sample, and preserve with HNO3 to pH <2 in the field.

Gallup sampling personnel carry a cell phone when gathering ground water and other water samples. While sampling procedures are generally well known and the appropriate sample

bottles are ordered to match each sampling event, occasional questions do arise from unforeseen circumstances which may develop during sampling. At such times, sampling personnel contact Hall Environmental Analytical Laboratory to verify that sampling is correctly performed.

Sample Handling Procedures

At a minimum, the following procedures will be used when collecting samples:

- Neoprene, nitrile, or other protective gloves will be worn when collecting samples. New disposable gloves will be used to collect each sample.
- All samples collected for chemical analysis will be transferred into clean sample containers supplied by the analytical laboratory. The sample container will be clearly marked. Sample container volumes and preservation methods will be in accordance with the most recent standard EPA and industry accepted practices for use by accredited analytical laboratories. Sufficient sample volume will be obtained for the laboratory to complete the method-specific QC analyses on a laboratory-batch basis.
- Sample labels and documentation will be completed for each sample.

Immediately after the samples are collected, they will be stored in a cooler with ice or other appropriate storage method until they are delivered to the analytical laboratory. Standard chain-of-custody procedures, as described in Section 4.2.1 of this Plan, will be followed for all samples collected. All samples will be submitted to the laboratory to allow the laboratory to conduct the analyses within the method holding times.

General Well Sampling Procedures

For safety protection and sampling purity, rubber gloves are worn and changed between each activity.

Prepare for sampling event by making out sample bottle labels and have bottles separated into plastic bags for each well to be sampled and placed in an ice chest ready to take into the field. Bring along a note book and sample log. Document weather conditions, sample date and time. Fill in label with location, date, time, analysis, preservative, and your name. Start sampling by adjusting converter speed for each well. Affix sample label and fill bottle according to lab instructions. For samples intended for VOC analysis, use bottles with septa lids, fill bottle to neck

and add final amount of water with cap to form meniscus. Turn bottles upside down to examine for bubbles, if bubbles are detected in the vial, repeat collection procedure. If no bubbles show, secure lids and pack in bubble wrap and place in cooler until sampling is completed.

Decontaminate equipment that is not dedicated for use in a particular well. Refrigerate completed samples until shipping to lab. Be sure to check holding times and arrange for appropriate shipping method. Be sure that the field effort is adequately staffed and equipped. Check QC requirements before departing—QC samples require additional equipment and supplies.

Surface Water Sample Collection

At the evaporation ponds, samples will be collected as a grab sample at the pond edge near the inlets. This location will be noted in the field notebooks. The sampler will avoid disturbing sediment and gently allow the sample container to fill making sure that undue disturbance does not allow volatile contaminants to be lost. The sample bottle will be used for the sample collection in a shallow location near the bank. If a separate bottle and/or bailer are used to refill the sample container, this will be duly noted in the field log books. The decision to use a separate bottle/bailer will be made, if at all, by the sampler and the reasons for doing so will be noted in the field log book.

Upon arrival at the field site, the sampler will set out safety equipment such as traffic cones and signs (if required). The vehicle will be parked a sufficient distance away so as to prevent sample contamination from emissions. Appropriate sample containers and gloves must be used for the type of analyses to be performed.

Decontamination Procedures

The objective of the decontamination procedures is to minimize the potential for cross-contamination

The majority of field equipment used for ground water sampling will be disposable and, therefore, not require decontamination. In order to prevent cross-contamination, field equipment that comes into contact with water or soil will be decontaminated between each sampling location. The decontamination procedure will consist of washing the equipment with a non-phosphate detergent solution (examples include Fantastik™, Liqui-Nox®), followed by two rinses of distilled water and air dried.

Decontamination water and rinsate will be contained and disposed of the same way as purge water, as described in Section 4.2. Decontamination procedures and the cleaning agents used will be documented in the daily field log.

Field Equipment Calibration Procedures

Field equipment requiring calibration will be calibrated to known standards, in accordance with the manufacturers' recommended schedules and procedures. Calibration checks will be conducted daily and the instruments will be recalibrated if necessary. Calibration measurements will be recorded in the daily field logs.

If field equipment becomes inoperable, its use will be discontinued until the necessary repairs are made. A properly calibrated replacement instrument will be used in the interim. Instrumentation used during sampling events will be recorded in the daily field logs.

Collection and Management of Investigation Derived Waste

Investigation derived waste (IDW) generated during each groundwater sampling event may include purge water, decontamination water, excess sample material, and disposable sampling equipment. All water from all wells generated during sampling and decontamination activities will be temporarily stored in labeled 55-gallon drums until placed in the refinery wastewater treatment system upstream of the API separator. All other solid waste generated during sampling activities (including sampling gloves, tubing, etc) will be disposed of with the Refinery's general municipal waste.

Documentation of Field Activities

Daily field activities, including observations and field procedures, will be recorded using indelible ink on field sampling forms. The original field forms will be maintained at Gallup Refinery. Completed forms will be maintained in a bound and sequentially numbered field file for reference during field activities. The daily record of field activities will include the following information:

- Well ID/ Evaporation pond location/ Outfall
- Date
- Start and finish sampling time
- Field team members, including visitors
- Weather conditions
- Daily activities and times conducted
- Observations
- Record of samples collected with sample designations
- Photo log (if needed)
- Field monitoring data, including health and safety monitoring (if needed)
- Equipment used and calibration records, if appropriate
- List of additional data sheets and maps completed
- An inventory of the waste generated and the method of storage or disposal
- Signature of personnel completing the field record

Sample Custody

All samples collected for analysis will be recorded in the field report or data sheets. Chain-of-custody forms will be completed at the end of each sampling day, prior to the transfer of samples off site, and will accompany the samples during shipment to the laboratory. A signed and dated custody seal will be affixed to the lid of the shipping container. Upon receipt of the samples at the laboratory, the custody seals will be broken, the chain-of-custody form will be signed as received by the laboratory, and the conditions of the samples will be recorded on the form. The original chain-of-custody form will remain with the laboratory. Gallup Refinery will maintain copies of all chain-of-custody forms generated as part of sampling activities. Copies of the chain-of-custody records will be included with all draft and final laboratory reports submitted to NMED and OCD.

Appendix C

Well Data Tables

WELL DATA 2013 ANNUAL/QUARTERLY SAMPLING
DTB/DTW MEASUREMENTS

Date of Installation	Well ID Number	Inspection or Sample Date	Casing Diameter (Inch)	A Ground Level Elevations (ft)	Well Casing Rim Elevations (ft)	Ground Elevation Inside Steel Sleeve (ft)	Stick-up length (ft)	Well Casing Bottom Elevations (ft)	Total Well Depth (ft)	A Depth to SPH (ft)	B SPH Thickness (ft)	C Depth to Water (ft)	D = A-C Ground water Elevation (ft)	= 0.8 B + D Corrected Water Table Elevation	Screened Interval Depth Top to Bottom (ft)	2012 Re-Evaluated Stratigraphic unit in which screen exists	Purge Volume = 3 Well Vol (gal)
11/10/2003	BW-1A	9/3/2013	2.00	6,874.10	6,876.68	6,872.30	2.58	6,839.06	37.62	N/A	N/A	DRY	DRY	N/A	30 - 35	Upper Sand	N/A
10/28/2003	BW-1B	9/3/2013	2.00	6,874.13	6,876.94	6,876.26	2.81	6,809.49	67.45	N/A	N/A	DRY	DRY	N/A	54.6 - 64.6	Chinle/Alluvium Interface	N/A
11/10/2003	BW-1C	9/3/2013	2.00	6,873.95	6,876.78	6,872.28	2.83	6,740.39	136.39	N/A	N/A	6.69	6,867.26	N/A	125 -135	Sonsela	63.37
11/10/2003	BW-2A	9/3/2013	2.00	6,871.88	6,874.69	6,870.45	2.81	6,807.12	67.57	N/A	N/A	32.09	6,839.79	N/A	55 - 65	Upper Sand	17.35
10/28/2003	BW-2B	9/3/2013	2.00	6,871.66	6,874.50	6,870.06	2.84	6,782.24	92.26	N/A	N/A	27.92	6,843.74	N/A	80 - 90	Chinle/Alluvium Interface	45.12
10/28/2003	BW-2C	9/3/2013	2.00	6,872.90	6,875.30	6,872.02	2.40	6,722.46	152.84	N/A	N/A	20.39	6,852.51	N/A	139.5 - 149.5	Sonsela	64.77
6/15/2004	BW-3A	9/3/2013	2.00	6,875.94	6,878.39	6,875.08	2.45	6,826.04	52.35	N/A	N/A	DRY	DRY	N/A	39.5 - 49.5	Upper Sand	N/A
10/15/2003	BW-3B	9/3/2013	2.00	6,876.16	6,878.59	6,875.41	2.43	6,809.19	69.40	N/A	N/A	33.01	6,843.15	N/A	63 - 73	Chinle/Alluvium Interface	17.79
7/20/2004	BW-3C	9/3/2013	2.00	6,875.72	6,877.95	6,875.27	2.23	6,723.40	154.55	N/A	N/A	8.15	6,867.57	N/A	144.5 - 154.5	Sonsela	71.59
9/25/1981	OW-11	9/3/2013	4.00	6,922.05	6,923.51	6,921.80	1.46	6,857.72	65.79	N/A	N/A	20.68	6,901.37	N/A	43 - 65	Sonsela	100.14
12/15/1980	OW-12	9/3/2013	4.00	6,939.57	6,940.69	6,939.04	1.12	6,811.84	128.85	N/A	N/A	47.80	6,891.77	N/A	117.8 - 137.8	Sonsela	179.93
10/14/1981	MW-1	9/3/2013	5.00	6,876.63	6,878.12	6,876.79	1.49	6,747.29	130.83	N/A	N/A	7.13	6,869.50	N/A	117.72 - 127.72	Sonsela	378.52
10/15/1981	MW-2	9/3/2013	5.00	6,878.39	6,880.30	6,878.41	1.91	6,742.82	137.48	N/A	N/A	9.44	6,868.95	N/A	112 - 122	Sonsela	391.8
10/16/1981	MW-4	9/3/2013	5.00	6,879.89	6,881.63	6,879.34	1.74	6,759.91	121.72	N/A	N/A	7.70	6,872.19	N/A	101 - 121	Sonsela	348.9
7/21/1986	MW-5	9/3/2013	4.00	6,880.20	6,882.83	6,881.77	2.63	6,752.00	130.83	N/A	N/A	11.49	6,868.71	N/A	115 - 125	Sonsela	365.18
9/26/1985	SMW-2	9/3/2013	2.00	6,881.63	6,883.97	6,879.07	2.34	6,831.17	52.80	N/A	N/A	25.34	6,856.29	N/A	34.31 - 54.31	Chinle/Alluvium and Upper Sand	13.43
9/25/1985	SMW-4	9/3/2013	2.00	6,877.63	6,879.52	6,875.72	1.89	6,809.84	69.68	N/A	N/A	29.24	6,848.39	N/A	51.7 - 71.7	Chinle/Alluvium Interface	19.78
10/5/2009	OW-50	9/3/2013	2.00	6,912.63	6,914.21	6,911.46	1.58	6,850.21	64.00	N/A	N/A	15.97	6,896.66	N/A	48 - 63	Chinle/Alluvium Interface	23.49
10/5/2009	OW-52	9/3/2013	2.00	6,906.53	6,907.68	6,905.31	1.15	6,829.94	77.74	N/A	N/A	17.02	6,889.51	N/A	64 - 79	Chinle/Alluvium Interface	29.69
1/5/1981	OW-1	3/19/2013	4.00	6,866.32	6,866.62	6,866.44	0.30	6,772.07	94.55	N/A	N/A	1.40	6,864.92	N/A	89.3 - 99.3	Sonsela	177.7
		6/12/2013	4.00	6,866.32	6,866.62	6,866.44	0.30	6,772.07	94.55	N/A	N/A	2.13	6,864.19	N/A	89.3 - 99.3	Sonsela	177.7
		9/3/2013	4.00	6,866.32	6,866.62	6,866.44	0.30	6,772.07	94.55	N/A	N/A	0.92	6,865.40	N/A	89.3 - 99.3	Sonsela	177
		11/11/2013	4.00	6,866.32	6,866.62	6,866.44	0.30	6,772.07	94.55	N/A	N/A	0.00	6,866.32	N/A	89.3 - 99.3	Sonsela	184.37

WELL DATA 2013 ANNUAL/QUARTERLY SAMPLING
DTB/DTW MEASUREMENTS

Date of Installation	Well ID Number	Inspection or Sample Date	Casing Diameter (Inch)	A Ground Level Elevations (ft)	Well Casing Rim Elevations (ft)	Ground Elevation Inside Steel Sleeve (ft)	Stick-up length (ft)	Well Casing Bottom Elevations (ft)	Total Well Depth (ft)	A Depth to SPH (ft)	B SPH Thickness (ft)	C Depth to Water (ft)	D = A-C Ground water Elevation (ft)	= 0.8 B + D Corrected Water Table Elevation	Screened Interval Depth Top to Bottom (ft)	2012 Re-Evaluated Stratigraphic unit in which screen exists	Purge Volume = 3 Well Vol (gal)
11/25/1980	OW-10	3/19/2013	4.00	6,873.67	6,874.91	6,872.59	1.24	6,814.58	60.33	N/A	N/A	3.00	6,870.67	N/A	40 - 60	Sonslea	125.5
		6/13/2013	4.00	6,873.67	6,874.91	6,872.59	1.24	6,814.58	60.33	N/A	N/A	8.00	6,865.67	N/A	40 - 60	Sonsela	116.17
		9/3/2013	4.00	6,873.67	6,874.91	6,872.59	1.24	6,814.58	60.33	N/A	N/A	0.92	6,872.75	N/A	40 - 60	Sonsela	114
		11/11/2013	4.00	6,873.67	6,874.91	6,872.59	1.24	6,814.58	60.33	N/A	N/A	0.00	6,873.67	N/A	40 - 60	Sonsela	133.93
12/10/1980	OW-13	3/19/2013	4.00	6,918.95	6,920.07	6,915.33	1.12	6,820.92	99.15	N/A	N/A	22.54	6,896.41	N/A	78.2 - 98.2	Sonsela	170.07
		6/13/2013	4.00	6,918.95	6,920.07	6,915.33	1.12	6,820.92	99.15	N/A	N/A	22.74	6,896.21	N/A	78.2 - 98.2	Sonsela	169.63
		9/3/2013	4.00	6,918.95	6,920.07	6,915.33	1.12	6,820.92	99.15	N/A	N/A	22.80	6,896.15	N/A	78.2 - 98.2	Sonsela	169.5
		11/11/2013	4.00	6,918.95	6,920.07	6,915.33	1.12	6,820.92	99.15	N/A	N/A	22.38	6,896.57	N/A	78.2 - 98.2	Sonsela	170.43
12/17/1980	OW-14	3/19/2013	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	N/A	N/A	24.79	6,899.76	N/A	35 - 45	Chinle/Alluvium Interface	48.24
		6/13/2013	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	N/A	N/A	24.89	6,899.66	N/A	35 - 45	Chinle/Alluvium Interface	48.02
		9/3/2013	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	N/A	N/A	24.92	6,899.63	N/A	35 - 45	Chinle/Alluvium Interface	47.95
		11/11/2013	4.00	6,924.55	6,926.65	6,924.40	2.10	6,880.13	46.52	N/A	N/A	24.59	6,899.96	N/A	35 - 45	Chinle/Alluvium Interface	48.68
8/23/1996	OW-29	3/19/2013	4.00	6,913.89	6,917.00	6,912.09	3.11	6,865.92	51.08	N/A	N/A	19.52	6,894.37	N/A	37.5 - 47.5	Chinle/Alluvium Interface	70.06
		6/13/2013	4.00	6,913.89	6,917.00	6,912.09	3.11	6,865.92	51.08	N/A	N/A	18.68	6,895.21	N/A	37.5 - 47.5	Chinle/Alluvium Interface	71.93
		9/3/2013	4.00	6,913.89	6,917.00	6,912.09	3.11	6,865.92	51.08	N/A	N/A	19.70	6,894.19	N/A	37.5 - 47.5	Chinle/Alluvium Interface	69.66
		11/11/2013	4.00	6,913.89	6,917.00	6,912.09	3.11	6,865.92	51.08	N/A	N/A	19.30	6,894.59	N/A	37.5 - 47.5	Chinle/Alluvium Interface	70.55
8/28/1996	OW-30	3/19/2013	4.00	6,921.81	6,924.69	6,919.84	2.88	6,874.79	49.90	N/A	N/A	24.00	6,897.81	N/A	37.9 - 47.9	Chinle/Alluvium Interface	57.5
		6/17/2013	4.00	6,921.81	6,924.69	6,919.84	2.88	6,874.79	49.90	N/A	N/A	24.20	6,897.61	N/A	37.9 - 47.9	Chinle/Alluvium Interface	57.05
		9/3/2013	4.00	6,921.81	6,924.69	6,919.84	2.88	6,874.79	49.90	N/A	N/A	24.30	6,897.51	N/A	37.9 - 47.9	Chinle/Alluvium Interface	56.83
		11/11/2013	4.00	6,921.81	6,924.69	6,919.84	2.88	6,874.79	49.90	N/A	N/A	23.90	6,897.91	N/A	37.9 - 47.9	Chinle/Alluvium Interface	57.72
7/8/2004	GWM-1	3/18/2013	2.00	6,910.22	6,912.61	6,908.36	2.39	6,886.41	26.20	N/A	N/A	16.87	6,893.35	N/A	17.5 - 23.5	Chinle/Alluvium Interface	4.56
		6/12/2013	2.00	6,910.22	6,912.61	6,908.36	2.39	6,886.41	26.20	N/A	N/A	17.45	6,892.77	N/A	17.5 - 23.5	Chinle/Alluvium Interface	4.85
		9/3/2013	2.00	6,910.22	6,912.61	6,908.36	2.39	6,886.41	26.20	N/A	N/A	17.88	6,892.34	N/A	17.5 - 23.5	Chinle/Alluvium Interface	4.07
		11/11/2013	2.00	6,910.22	6,912.61	6,908.36	2.39	6,886.41	26.20	N/A	N/A	18.41	6,891.81	N/A	17.5 - 23.5	Chinle/Alluvium Interface	3.81

WELL DATA 2013 ANNUAL/QUARTERLY SAMPLING
DTB/DTW MEASUREMENTS

Date of Installation	Well ID Number	Inspection or Sample Date	Casing Diameter (Inch)	A Ground Level Elevations (ft)	Well Casing Rim Elevations (ft)	Ground Elevation Inside Steel Sleeve (ft)	Stick-up length (ft)	Well Casing Bottom Elevations (ft)	Total Well Depth (ft)	A Depth to SPH (ft)	B SPH Thickness (ft)	C Depth to Water (ft)	D = A-C Ground water Elevation (ft)	= 0.8 B + D Corrected Water Table Elevation	Screened Interval Depth Top to Bottom (ft)	2012 Re-Evaluated Stratigraphic unit in which screen exists	Purge Volume = 3 Well Vol (gal)
9/25/2005	GWM-2	3/18/2013	2.00	6,910.32	6,913.09	6,908.05	2.77	6,894.28	18.81	N/A	N/A	16.77	6,893.55	N/A	3.2 - 16.2	Chinle/Alluvium Interface	1
		6/12/2013	2.00	6,910.32	6,913.09	6,908.05	2.77	6,894.28	18.81	N/A	N/A	17.10	6,893.22	N/A	3.2 - 16.2	Chinle/Alluvium Interface	0.84
		9/3/2013	2.00	6,910.32	6,913.09	6,908.05	2.77	6,894.28	18.81	N/A	N/A	17.88	6,892.44	N/A	3.2 - 16.2	Chinle/Alluvium Interface	0.45
		11/11/2013	2.00	6,910.32	6,913.09	6,908.05	2.77	6,894.28	18.81	N/A	N/A	18.39	6,891.93	N/A	3.2 - 16.2	Chinle/Alluvium Interface	0.21
9/25/2005	GWM-3	3/18/2013	2.00	6,907.35	6,910.25	6,905.48	2.90	6,892.45	17.80	N/A	N/A	DRY	#VALUE!	N/A	3 - 15	Chinle/Alluvium Interface	2.4
		6/12/2013	2.00	6,907.35	6,910.25	6,905.48	2.90	6,892.45	17.80	N/A	N/A	DRY	#VALUE!	N/A	3 - 15	Chinle/Alluvium Interface	0
		9/3/2013	2.00	6,907.35	6,910.25	6,905.48	2.90	6,892.45	17.80	N/A	N/A	DRY	#VALUE!	N/A	3 - 15	Chinle/Alluvium Interface	0
		11/11/2013	2.00	6,907.35	6,910.25	6,905.48	2.90	6,892.45	17.80	N/A	N/A	DRY	#VALUE!	N/A	3 - 15	Chinle/Alluvium Interface	0
3/14/2008	NAPIS-1	3/18/2013	2.00	6,913.62	6,913.86	6,913.56	0.24	6,900.33	13.53	N/A	N/A	7.84	6,905.78	N/A	3.7 - 13.7	Chinle/Alluvium Interface	2.78
		6/12/2013	2.00	6,913.62	6,913.86	6,913.56	0.24	6,900.33	13.53	N/A	N/A	7.88	6,905.74	N/A	3.7 - 13.7	Chinle/Alluvium Interface	2.76
		9/3/2013	2.00	6,913.62	6,913.86	6,913.56	0.24	6,900.33	13.53	N/A	N/A	6.64	6,906.98	N/A	3.7 - 13.7	Chinle/Alluvium Interface	3.37
		11/12/2013	2.00	6,913.62	6,913.86	6,913.56	0.24	6,900.33	13.53	N/A	N/A	6.65	6,906.97	N/A	3.7 - 13.7	Chinle/Alluvium Interface	3.36
3/14/2008	NAPIS-2	3/18/2013	2.00	6,913.40	6,912.65	6,912.54	-0.75	6,899.04	13.61	N/A	N/A	9.19	6,904.21	N/A	4.2 - 14.2	Chinle/Alluvium Interface	2.16
		6/12/2013	2.00	6,913.40	6,912.65	6,912.54	-0.75	6,899.04	13.61	N/A	N/A	9.00	6,904.40	N/A	4.2 - 14.2	Chinle/Alluvium Interface	2.25
		9/3/2013	2.00	6,913.40	6,912.65	6,912.54	-0.75	6,899.04	13.61	N/A	N/A	8.34	6,905.06	N/A	4.2 - 14.2	Chinle/Alluvium Interface	2.58
		11/12/2013	2.00	6,913.40	6,912.65	6,912.54	-0.75	6,899.04	13.61	N/A	N/A	8.20	6,905.20	N/A	4.2 - 14.2	Chinle/Alluvium Interface	2.65
3/14/2008	NAPIS-3	3/18/2013	2.00	6,913.38	6,912.76	6,912.53	-0.62	6,882.34	30.42	N/A	N/A	9.10	6,904.28	N/A	25.4 - 30-4	Chinle/Alluvium Interface	10.43
		6/12/2013	2.00	6,913.38	6,912.76	6,912.53	-0.62	6,882.34	30.42	N/A	N/A	8.64	6,904.74	N/A	25.4 - 30-4	Chinle/Alluvium Interface	10.65
		9/3/2013	2.00	6,913.38	6,912.76	6,912.53	-0.62	6,882.34	30.42	N/A	N/A	8.92	6,904.46	N/A	25.4 - 30-4	Chinle/Alluvium Interface	10.51
		11/12/2013	2.00	6,913.38	6,912.76	6,912.53	-0.62	6,882.34	30.42	N/A	N/A	8.61	6,904.77	N/A	25.4 - 30-4	Chinle/Alluvium Interface	10.67
6/11/2007	KA-3	3/18/2013	2.00	6,913.29	6,912.52	6,912.20	-0.77	6,889.32	23.20	N/A	N/A	9.07	6,904.22	N/A	15 - 25	Chinle/Alluvium Interface	6.91
		6/12/2013	2.00	6,913.29	6,912.52	6,912.20	-0.77	6,889.32	23.20	N/A	N/A	8.88	6,904.41	N/A	15 - 25	Chinle/Alluvium Interface	7
		9/3/2013	2.00	6,913.29	6,912.52	6,912.20	-0.77	6,889.32	23.20	N/A	N/A	8.35	6,904.94	N/A	15 - 25	Chinle/Alluvium Interface	7.26
		11/12/2013	2.00	6,913.29	6,912.52	6,912.20	-0.77	6,889.32	23.20	N/A	N/A	7.91	6,905.38	N/A	15 - 25	Chinle/Alluvium Interface	7.48

WELL DATA 2013 ANNUAL/QUARTERLY SAMPLING
DTB/DTW MEASUREMENTS

Date of Installation	Well ID Number	Inspection or Sample Date	Casing Diameter (Inch)	A Ground Level Elevations (ft)	Well Casing Rim Elevations (ft)	Ground Elevation Inside Steel Sleeve (ft)	Stick-up length (ft)	Well Casing Bottom Elevations (ft)	Total Well Depth (ft)	A Depth to SPH (ft)	B SPH Thickness (ft)	C Depth to Water (ft)	D = A-C Ground water Elevation (ft)	= 0.8 B + D Corrected Water Table Elevation	Screened Interval Depth Top to Bottom (ft)	2012 Re-Evaluated Stratigraphic unit in which screen exists	Purge Volume = 3 Well Vol (gal)
7/17/2012	OAPIS-1	3/18/2013	2.00	6,914.37	6,916.73	6,916.50	2.36	6,888.37	28.30	N/A	N/A	11.18	6,903.19	N/A	16 - 26	Chinle/Alluvium Interface	8.37
		6/12/2013	2.00	6,914.37	6,916.73	6,916.50	2.36	6,888.37	28.30	N/A	N/A	11.50	6,902.87	N/A	17 - 26	Chinle/Alluvium Interface	8.22
		9/3/2013	2.00	6,914.37	6,916.73	6,916.50	2.36	6,888.37	28.30	N/A	N/A	10.69	6,903.68	N/A	18 - 26	Chinle/Alluvium Interface	8.61
		11/11/2013	2.00	6,914.37	6,916.73	6,916.50	2.36	6,888.37	28.30	N/A	N/A	10.90	6,903.47	N/A	19 - 26	Chinle/Alluvium Interface	8.51
3/28/1995	RW-1	3/26/2013	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	29.11	3.49	32.60	6,910.26	6913.052	25 - 40	Chinle/Alluvium Interface	NA
		6/17/2013	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	29.37	3.73	33.10	6,909.76	6912.744	25 - 40	Chinle/Alluvium Interface	19
		9/16/2013	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.75	4.34	33.09	6,909.77	6913.242	25 - 40	Chinle/Alluvium Interface	NA
		11/12/2013	4.00	6,942.86	6,946.06	6,941.25	3.20	6,903.02	43.04	28.73	4.38	33.11	6,909.75	6913.254	25 - 40	Chinle/Alluvium Interface	NA
3/29/1995	RW-2	3/26/2013	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	0.00	0.00	24.74	6,901.66	6901.66	26.1 - 36.1	Chinle/Alluvium Interface	NA
		6/17/2013	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	0.00	0.00	24.80	6,901.60	6901.6	26.1 - 36.1	Chinle/Alluvium Interface	10
		9/16/2013	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	0.00	0.00	24.64	6,901.76	6901.76	26.1 - 36.1	Chinle/Alluvium Interface	NA
		11/12/2013	4.00	6,926.40	6,928.53	6,925.02	2.13	6,888.73	39.80	0.00	0.00	24.66	6,901.74	6901.74	26.1 - 36.1	Chinle/Alluvium Interface	NA
8/27/1997	RW-5	3/26/2013	4.00	6,941.53	6,943.57	6,940.82	2.04	6,903.98	39.59	0.00	0.00	29.45	6,912.08	6912.08	29.5 - 39.5	Chinle/Alluvium Interface	NA
		6/17/2013	4.00	6,941.53	6,943.57	6,940.82	2.04	6,903.98	39.59	0.00	0.00	29.44	6,912.09	6912.09	29.5 - 39.5	Chinle/Alluvium Interface	15
		9/16/2013	4.00	6,941.53	6,943.57	6,940.82	2.04	6,903.98	39.59	0.00	0.00	28.98	6,912.55	6912.55	29.5 - 39.5	Chinle/Alluvium Interface	NA
		11/12/2013	4.00	6,941.53	6,943.57	6,940.82	2.04	6,903.98	39.59	0.00	0.00	28.96	6,912.57	6912.57	29.5 - 39.5	Chinle/Alluvium Interface	NA
8/27/1997	RW-6	3/26/2013	4.00	6,941.96	6,944.01	6,941.49	2.05	6,903.11	40.90	0.00	0.00	29.59	6,912.37	6912.37	28.5 - 38.5	Chinle/Alluvium Interface	NA
		6/17/2013	4.00	6,941.96	6,944.01	6,941.49	2.05	6,903.11	40.90	0.00	0.00	29.52	6,912.44	6912.44	28.5 - 38.5	Chinle/Alluvium Interface	20
		9/16/2013	4.00	6,941.96	6,944.01	6,941.49	2.05	6,903.11	40.90	0.00	0.00	29.13	6,912.83	6912.83	28.5 - 38.5	Chinle/Alluvium Interface	NA
		11/12/2013	4.00	6,941.96	6,944.01	6,941.49	2.05	6,903.11	40.90	0.00	0.00	29.10	6,912.86	6912.86	28.5 - 38.5	Chinle/Alluvium Interface	NA

NOTES:
DTB - Depth to Bottom
DTW - Depth to Water
SPH = Separate Phase Hydrocarbons
Corrected water table elevations are only provided if SPH was detected.

2011 CORRECTED WELL ELEVATION SUMMARY TABLE
Revision 4 - September 26, 2012

Date of Installation	Well ID Number	2011 Survey Measurement date[1]	Previous Casing Diameter (Inch)	2011 Verified Casing Diameter[2] (Inch)	Previous Ground Level Elevation (feet)	2011 Survey Ground Level Elevation[1] (feet)	Previous Well Casing Rim Elevation (feet)	2011 Survey Well Casing Rim Elevation[1] (feet)	2011 Measuring Point Description[1]	Previous Stick-up length[3] (feet)	2011 Survey Stick up Length[4] (feet)	Previous Well Casing Bottom Elevation (feet)	2011 Survey Well Casing Bottom Elevation[5] (feet)	Previous Total Well Depth (feet)	2011 Survey Total Well Depth[6] (feet)	Screened Interval Depth Top to Bottom[7] (feet)	Previous Stratigraphic unit in which screen exists	2012 Re-Evaluated Stratigraphic unit in which screen exists[8]
11/10/2003	BW-1A	6/7/2011	2.00	2.00	6,876.73	6,874.10	6,876.73	6,876.68	North edge PVC casing	4.38	2.58	6,836.73	6,839.06	40.00	37.62	30 - 35	Chinle/Alluvium	Upper Sand
10/28/2003	BW-1B	6/7/2011	2.00	2.00	6,876.91	6874.13[9]	6,876.91	6,876.94	North edge PVC casing	2.39	2.81	6,811.71	6,809.49	67.55	67.45	54.6 - 64.6	Chinle/Alluvium	Chinle/Alluvium Interface
11/10/2003	BW-1C	6/7/2011	2.00	2.00	6,876.75	6,873.95	6,876.75	6,876.78	North edge PVC casing	4.52	2.83	6,719.75	6,740.39	157.00	136.39	125 -135	Sonsela Sandstone	Sonsela
11/10/2003	BW-2A	6/7/2011	2.00	2.00	6,874.72	6,871.88	6,874.72	6,874.69	North edge PVC casing	4.27	2.81	6,809.22	6,807.12	65.50	67.57	55 - 65	Chinle/Alluvium	Upper Sand
10/28/2003	BW-2B	6/7/2011	2.00	2.00	6,874.58	6,871.66	6,874.58	6,874.50	North edge PVC casing	4.50	2.84	6,784.08	6,782.24	90.50	92.26	80 - 90	Sonsela sandstone	Chinle/Alluvium Interface
10/28/2003	BW-2C	6/7/2011	2.00	2.00	6,875.40	6,872.90	6,875.40	6,875.30	North edge PVC casing	2.98	2.40	6,724.40	6,722.46	151.00	152.84	139.5 - 149.5	Sonsela sandstone	Sonsela
6/15/2004	BW-3A	6/7/2011	2.00	2.00	6,878.22	6,875.94	6,878.22	6,878.39	North edge PVC casing	3.00	2.45	6,828.22	6,826.04	52.60	52.35	39.5 - 49.5	Chinle/alluvium	Upper Sand
10/15/2003	BW-3B	6/7/2011	2.00	2.00	6,878.79	6,876.16	6,878.79	6,878.59	North edge PVC casing	3.15	2.43	6,803.79	6,809.19	75.00	69.40	63 - 73	Chinle/alluvium	Chinle/Alluvium Interface
7/20/2004	BW-3C	6/7/2011	2.00	2.00	6,878.08	6,875.72	6,878.08	6,877.95	North edge PVC casing	2.69	2.23	6,723.08	6,723.40	155.00	154.55	144.5 - 154.5	Sonsela sandstone	Sonsela
1/5/1981	OW-1	6/7/2011	4.00	4.00	6,868.00	6,866.32	6,868.45	6866.62[10]	North edge PVC casing	1.92	0.30[10]	6,773.96	6,772.07	94.04	94.55	89.3 - 99.3	Sonsela sandstone	Sonsela
11/25/1980	OW-10	6/7/2011	4.00	4.00	6,872.00	6,873.67	6,875.12	6,874.91	North edge PVC casing	1.59	1.24	6,804.00	6,814.58	68.00	60.33	40 - 60	Chinle/alluvium	Sonsela
9/25/1981	OW-11	6/7/2011	4.00	4.00	6,923.89	6,922.05	6,923.51	6,923.51	North edge PVC casing	2.08	1.46	6,857.27	6,857.72	66.62	65.79	43 - 65	Chinle/alluvium	Sonsela
12/15/1980	OW-12	6/7/2011	4.00	4.00	6,940.43	6,939.57	6,940.43	6,940.69	North edge PVC casing	1.88	1.12	6,795.43	6,811.84	145.00	128.85	117.8 - 137.8	Sonsela sandstone	Sonsela
12/10/1980	OW-13	6/7/2011	4.00	4.00	6,920.12	6,918.95	6,920.12	6,920.07	North edge PVC casing	4.79	1.12	6,820.12	6,820.92	100.00	99.15	78.2 - 98.2	Sonsela sandstone	Sonsela
12/17/1980	OW-14	6/7/2011	4.00	4.00	6,926.64	6,924.55	6,926.64	6,926.65	North edge PVC casing	2.25	2.10	6,881.64	6,880.13	45.00	46.52	35 - 45	Chinle/alluvium	Chinle/Alluvium Interface
8/23/1996	OW-29	6/7/2011	4.00	4.00	6,913.50	6,913.89	6,913.50	6,917.00	North edge PVC casing	3.88	3.11	6,864.50	6,865.92	49.00	51.08	37.5 - 47.5	Chinle/alluvium	Chinle/Alluvium Interface
8/28/1996	OW-30	6/7/2011	4.00	4.00	6,921.60	6,921.81	6,921.60	6,924.69	North edge PVC casing	4.85	2.88	6,873.20	6,874.79	48.40	49.90	37.9 - 47.9	Chinle/alluvium	Chinle/Alluvium Interface
10/5/2009	OW-50	6/7/2011	2.00	2.00	6,914.37	6,912.63	6,914.37	6,914.21	North edge PVC casing	2.71	1.58	6,977.37	6,850.21	63.00	64.00	48 - 63	Chinle/alluvium	Chinle/Alluvium Interface
10/5/2009	OW-52	6/7/2011	2.00	2.00	6,906.26	6,906.53	6,907.68	6,907.68	North edge PVC casing	2.21	1.15	6,985.26	6,829.94	79.00	77.74	64 - 79	Chinle/alluvium	Chinle/Alluvium Interface
10/14/1981	MW-1	6/7/2011	5.00	5.00	6,878.52	6,876.63	6,878.15	6,878.12	North edge PVC casing	1.25	1.49	6,746.50	6,747.29	132.02	130.83	117.72 - 127.72	Chinle/Alluvium	Sonsela
10/15/1981	MW-2	6/7/2011	5.00	5.00	6,878.40	6,878.39	6,880.84	6,880.30	North edge PVC casing	1.88	1.91	6,741.90	6,742.82	138.94	137.48	112 - 122	Chinle/alluvium	Sonsela
10/16/1981	MW-4	6/7/2011	5.00	5.00	6,882.54	6,879.89	6,882.20	6,881.63	North edge PVC casing	2.31	1.74	6,760.40	6,759.91	122.14	121.72	101 - 121	Sonsela sandstone	Sonsela
7/21/1986	MW-5	6/7/2011	4.00	4.00	6,883.32	6,880.20	6,882.93	6,882.83	North edge aluminum casing	2.02	2.63	6,750.30	6,752.00	133.02	130.83	115 - 125	Sonsela sandstone	Sonsela
3/28/1995	RW-1	6/7/2011	4.00	4.00	6,943.50	6,942.86	6,943.50	6,946.06	North edge PVC casing	4.42	3.20	6,900.50	6,903.02	43.00	43.04	25 - 40	Chinle/alluvium	Chinle/Alluvium Interface
3/29/1995	RW-2	6/7/2011	4.00	4.00	6,927.20	6,926.40	6,927.20	6,928.53	North edge PVC casing	3.58	2.13	6,889.20	6,888.73	38.00	39.80	26.1 - 36.1	Chinle/alluvium	Chinle/Alluvium Interface
8/27/1997	RW-5	6/7/2011	4.00	4.00	6,942.50	6,941.53	6,942.50	6,943.57	West Edge PVC Casing (Existing Mark)	2.92	2.04	6,902.50	6,903.98	40.00	39.59	29.5 - 39.5	Chinle/alluvium	Chinle/Alluvium Interface
8/27/1997	RW-6	6/7/2011	4.00	4.00	6942.6[11]	6,941.96	6942.6[11]	6,944.01	North edge PVC casing	2.58	2.05	6,933.80	6,903.11	38.80	40.90	28.5 - 38.5	Chinle/alluvium	Chinle/Alluvium Interface
9/26/1985	SMW-2	6/7/2011	2.00	2.00	6,884.44	6,881.63	6,884.11	6,883.97	North edge aluminum casing	4.54	2.34	6,827.10	6,831.17	57.34	52.80	34.31 - 54.31	Chinle/alluvium	Chinle/Alluvium Interface and Upper Sand
9/25/1985	SMW-4	6/7/2011	2.00	2.00	6,882.54	6,877.63	6,882.73	6,879.52	North edge aluminum casing	3.83	1.89	6,760.40	6,809.84	122.14	69.68	51.7 - 71.7	Chinle/alluvium	Chinle/Alluvium Interface
7/8/2004	GWM-1	6/7/2011	2.00	2.00	6,912.65	6,910.22	6,912.65	6,912.61	North edge PVC casing	3.88	2.39	6,888.95	6,886.41	23.70	26.20	17.5 - 23.5	Chinle/alluvium	Chinle/Alluvium Interface
9/25/2005	GWM-2	6/7/2011	2.00	2.00	6,913.17	6,910.32	6,913.17	6,913.09	North edge PVC casing	4.75	2.77	6,896.97	6,894.28	18.97	18.81	3.2 - 16.2	Chinle/alluvium	Chinle/Alluvium Interface
9/25/2005	GWM-3	6/7/2011	2.00	2.00	6,912.65	6,907.35	6,912.65	6,910.25	North edge PVC casing	4.85	2.90	6,896.15	6,892.45	17.94	17.80	3 - 15	Chinle/alluvium	Chinle/Alluvium Interface

2011 CORRECTED WELL ELEVATION SUMMARY TABLE
Revision 4 - September 26, 2012

Date of Installation	Well ID Number	2011 Survey Measurement date[1]	Previous Casing Diameter (Inch)	2011 Verified Casing Diameter[2] (Inch)	Previous Ground Level Elevation (feet)	2011 Survey Ground Level Elevation[3] (feet)	Previous Well Casing Rim Elevation (feet)	2011 Survey Well Casing Rim Elevation[4] (feet)	2011 Measuring Point Description[1]	Previous Stick-up length[3] (feet)	2011 Survey Stick up Length[4] (feet)	Previous Well Casing Bottom Elevation (feet)	2011 Survey Well Casing Bottom Elevation[5] (feet)	Previous Total Well Depth (feet)	2011 Survey Total Well Depth[6] (feet)	Screened Interval Depth Top to Bottom[7] (feet)	Previous Stratigraphic unit in which screen exists	2012 Re-Evaluated Stratigraphic unit in which screen exists[8]
3/14/2008	NAPIS-1	6/7/2011	2.00	2.00	6,918.43	6,913.62	6,918.43	6,913.86	North edge PVC casing	0.29	0.24	6,904.40	6,900.33	14.00	13.53	3.7 - 13.7	Chinle/alluvium	Chinle/Alluvium Interface
3/14/2008	NAPIS-2	6/7/2011	2.00	2.00	6,917.27	6,913.40	6,917.27	6,912.65	North edge PVC casing	0.10	-0.75	6,902.80	6,899.04	14.50	13.61	4.2 - 14.2	Chinle/alluvium	Chinle/Alluvium Interface
3/14/2008	NAPIS-3	6/7/2011	2.00	2.00	6,917.31	6,913.38	6,917.31	6,912.76	North edge PVC casing	0.29	-0.62	6,886.60	6,882.34	30.70	30.42	25.4 - 30.4	Chinle/alluvium	Chinle/Alluvium Interface
6/11/2007	KA-3	6/7/2011	2.00	2.00	6,917.17	6,913.29	6,917.17	6,912.52	North edge PVC casing	0.17	-0.77	6,892.40	6,889.32	25.00	23.20	15 - 25	Chinle/alluvium	Chinle/Alluvium Interface

NOTES:

1) Surveyed by DePauli Engineering & Surveying, LLC on June 7, 2011 at request of NMED due to discrepancies on well casing and ground level elevations.
2) Field verified using a tape measure by Gallup Refinery field technician.
3) Original measurements were given in inches and converted to feet by dividing by 12.
4) Stick up length is determined by subtracting 2011 Survey Ground Level Elevation from 2011 Survey Well Casing Rim Elevation.
5) 2011 Survey Well Casing Bottom Elevation is determined by subtracting the 2011 Survey Well Casing Rim Elevation from the 2011 Survey Total Well Depth Measurement.
6) Total well depth was determined using a bottom sensing meter, Testwell Water level meter with bottom sensing indicator.
7) Screened interval for each well was verfied to the well boring logs. Settlement may have occurred since installation of well which is why total well depth is higher or equal to the screened interval levels.
8) Stratigraphic interpretation conducted by Peregrine Geoconnect to re-evaluate the named zones they produce water from. Tables were updated to reflect correct stratigraphic zone.
9) BW-1B 2011 Survey Ground Level Elevation is to the lowest concrete pad elevation surrounding the well.
10) OW-1 original stick up length was measured to the top of the pvc casing which is connected to the well shroud with a rubber coupling. 2011 survey measurement was taken to the top segment of pvc casing not connected to the rubber coupling. (Coupling is where elevation is referenced)
11) RW-6 elevation data was originally entered incorrectly as 6972.6 feet. Correct elevation is 6942.6 feet.
12) NAPIS 2, 3 and 4 well shroud is located below ground level therefore values entered in "2011 Survey Stick-Up Length (feet)" indicate a negative value.
13) Previous measurements and elevations are from the Well Data Summary Table from the 2009 Annual Ground Water Monitoring Report.

2014 WELL ELEVATION SUMMARY TABLE

New Wells MKTF-01 through MKTF-18

Date of Installation	Well ID Number	2014 Survey Measurement Date	Casing Diameter (Inch)	Ground Level Elevations (ft)	Well Casing Rim Elevations (ft)	Ground Elevation Inside Steel Sleeve (ft)	Measuring Point Description	Stick-up length (ft)	Well Casing Bottom Elevations (ft)	Total Well Depth (ft)	Screened Interval Depth Top to Bottom (ft)	Stratigraphic unit in which screen exists
11/14/2013	MKTF-01	1/21/2014	4.00	6,918.28	6,920.67	6,920.67	North edge PVC Casing	2.39	6,902.28	16.00	5 - 15	Chinle/Alluvium Interface
11/14/2013	MKTF-02	1/21/2014	4.00	6,915.00	6,917.45	6,917.18	North edge PVC Casing	2.45	6,926.79	19.00	7 - 17	Chinle/Alluvium Interface
11/7/2013	MKTF-03	1/21/2014	4.00	6,931.73	6,931.69	6,930.85	North edge PVC Casing	-0.04	6,912.73	19.00	3 - 18	Chinle/Alluvium Interface
11/12/2013	MKTF-04	1/21/2014	4.00	6,933.90	6,933.57	6,933.24	North edge PVC Casing	-0.33	6,909.90	24.00	10 - 22	Chinle/Alluvium Interface
11/20/2013	MKTF-05	1/21/2014	4.00	6,939.49	6,942.22	6,941.95	North edge PVC Casing	2.73	6,924.49	15.00	4 - 14	Chinle/Alluvium Interface
11/11/2013	MKTF-06	1/21/2014	4.00	6,944.24	6,946.81	6,946.63	North edge PVC Casing	2.57	6,923.24	21.00	8 - 20	Chinle/Alluvium Interface
11/11/2013	MKTF-07	1/21/2014	4.00	6,944.40	6,947.18	6,947.06	North edge PVC Casing	2.78	6,929.40	15.00	4 - 14	Chinle/Alluvium Interface
11/11/2013	MKTF-08	1/21/2014	4.00	6,944.02	6,947.09	6,942.67	North edge PVC Casing	3.07	6,922.67	20.00	8 - 18	Chinle/Alluvium Interface
11/11/2013	MKTF-09	1/21/2014	4.00	6,943.57	6,946.50	6,945.90	North edge PVC Casing	2.93	6,921.57	22.00	7 - 19	Chinle/Alluvium Interface
10/31/2013	MKTF-10	1/21/2014	4.00	6,937.51	6,937.16	6,936.63	North edge PVC Casing	-0.35	6,919.51	18.00	7 - 17	Chinle/Alluvium Interface
10/31/2013	MKTF-11	1/21/2014	4.00	6,931.61	6,931.34	6,930.86	South edge PVC Casing	-0.27	6,912.61	19.00	8 - 18	Chinle/Alluvium Interface
11/7/2013	MKTF-12	1/21/2014	4.00	6,939.70	6,942.11	6,941.88	North edge PVC Casing	2.41	6,916.70	23.00	12 - 22	Chinle/Alluvium Interface
11/12/2013	MKTF-13	1/21/2014	4.00	6,933.67	6,935.18	6,934.83	North edge PVC Casing	1.51	6,913.67	20.00	8 - 18	Chinle/Alluvium Interface
11/12/2013	MKTF-14	1/21/2014	4.00	6,925.65	6,928.02	6,927.80	North edge PVC Casing	2.37	6,910.65	15.00	4 - 14	Chinle/Alluvium Interface
10/29/2013	MKTF-15	1/21/2014	2.00	6,943.74	6,943.48	6,943.19	North edge PVC Casing	-0.26	6,921.74	22.00	9 - 19	Chinle/Alluvium Interface
11/7/2013	MKTF-16	1/21/2014	2.00	6,951.00	6,950.58	6,950.58	North edge PVC Casing	-0.42	6,935.00	16.00	4 - 14	Chinle/Alluvium Interface
11/14/2013	MKTF-17	1/21/2014	2.00	6,945.79	6,945.76	6,945.64	North edge PVC Casing	-0.03	6,920.79	25.00	14 - 24	Chinle/Alluvium Interface
11/14/2013	MKTF-18	1/13/2014	2.00	6,950.97	6,950.65	6,950.17	North edge PVC Casing	-0.32	6,923.97	27.00	17 - 27	Chinle/Alluvium Interface

2011 WELL ELEVATION SUMMARY TABLE FOR ARTESIAN WATER WELLS
Revision #2 - March 21, 2012

Date of Installation	Well ID Number	Submersible pump depth (feet)	Casing Diameter (Inch)	Well Head Elevation Mark* (North) (feet)	Well Head Elevation Mark* (West) (feet)	Well Head Elevation Mark* (Z) (feet)	Measuring Point Description	Total Well Depth (feet)	Well Casing Bottom Elevation[1] (feet)	Stratigraphic unit	Aquifer
9/24/1956	PW-2	800	16.0	3,300.40	4,694.28	162.78	1st Discharge tee or elbow	1,075.00	2,225.40	Chinle	San Andreas/Yeso Aquifer
April 1979	PW-3	900	14.0	2,932.83	1,387.79	248.00	1st Discharge tee or elbow	1,030.00	1,902.83	Chinle	San Andreas/Yeso Aquifer
11/12/1999	PW-4	750	12.0[2]	1,895.73	2,979.78	178.51	1st Discharge tee or elbow	1,020.00[3]	819.73	Chinle	San Andreas/Yeso Aquifer

NOTES:

* Basis of survey Refinery Control Point at 1000W, 2575N, plant elevation = 254.87 feet and MSL elevation = 6959.41 feet.

1) Well casing bottom elevation using Well Head Elevation Mark (North) as reference point.
2) Actual well casing diameter is 12 inches. The 176 feet of 24 inch steel casing is the actual cemented support for development of the well.
3) The actual total well depth is 1020 feet with additional 56 feet x 7-7/8 inch diameter open exploratory hole which was accounted for as total well depth of 1076 feet.

At the time of the survey by DePauli Engineering the artesian wells were not included as these wells have never been listed on the summary table or had questionable elevations. These wells are sampled every three years and are not required to be gauged when sampling. A copy of an original survey dated February 13, 2003 conducted by DePauli Engineering is attached for reference.

Western Refining

Appendix D

2014 Ground Water Monitoring Schedule

Appendix D

Table 1: Gallup Refinery - 2014 Proposed Ground Water Monitoring Schedule

Sampling Location ID	Sampling Frequency	Collect GW Elevation, DTW, DTP	Water Quality Parameters	Analytical Suite
NAPI Secondary Containment (3 units)	Q	NA	NA	BTEX+MTBE, GRO/DRO extended, WQCC Metals or check for fluids
RW-1[7]	Q - Inspection	X	NA	Measure DTW, DTP (Hydrocarbon recovery)
RW-2[7]	Q - Inspection	X	NA	Measure DTW, DTP (Hydrocarbon recovery)
RW-5[7]	Q - Inspection	X	NA	Measure DTW, DTP (Hydrocarbon recovery)
RW-6[7]	Q - Inspection	X	NA	Measure DTW, DTP (Hydrocarbon recovery)
OW-1[1]	Q	X	pH , EC, DO, ORP, Temp, TDS	Visual check for artesian flow conditions and sample for major cations, major anions, VOC, Arsenic, Uranium
OW-10[1]	Q	X	pH , EC, DO, ORP, Temp, TDS	Water level measurement of the Sonsela Aquifer water table. Major cations/anions, VOC, Arsenic, Uranium.
OW-13	Q	X	pH , EC, DO, ORP, Temp, TDS	VOC, WQCC Metals
OW-14	Q	X	pH , EC, DO, ORP, Temp, TDS	VOC, WQCC Metals
OW-29	Q	X	pH , EC, DO, ORP, Temp, TDS	VOC, WQCC Metals
OW-30	Q	X	pH , EC, DO, ORP, Temp, TDS	VOC, WQCC Metals
GWM-1	Q	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, GRO/DRO extended, WQCC Metals
GWM-2[2]	Q	X	NA	Check for Water - if water is detected report to OCD & NMED within 24 hours. Sample for VOC, GRO/DRO extended, major cations/anions.
GWM-3[2]	Q	X	NA	Check for Water - if water is detected report to OCD & NMED within 24 hours. Sample for VOC, GRO/DRO extended, major cations/anions.
NAPIS-1 (a)	Q	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, BTEX+MTBE, SVOC, GRO/DRO EXTENDED. WQCC Metals
NAPIS-2 (a)	Q	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, BTEX+MTBE, SVOC, GRO/DRO EXTENDED. WQCC Metals
NAPIS-3 (a)	Q	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, BTEX+MTBE, SVOC, GRO/DRO EXTENDED. WQCC Metals
KA- 3(a)	Q	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, BTEX+MTBE, SVOC, GRO/DRO EXTENDED. WQCC Metals
OAPIS-1	Q	X	pH , EC, DO, ORP, Temp, TDS	VOC, SVOC, GRO/DRO EXTENDED, WQCC Metals, Major cations/anions
MKTF-01 thru MKTF-18[9]	Q	X	NA	VOC, SVOC, WQCC Metals, GRO/DRO extended, Major cations/anions. Ground water samples will not be collected if SPH is present in any of these wells.
Boiler Water & Cooling Tower Blow down inlet to EP-2	Semi Annual (SA)		pH , EC, DO, ORP, Temp, TDS	Major Cations/Anions
Pond 1(b)	SA		pH , EC, DO, ORP, Temp, TDS	General Chemistry, VOC, SVOC, BOD, COD, E-Coli Bacteria, WQCC Metals
Evaporation Pond 2(b)	SA		pH , EC, DO, ORP, Temp, TDS	Same as Pond 1
Evaporation Pond 3(b)	SA		pH , EC, DO, ORP, Temp, TDS	Same as Pond 1
Evaporation Pond 4(b)	SA		pH , EC, DO, ORP, Temp, TDS	Same as Pond 1

Appendix D

Sampling Location ID	Sampling Frequency	Collect GW Elevation, DTW, DTP	Water Quality Parameters	Analytical Suite
Evaporation Pond 5 (b)	SA		pH , EC, DO, ORP, Temp, TDS	Same as Pond 1
Evaporation Pond 6(b)	SA		pH , EC, DO, ORP, Temp, TDS	Same as Pond 1
Evaporation Pond 7(b)	SA		pH , EC, DO, ORP, Temp, TDS	Same as Pond 1
Evaporation Pond 8(b)	SA		pH , EC, DO, ORP, Temp, TDS	Same as Pond 1
Evaporation Pond 9(b)	SA		pH , EC, DO, ORP, Temp, TDS	Same as Pond 1
Evaporation Pond 11(b)	SA		pH , EC, DO, ORP, Temp, TDS	Same as Pond 1
Evaporation Pond 12a(b)	SA		pH , EC, DO, ORP, Temp, TDS	Same as Pond 1
Evaporation Pond 12b(b)	SA		pH , EC, DO, ORP, Temp, TDS	Same as Pond 1
Any temporary Pond containing fluid	SA		pH , EC, DO, ORP, Temp, TDS	Same as Pond 1
BW-1A[3]	Annual (A)	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, RCRA Metals
BW-2A[3]	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, RCRA Metals
BW-3A[3]	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, RCRA Metals
BW-2A[3]	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, RCRA Metals
W-2B[3]	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, RCRA Metals
BW-2C[3]	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, RCRA Metals
BW-3A[3]	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, RCRA Metals
BW-3B[3]	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, RCRA Metals
BW-3C[3]	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, RCRA Metals
Pond 2 Inlet[4]	A		NA	VOC, GRO/DRO extended, BOD, COD, TDS
MW-1	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, GRO/DRO extended, WQCC Metals, Cyanide
MW-2	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, GRO/DRO extended, WQCC Metals, Cyanide
MW-4	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, GRO/DRO extended, WQCC Metals, Cyanide
MW-5	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, GRO/DRO extended, WQCC Metals, Cyanide
OW-11[5]	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, WQCC Metals
OW-12 (a)	A	X	pH , EC, DO, ORP, Temp, TDS	VOC, WQCC Metals
OW-50[6]	A	X	pH , EC, DO, ORP, Temp, TDS	VOC, WQCC Metals

Appendix D

Sampling Location ID	Sampling Frequency	Collect GW Elevation, DTW, DTP	Water Quality Parameters	Analytical Suite
OW-52[6]	A	X	pH , EC, DO, ORP, Temp, TDS	VOC, WQCC Metals
SMW-2[6]	A	X	pH , EC, DO, ORP, Temp, TDS	VOC, WQCC Metals
SMW-4	A	X	pH , EC, DO, ORP, Temp, TDS	Major cations/anions, VOC, GRO/DRO extended, WQCC Metals, Cyanide
All wells including the recovery wells containing separate phase hydrocarbons.[7]	Annual Event			Major Cations/Anions, VOC, SVOC, WQCC 20.6.2.3103 Constituents.
PW-3[8]	Annual beginning in 2009	X	pH , EC, DO, ORP, Temp, TDS	VOC, SVOC, WQCC Metals, Cyanide, Nitrates
PW-2	Every 3 years. Starting in 2008	X	pH , EC, DO, ORP, Temp, TDS	VOC, SVOC, WQCC Metals, Cyanide, Nitrates
PW-4	Every 3 years. Starting in 2007	X	pH , EC, DO, ORP, Temp, TDS	VOC, SVOC, WQCC Metals, Cyanide, Nitrates

NOTES:

a) NAPIS 1, NAPIS 2, NAPIS 3: Detection of product during quarterly monitoring must comply with Section II.F.2 (twenty-four hour reporting) of NMED Post-Closure Care Permit

b) Sample using the State of New Mexico approved analytical methods as required by 20.6.4.14 NMAC, as amended through February 16, 2006 (use methods 9221-E and 9221-F, until EPA approves 40 CFR 136 methods. (Colilert, Colilert - 18, m-Coliblue24, membrane filter method)). Parameters are subject to change. Evaporation Pond samples must be collected at the inlet where waste water flows into the evaporation ponds.

REQUESTED CHANGES TO SAMPLING PLAN:

1) Change quarterly sampling to VOC, Major Cations/Anions, Arsenic and Uranium. Annual sampling requirements will remain same.
2) Changed BTEX+MTBE analysis to 8260B+MTBE (Pending approval)
3) Change to RCRA Metals, and drop SVOCs.
4) Pond 2 Inlet - stream is now coming from STP-1 and not from Evoporation Pond 1.
5) Reduce to Major Cations/Anions, WQCC Metals.
6) Reduce to VOC and WQCC Metals.
7) Remove from annual sampling event any wells that have separate phase hydrocarbons.
8) Return to 3 year sampling schedule beginning 2016.
9) New wells installed to be added to sampling schedule.

DEFINITIONS:

Pond 2 Inlet - Sample collected at the inlet to Evaporation Pond 2 from STP-1

NAPIS 1 = (KA-1R); NAPIS-2 = (KA-2R), NAPIS-3 = KA-3R) - monitor wells positioned around NAPIS to detect leakage

DO- Dissolved Oxygen; ORP - Oxygen Reduction Potential; Temp - Temperature; EC - Electrical or Specific Conductivity

TDS - Total Dissolved Solids; VOC - Volatile Organic Compounds-EPA Method 8260, must include MTBE

SVOC - Semi-Volatile Organic Compounds - EPA Method 8270, must include phenol

DRO - Diesel Range Organics - EPA Method 8015B (or as modified); GRO - Gasoline Range Organics - EPA Method 8015B (or as modified)

BTEX - Benzene, Toluene, Ethylbenzene, Xylene, plus Methyl Tert-Butyl Ether (MTBE) - EPA Method 8021+MTBE

General Chemistry - pH, specific conductance, cations, Anions

DTW - Depth to Water; DTP - Depth to Product; EP - Evaporation Pond; BW - Boundary Wells

GWM wells - located around the aeration lagoons to detect leakage

1W - Monitor Well; OW - Observation Well; RW - Recovery Well; PW - Raw Water Production Well

WQCC metals include the RCRA 8 metals, must be analyzed as totals and dissolved

NA - Not Applicable

APPENDIX D

Table 1: Gallup Refinery - Ground Water Monitoring Schedule

CHANGES FOR 2013 - Pending Approval

A) GWM-2 and GWM-3: Requested changing BTEX+MTBE analysis to 8260B+MTBE (Pending approval).

The following sampling locations has been deleted from the Monitoring Schedule as this was routed into the Waste Water Treatment Plant

Sampling Location ID	Sampling Frequency	Collect GW Elevation, DTW, DTP	Water Quality Parameters	Analytical Suite
Pilot Effluent	Quarterly (Q)			VOC/DRO extended/GRO/WQCC Metals/BOD/COD

Appendix E

New Wells MKTF-01 through MKTF-18
Drilling Logs, Survey Report
and Hall Laboratory Analysis

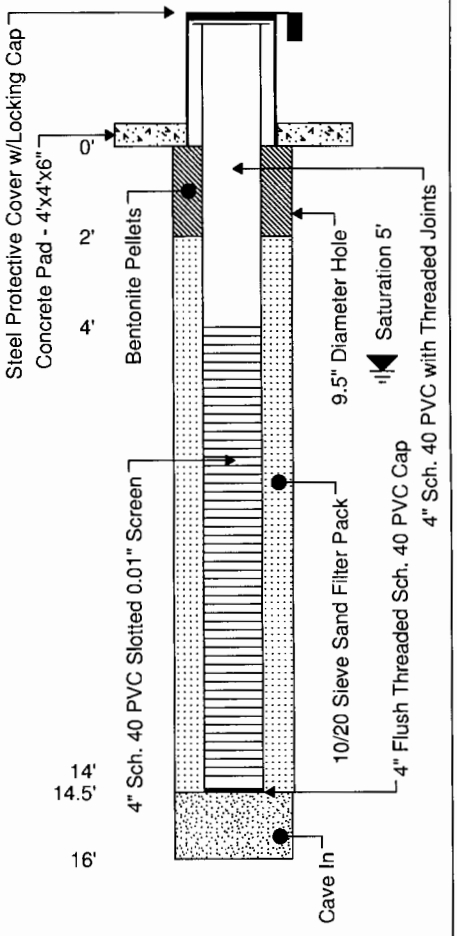
WELL INSTALLATION

Well No.: MKTF-01
Start Date: 11/14/2013
Finish Date: 11/14/2013

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.346' W 108°25.782'; Boring ID - HA1

Total Depth: 16' bgl
Ground Water: Saturated @ 5' bgl
Elev., TOC (ft. msl): 6920.67
Elev., PAD (ft. msl): 6918.28
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,864.41 **E** 2,545,561.73

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
					Ground Surface
1				100	**Silty Clay (CL)** Low plasticity, soft, damp, reddish brown to brown, no odor
5		▼ 5'		100	**Silty Clay/Clayey Silt (CL/ML)** Low plasticity, very soft, moist to saturated, brown grading to black, gravelly, bio odor, no phase-separated hydrocarbon
					Total Depth = 16' BGL



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WELL INSTALLATION

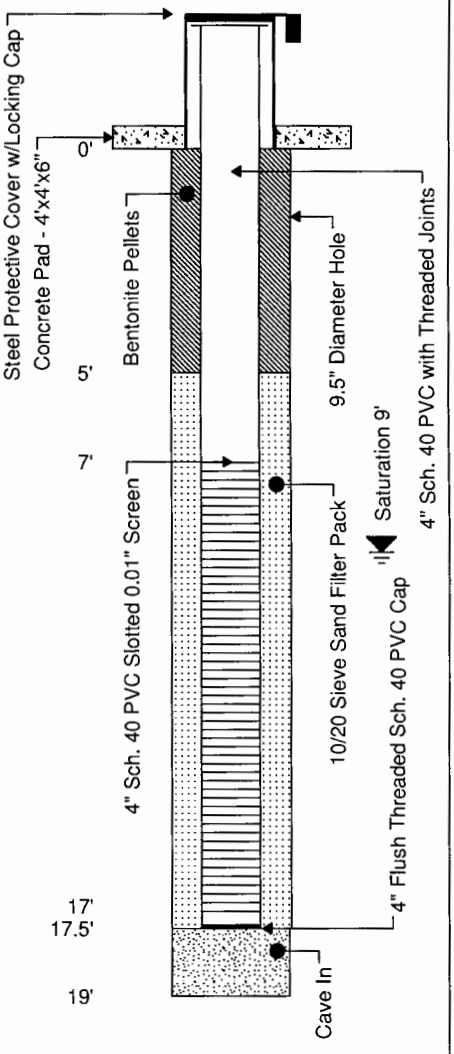
Well No.: MKTF-02
Start Date: 11/14/2013
Finish Date: 11/14/2013

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.360' W 108°25.789'; Boring ID HA3

Total Depth: 19' bgl
Ground Water: Saturated @ 9' bgl
Elev., TOC (ft. msl): 6917.45
Elev., PAD (ft. msl): 6915.00
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,946.93 **E** 2,545,530.46

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
-3					
-1					Ground Surface
1					**Silty Clay (CL)** Low plasticity, firm, damp, brown-reddish brown, no odor
3	24.6			100	
5	20.1				**Silty Clay (CL)** Similar to above, odor at 6' bgl with black discoloration
7	400			100	
	933	9'		100	**Sandy Clay (CL)** Low plasticity, soft, moist to saturated at 9' bgl, hydrocarbon odor, no phase-separated hydrocarbon
9	800				**Sandy Clay/Clayey Sand (SC/CL)** Fine grain, compact, saturated, dark brown, hydrocarbon odor, no phase-separated hydrocarbon
11					
13					
15				100	
17					
19					Total Depth = 19' BGL

Completion Results



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Sheet: **1 of 1**

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WELL INSTALLATION

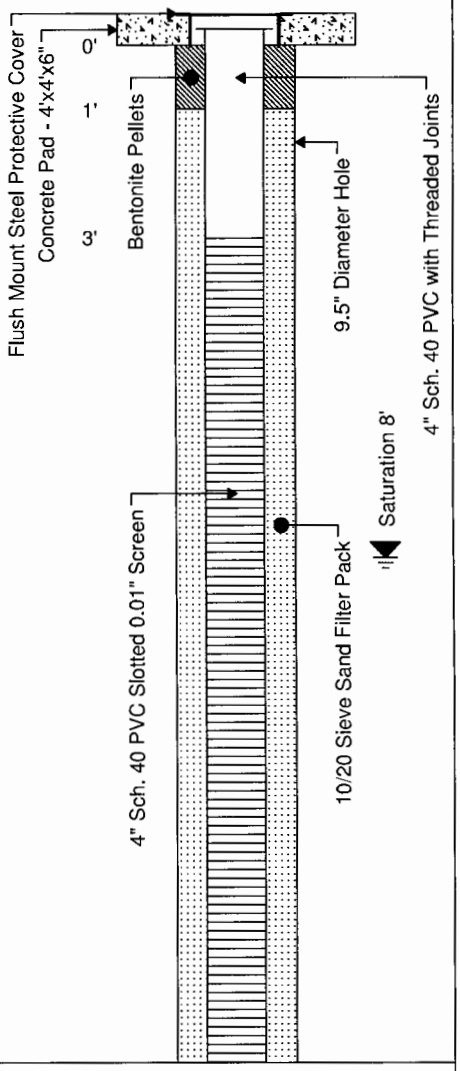
Well No.: MKTF-03
Start Date: 11/7/2013
Finish Date: 11/7/2013

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.328' W108°25.743'; Boring ID - SB01

Total Depth: 19' bgl
Ground Water: Saturated @ 8' bgl
Elev., TOC (ft. msl): 6931.31
Elev., PAD (ft. msl): 6931.73
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,746.53 **E** 2,545,756.87

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
-1					Ground Surface
1	164			60	**Fill (Silt/Sand)** Fine grain, loose, dry to damp, brown, no odor
3	423			40	**Silty Clay (CL)** Low plasticity, firm, damp, brown/reddish brown, no odor
5	330			70	**Silty Clay (CL)** Similar to above, no odor
7	75	8'		90	**Silty Clay (CL)** Similar to above, sandy at base from 7.75-8.0' bgl, no odor
9	326			90	**Silty Clay (CL)** Fine grain sand seams throughout, saturated, phase-separated hydrocarbon, hydrocarbon odor, clear phase-separated hydrocarbon poured out of split spoon
11	312			90	**Silty Clay (CL)** Similar to above with sand seams, saturated with phase-separated hydrocarbon, hydrocarbon odor, dark brown
13	368			80	**Gravelly Sand (SW)** Fine to medium to coarse grain, loose, saturated with phase-separated hydrocarbon, black, hydrocarbon odor
15	700			60	**Gravelly Sand (SW)** Similar to above

Completion Results



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WELL INSTALLATION

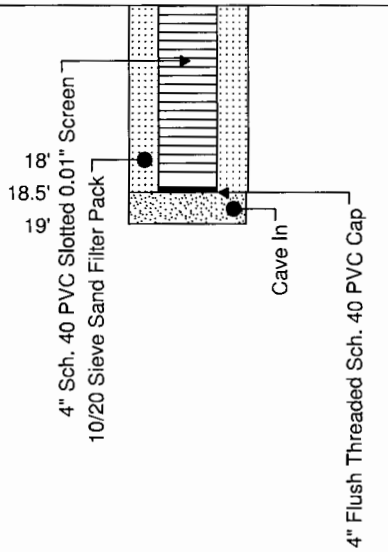
Well No.: MKTF-03
Start Date: 11/7/2013
Finish Date: 11/7/2013

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.328' W108°25.743'; Boring ID - SB01

Total Depth: 19' bgl
Ground Water: Saturated @ 8' bgl
Elev., TOC (ft. msl): 6931.31
Elev., PAD (ft. msl): 6931.73
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,746.53 **E** 2,545,756.87

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
17				10	**Silty Sand/Silty Clay (SM/CL)** Low plasticity, firm, moist, brown, faint odor, no phase-separated hydrocarbon
					Silty Clay (CL) Poor recovery
				80	**Clay (CH)** High plasticity, very dense, damp, light reddish brown, faint odor
19	225				Total Depth = 19' BGL
21					
23					
25					
27					
29					
31					

Completion Results



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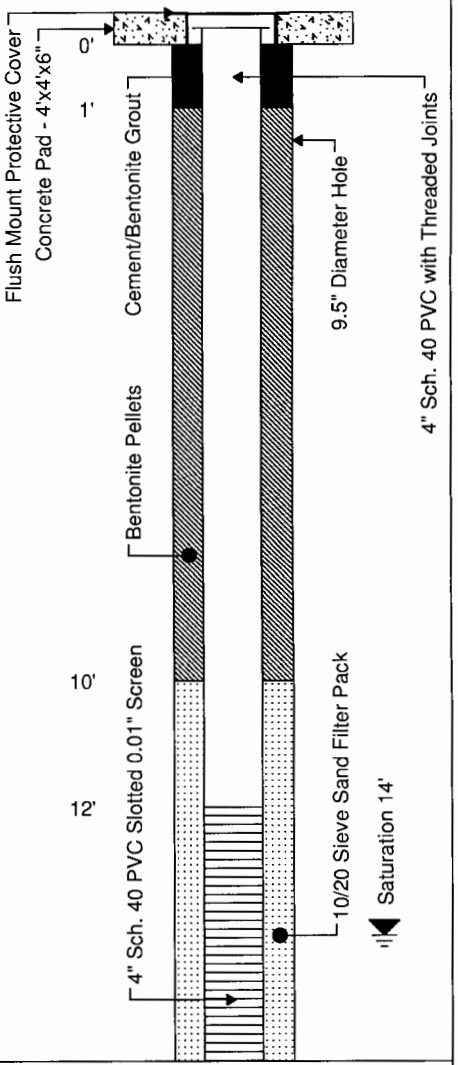
WELL INSTALLATION

Well No.: MKTF-04
Start Date: 11/12/2013
Finish Date: 11/12/2013

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.310' W 108°25.742'; Boring ID SB03

Total Depth: 24' bgl
Ground Water: Saturated @ 14' bgl
Elev., TOC (ft. msl): 6933.57
Elev., PAD (ft. msl): 6933.90
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,649.46 **E** 2,545,752.83

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
0					Ground Surface
1	10.2			90	**Fill (Silt/Gravel)** Low plasticity, very dense, dry, light brown, no odor
3	11.7			80	**Fill (Silt/Gravel)** Similar to above, black, dense at base, no odor
5	16			90	**Silty Clay (CL)** Low plasticity, stiff, damp, reddish brown, no odor, calcareous
7	26			90	**Gravelly Sandy Clay (CL)** Low plasticity, loose to firm, damp, brown, no odor
9	708			70	**Silty Clay (CL)** Low plasticity, very soft, damp, reddish brown, hydrocarbon odor
11	369			80	**Clay (CH)** High plasticity, firm, damp, reddish brown, hydrocarbon odor
13	660	14'		90	**Sandy Clay/Clayey Sand (SC/CL)** Low plasticity, fine grain, soft, damp, reddish brown, hydrocarbon odor
15	85			90	**Sandy Clay (SC)** Similar to above, saturated sand seams, hydrocarbon odor, brown



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WELL INSTALLATION

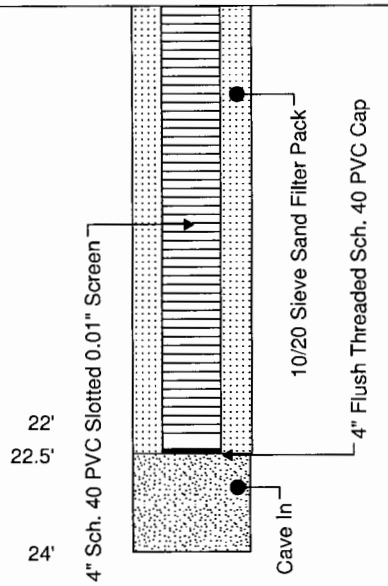
Well No.: MKTF-04
Start Date: 11/12/2013
Finish Date: 11/12/2013

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.310' W 108°25.742'; Boring ID SB03

Total Depth: 24' bgl
Ground Water: Saturated @ 14' bgl
Elev., TOC (ft. msl): 6933.57
Elev., PAD (ft. msl): 6933.90
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,649.46 **E** 2,545,752.83

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
17	64			70	**Sandy Clay (SC)** Similar to above, moist to saturated, hydrocarbon odor, brown
19	33				**Sandy Clay (SC)** Low plasticity, fine grain, soft, moist to saturated, light reddish brown, hydrocarbon odor, gravelly at base
21				90	**Silty Clay (CL)** Low plasticity, stiff, damp, light reddish brown grading to yellowish/greenish gray, becomes more silty at base
23					Total Depth = 24' BGL
25					
27					
29					
31					

Completion Results



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512/347-8243

WELL INSTALLATION

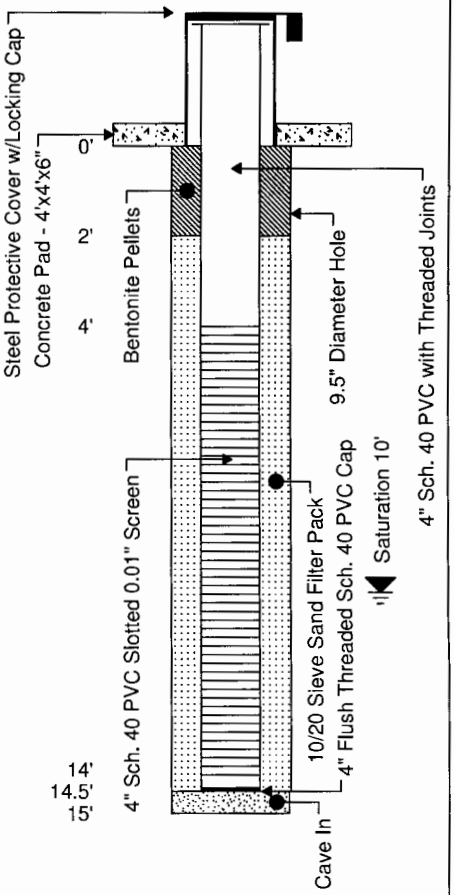
Well No.: MKTF-05
Start Date: 11/12/2013
Finish Date: 11/12/2013

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon

Total Depth: 15' bgl
Ground Water: Saturated @ 10' bgl
Elev., TOC (ft. msl): 6942.22
Elev., PAD (ft. msl): 6939.49
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,472.30 **E** 2,545,769.95

Comments: N 35°29.282' W 108°25.739'; Boring ID - SB06

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
					Ground Surface
1	52.6			60	**Fill (Silty Clay/Gravel)** Low plasticity, firm, damp, brown, faint odor
3	180			100	**Silty Clay (CL)** Low plasticity, firm, damp, reddish brown, odor, calcareous
5	224			90	**Sandy Clay/Clayey Sand (CL/SC)** Low plasticity, fine grain, damp, dark brown, hydrocarbon odor, sand seams present
7	1202			90	**Sandy Clay/Clayey Sand (CL)** Similar to above
9	1228	10'		90	**Sandy Silty Clay (CL)** Low plasticity, soft, damp, dark brown, hydrocarbon odor
11	1525			90	**Sandy Clay (CL)** Similar to above, with moist to saturated sand seams, hydrocarbon odor
13	377			90	**Clayey Sand (SC)** Fine grain, loose to compact, saturated, hydrocarbon odor, dark brown
15					**Sandy Clay (CL)** Low plasticity, soft to firm, moist, dark brown, hydrocarbon odor
					Total Depth = 15' BGL



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512/347-7588
512/347-8243

WELL INSTALLATION

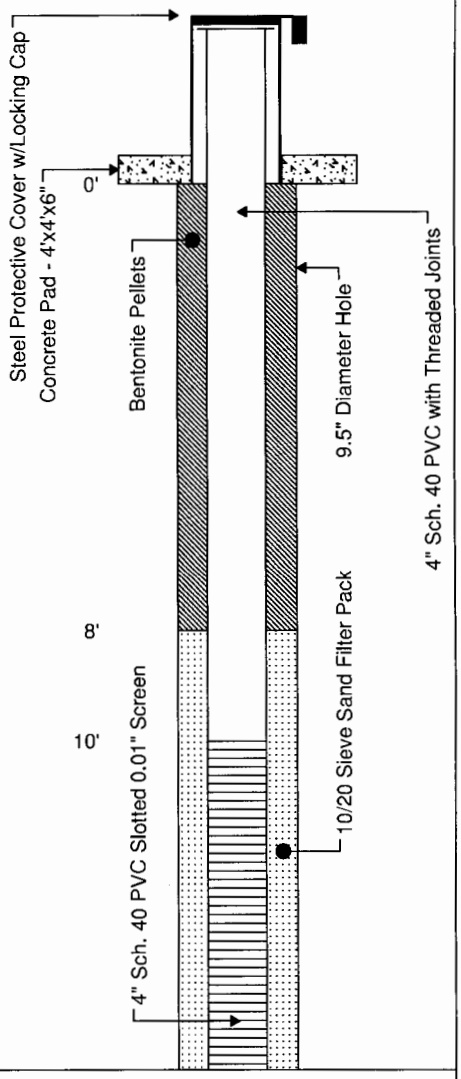
Well No.: MKTF-06
Start Date: 11/11/2013
Finish Date: 11/11/2013

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon

Total Depth: 21' bgl
Ground Water: Saturated @ 17.5' bgl
Elev., TOC (ft. msl): 6946.81
Elev., PAD (ft. msl): 6944.24
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,556.28 **E** 2,545,811.85

Comments: N 35°29.295' W 108°25.732'; Boring ID - SB08

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
					Ground Surface
1	15.9			70	**Fill (Silt/Silty Clay)** Low plasticity, stiff, dry, light brown, no odor
3	228			60	**Fill (Silty Clay/Gravel)** Similar to above, dry, no odor
5	177			60	**Fill (Silty Clay)** Similar to above, damp, no odor
7	264			40	**Fill (Silty Clay)** Low plasticity, soft, damp, brown, gravel and wood debris
9				--	No recovery
11	90			10	**Fill (Silty Clay/Gravel)** Similar to above
13	660			100	**Sandy Silty Clay (CL)** Low plasticity, soft, damp to moist at base, brown, hydrocarbon odor
15					



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Austin, Texas 78746

512/347-7588
512/347-8243

WELL INSTALLATION

Well No.: MKTF-06
Start Date: 11/11/2013
Finish Date: 11/11/2013

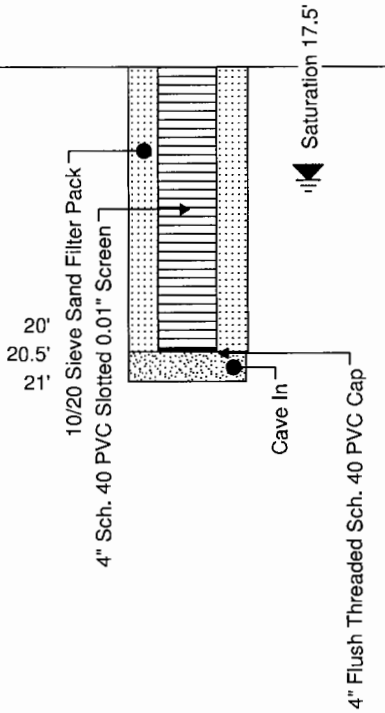
Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon

Total Depth: 21' bgl
Ground Water: Saturated @ 17.5' bgl
Elev., TOC (ft. msl): 6946.81
Elev., PAD (ft. msl): 6944.24
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,556.28 **E** 2,545,811.85

Comments: N 35°29.295' W 108°25.732'; Boring ID - SB08

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
17	1115	17.5'		100	**Sandy Silty Clay (CL)** Similar to above, moist, oily, hydrocarbon odor
19	225			100	**Gravelly Sandy Clay (CL)** Low plasticity, firm, moist, oily, 1" gravel, strong hydrocarbon odor
21				100	**Clayey Gravel Sand (SC)** Fine to medium grain, loose, saturated, phase-separated hydrocarbon present, black, hydrocarbon odor
					Sandy Clay (CL) Low plasticity, firm, moist, black hydrocarbon odor
					Total Depth = 21' BGL

Completion Results



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512/347-8243

WELL INSTALLATION

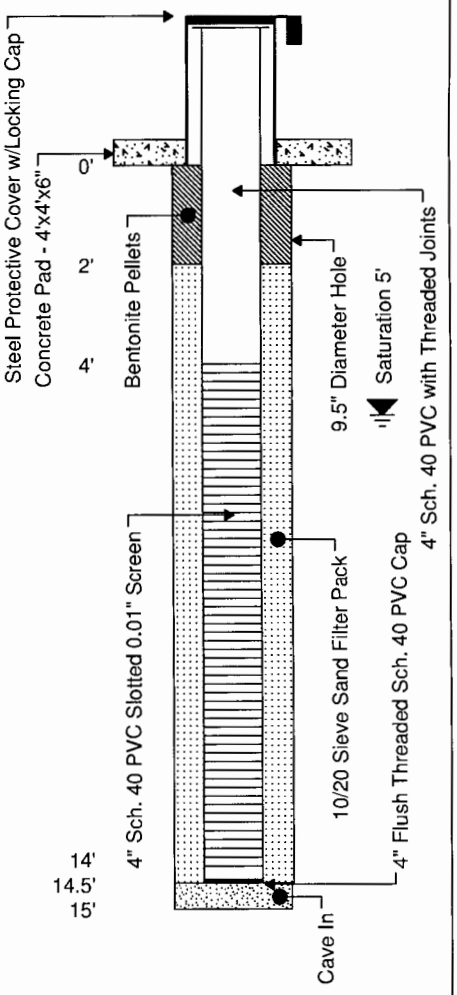
Well No.: MKTF-07
Start Date: 11/11/2013
Finish Date: 11/11/2013

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.295' W 108°25.710'; Boring ID - SB10

Total Depth: 15' bgl
Ground Water: Saturated @ 5' bgl
Elev., TOC (ft. msl): 6947.18
Elev., PAD (ft. msl): 6944.40
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,555.11 **E** 2,545,885.42

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
					Ground Surface
1	132			90	**Fill (Silty Clay)** Low plasticity, firm, dry to damp, brown, faint odor
3	235			90	**Fill (Clay/Sand/Gravel)** Damp, hydrocarbon odor
5	1202	▼ 5'		50	**Fill (Clay/Caliche Rock)** Odor
7	372			90	**Silty Sand (SM)** Fine grain, loose, saturated, phase-separated hydrocarbon, oily, brown to dark brown, hydrocarbon odor
					Silty Sand (SM) Similar to above, saturated
					Silty Clay (CL) Low plasticity, firm, damp, brown, hydrocarbon odor
11				--	No recovery
15					Total Depth = 15' BGL

Completion Results



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512/347-8243

WELL INSTALLATION

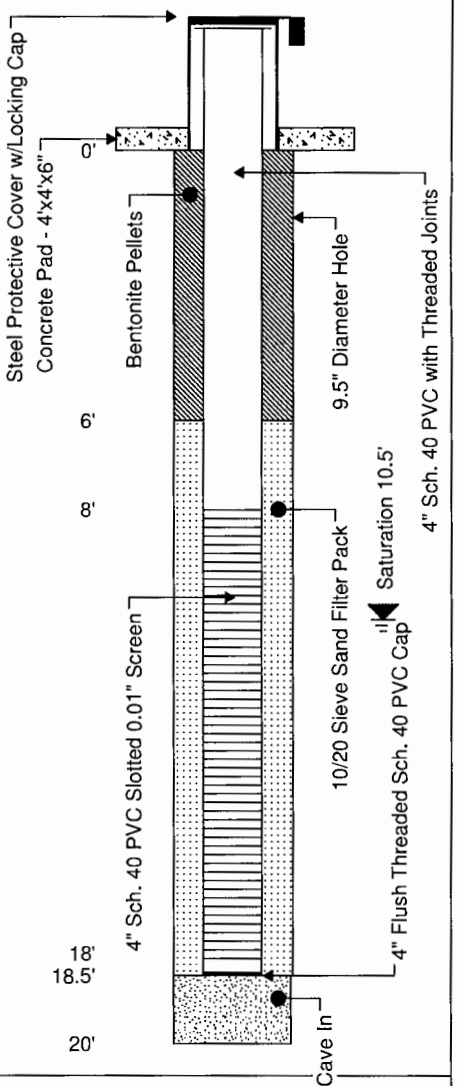
Well No.: MKTF-08
Start Date: 11/11/2013
Finish Date: 11/11/2013

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.302' W 108°25.716'; Boring ID - SB11

Total Depth: 20' bgl
Ground Water: Saturated @ 10.5' bgl
Elev., TOC (ft. msl): 6947.09
Elev., PAD (ft. msl): 6944.02
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,598.94 **E** 2,545,885.02

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
-3					
-1					Ground Surface
1	85			90	**Fill (Silty Clay/Gravel)** Low plasticity, firm, dry to damp, odor
3	273			80	**Fill (Silty Clay/Gravel)** Similar to above
5	86			90	**Clay (CH)** High plasticity, stiff, damp, brown with light brown pockets of silt, odor
7	308			90	**Silty Clay (CL)** Low plasticity, soft/crumbly, dry to damp, brown, hydrocarbon odor
9	1126			80	**Silty Clay (CL)** Low plasticity, soft, damp, brown, hydrocarbon odor
11	789	10.5'		80	**Silty Clay (CL)** Similar to above, moist
13	558			90	**Silty Clay (CL)** Medium grain, loose, saturated, phase-separated hydrocarbon, hydrocarbon odor, brown
15					**Sandy Silty Clay (CL)** Low plasticity, soft to firm, moist, hydrocarbon odor
17					**Sandy Clay (CL)** Low plasticity, soft to compact, saturated, phase-separated hydrocarbon, hydrocarbon odor
19					Total Depth = 20' BGL

Completion Results



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WELL INSTALLATION

Well No.: MKTF-09
Start Date: 11/11/2013
Finish Date: 11/11/2013

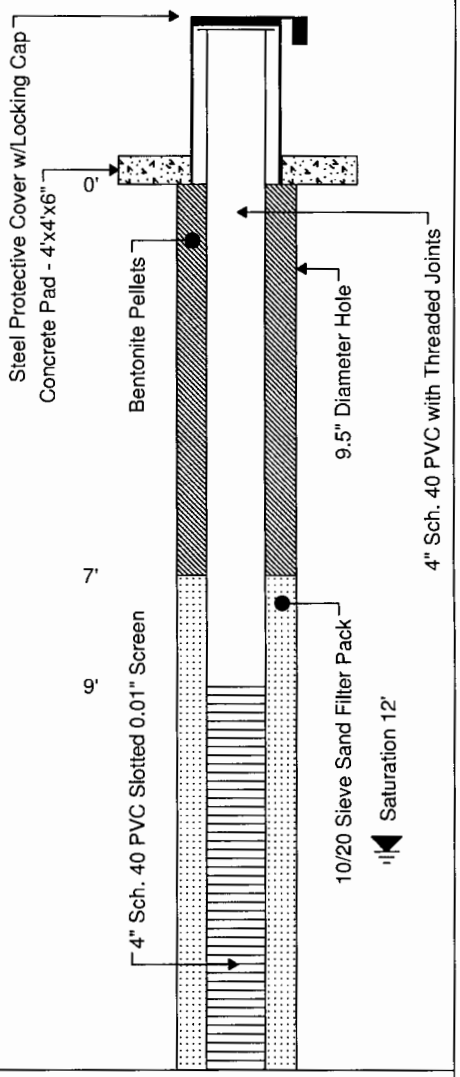
Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon

Total Depth: 22' bgl
Ground Water: Saturated @ 12' bgl
Elev., TOC (ft. msl): 6946.50
Elev., PAD (ft. msl): 6943.57
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,681.33 **E** 2,545,895.93

Comments: N 35°29.316' W 108°25.715'; Boring ID - SB13

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
-3					
-1					Ground Surface
1	21.9			90	**Fill (Silty Clay)** Low plasticity, stiff, dry to damp, no odor, brown
3	32.7			90	**Fill (Silty Clay)** Similar to above, gravel
5	36.1			90	**Silty Clay (CL)** Low plasticity, soft, damp, brown, faint odor
7	37			90	**Silty Clay (CL)** Similar to above
9	533			90	**Silty Clay (CL)** Similar to above
					Sandy Clay (CL) Similar to above, increase in sand and moisture
11	314	12'		90	**Sandy Clay (CL)** Similar to above, moist, hydrocarbon odor, dark brown
13	651			90	**Sandy Clay/Clayey Sand (CL/SC)** Fine to medium grain, compact, moist to saturated, hydrocarbon odor
15	587				**Sandy Clay/Clayey Sand (CL/SC)** Similar to above, saturated, sheen observed on split spoon, black, hydrocarbon odor

Completion Results



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512/347-8243

WELL INSTALLATION

Well No.: MKTF-09
Start Date: 11/11/2013
Finish Date: 11/11/2013

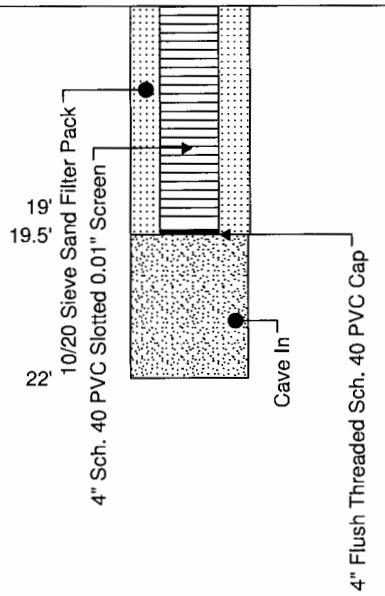
Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon

Total Depth: 22' bgl
Ground Water: Saturated @ 12' bgl
Elev., TOC (ft. msl): 6946.50
Elev., PAD (ft. msl): 6943.57
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,681.33 **E** 2,545,895.93

Comments: N 35°29.316' W 108°25.715'; Boring ID - SB13

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
17					**Sandy Clay/Clayey Sand (CL/SC)** Fine to medium grain, compact, saturated, sheen observed on split spoon, black, hydrocarbon odor
19				90	
21					
23					Total Depth = 22' BGL
25					
27					
29					
31					
33					

Completion Results



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WELL INSTALLATION

Well No.: MKTF-10
Start Date: 10/31/2013
Finish Date: 10/31/2013

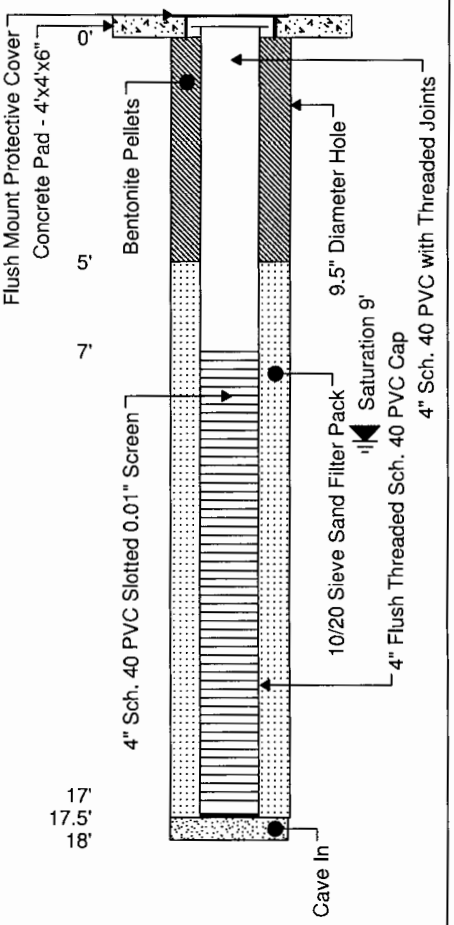
Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon

Total Depth: 18' bgl
Ground Water: Saturated @ 9' bgl
Elev., TOC (ft. msl): 6937.16
Elev., PAD (ft. msl): 6937.51
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,807.47 **E** 2,545,853.54

Comments: N 35°29.336' W 108°25.724'; Boring ID SB16

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
					Ground Surface
1	90			90	**Fill (Silt/Gravel)** Low plasticity, loose, dry, light brown
3	14			90	**Fill (Silty Clay/Gravel)** Similar to above
5	431			90	**Silty Clay (CL)** Low plasticity, stiff, dry, reddish brown, odor, calcareous
7	448			60	**Sand (SP)** Fine grain, loose, dry, reddish brown, odor
9	654	9'		60	**Sand (SP)** Similar to above, saturated at 9' bgl, phase-separated hydrocarbon, hydrocarbon odor
11	1559			90	**Clayey Sand (SC)** Fine grain, soft, saturated, phase-separated hydrocarbon, brown to black, hydrocarbon odor
13	713			90	**Clayey Sand/Sandy Clay (SC/CL)** Low plasticity, firm to stiff, moist to saturated, hydrocarbon odor, dark brown
15					
17					
19					Total Depth = 18' BGL
21					

Completion Results



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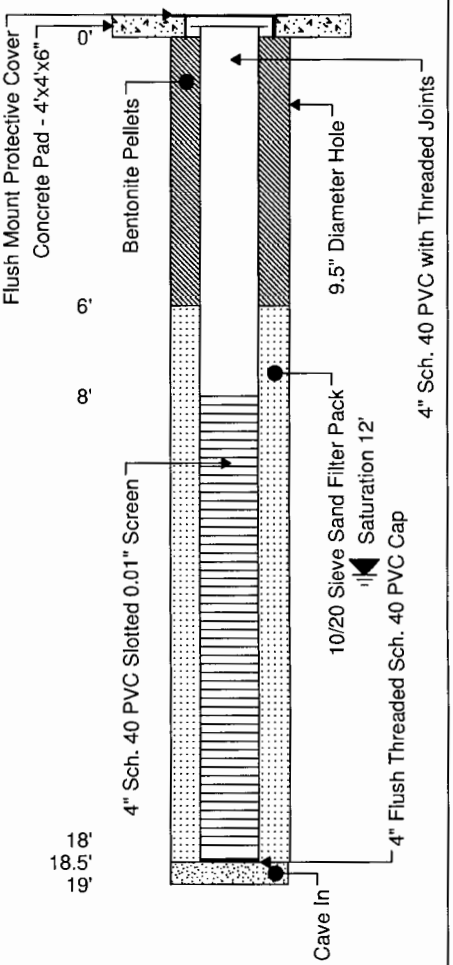
WELL INSTALLATION

Well No.: MKTF-11
Start Date: 10/31/2013
Finish Date: 10/31/2013

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.336' W 108°25.739'; Boring ID - SB17

Total Depth: 19' bgl
Ground Water: Saturated @ 12' bgl
Elev., TOC (ft. msl): 6931.34
Elev., PAD (ft. msl): 6931.61
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,806.93 **E** 2,545,754.77

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
0					Ground Surface
1	14			60	**Fill (Silty Clay/Gravel)** Low plasticity, stiff, dry, light brown
3	36			70	**Fill (Silty Clay)** Similar to above
5	80			90	**Silty Clay (CL)** Low plasticity, firm, damp, brown, calcareous
7	125			80	**Silty Clay (CL)** Similar to above
9	1259			80	**Silty Clay (CL)** Low plasticity, firm, damp, oily, hydrocarbon odor, dark brown
11	860	▼ 12'		70	**Silty Clay (CL)** Similar to above, moist, hydrocarbon odor, oily, phase-separated hydrocarbon
13	1716			60	**Sandy Clay (CL)** Low plasticity, soft, moist to saturated, hydrocarbon odor, dark brown
15	1050				**Silty Sand (SM)** Medium grain, loose, saturated, hydrocarbon odor, dark brown to black
17				70	**Sandy/Silty Clay (CL)** Low plasticity, firm, saturated, dark brown to black, hydrocarbon odor
19					Total Depth = 19' BGL
21					



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WELL INSTALLATION

Well No.: MKTF-12
Start Date: 11/7/2013
Finish Date: 11/7/2013

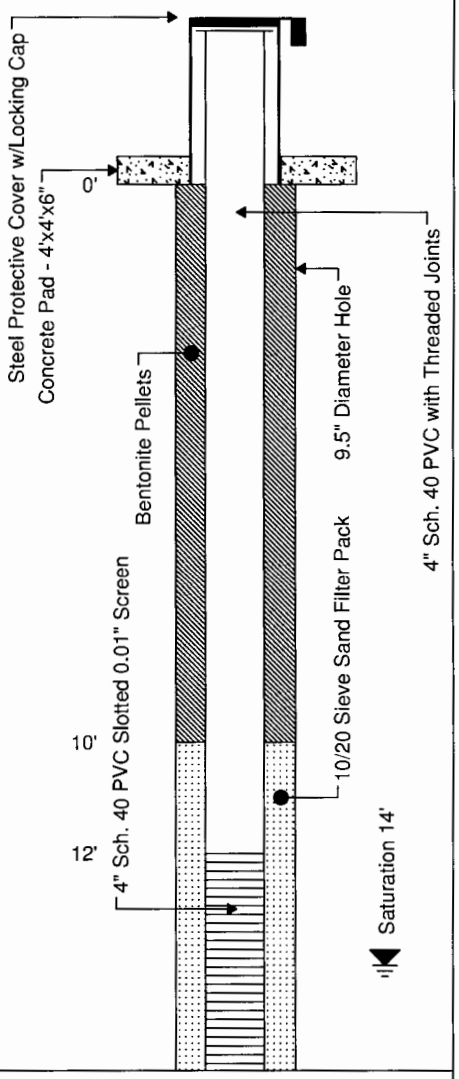
Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon

Total Depth: 23' bgl
Ground Water: Saturated @ 14' bgl
Elev., TOC (ft. msl): 6942.11
Elev., PAD (ft. msl): 6939.70
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,542.07 **E** 2,545,688.29

Comments: N 35°29.294' W 108°25.754'; Boring ID - SB19

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
-3					
-1					Ground Surface
1	8.7			90	**Silt/Gravel (ML)** Low plasticity, soft, dry/damp, no odor, brown
3	54			80	**Silt/Gravel (ML)** Similar to above
5	7			70	**Gravel/Silt (GW)** 1/2 to 1" gravel, loose, compact, dry, no odor
7	7.5			70	**Clayey Sandy Silt (ML)** Very fine grain, compact, dry to damp, brown, no odor
9	5.5			60	**Sandy Clay (CL)** Low plasticity, firm, damp, light brown, no odor
11	5.8			70	**Sandy Clay (CL)** Similar to above, brown, no odor
13	10	▼ 14'		70	**Sandy Clay (CL)** Similar to above
					Silty Sand (SM) Fine to medium grain, loose, damp, brown, no odor
15	225			50	**Sandy Clay (CL)** Low plasticity, firm, moist to saturated in sand seams, hydrocarbon odor, dark brown

Completion Results



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Austin, Texas 78746

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512/347-8243

WELL INSTALLATION

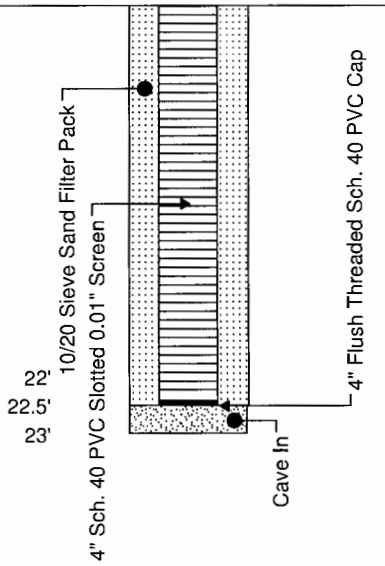
Well No.: MKTF-12
Start Date: 11/7/2013
Finish Date: 11/7/2013

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.294' W 108°25.754'; Boring ID - SB19

Total Depth: 23' bgl
Ground Water: Saturated @ 14' bgl
Elev., TOC (ft. msl): 6942.11
Elev., PAD (ft. msl): 6939.70
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,542.07 **E** 2,545,688.29

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
17	319			70	**Sandy Clay (CL)** Similar to above, moist, hydrocarbon odor
19	400			--	**Sandy Clay (CL)** Similar to above, moist, hydrocarbon odor
21	532			--	**Sandy Clay/Clayey Sand (CL)** Very fine grain, compact, moist to saturated, sheen observed in split spoon, hydrocarbon odor
23					Total Depth = 23' BGL
25					
27					
29					
31					
33					

Completion Results



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WELL INSTALLATION

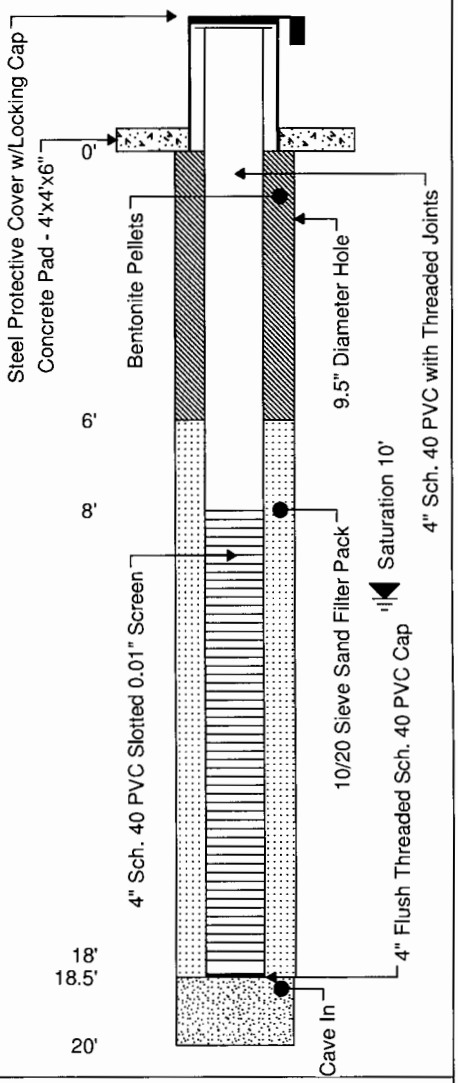
Well No.: MKTF-13
Start Date: 11/12/2013
Finish Date: 11/12/2013

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.307' W 108°25.755'; Boring ID - SB20

Total Depth: 20' bgl
Ground Water: Saturated @ 10' bgl
Elev., TOC (ft. msl): 6935.18
Elev., PAD (ft. msl): 6933.67
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,625.25 **E** 2,545,697.39

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
					Ground Surface
1	8			90	**Silt (ML)** Low plasticity, soft, damp, brown, no odor
3	12.7			90	**Silt (ML)** Similar to above, trace gravel
5	13			80	**Sandy Clay (CL)** Low plasticity, stiff, dry, brown, calcareous
7	17			90	**Silty Sand/Sandy Silt (SM/ML)** Very fine grain, loose to compact, dry, calcareous, brown
9	59	10'		90	**Sandy Silt (ML)** Similar to above, no odor
11	1165			90	**Sandy Clay/Clayey Sand (SC/CL)** Medium grain, compact, moist to saturated, hydrocarbon odor, brown
13	1200			90	**Clayey Sand (SC)** Similar to above, saturated, hydrocarbon odor
19					Total Depth = 20' BGL

Completion Results



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WELL INSTALLATION

Well No.: MKTF-14
Start Date: 11/12/2013
Finish Date: 11/12/2013

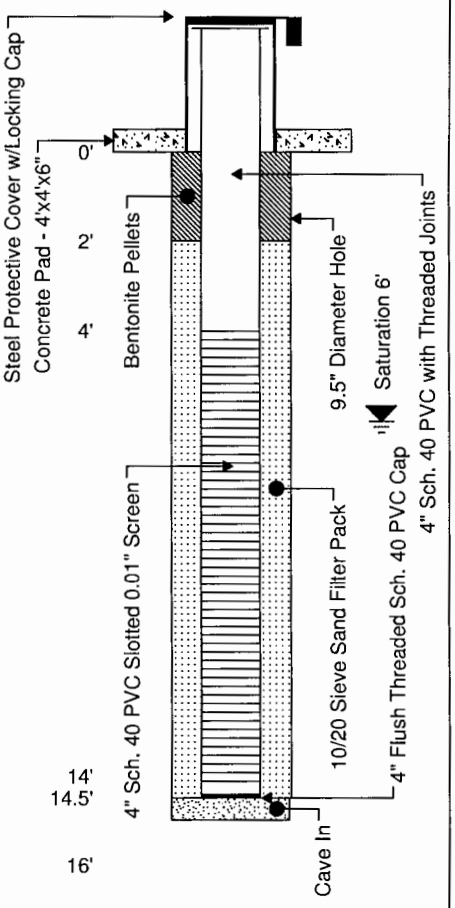
Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon

Total Depth: 15' bgl
Ground Water: Saturated @ 6' bgl
Elev., TOC (ft. msl): 6928.02
Elev., PAD (ft. msl): 6925.65
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,719.43 **E** 2,545,625.96

Comments: N 35°29.323' W 108°25.769'; Boring ID SB22

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
					Ground Surface
1	18			20	**Silty Clay (CL)** Low plasticity, soft, damp, brown
3	308			90	**Silty Clay (CL)** Similar to above, odor
5	793	▼ 6'		90	**Sandy Clay (CL)** Low plasticity, firm, moist, oily, brown, trace gravel
7	504			90	**Clayey Sand (SC)** Medium grain, loose to compact, saturated, phase-separated hydrocarbon, hydrocarbon odor, black
9	760			90	**Clayey Sand (SC)** Similar to above
15					Total Depth = 15' BGL

Completion Results



RPS
1250 S. Capital of Texas Hwy., Bldg. 3, Suite 200
Austin, Texas 78746

512/347-7588
512/347-8243

WELL INSTALLATION

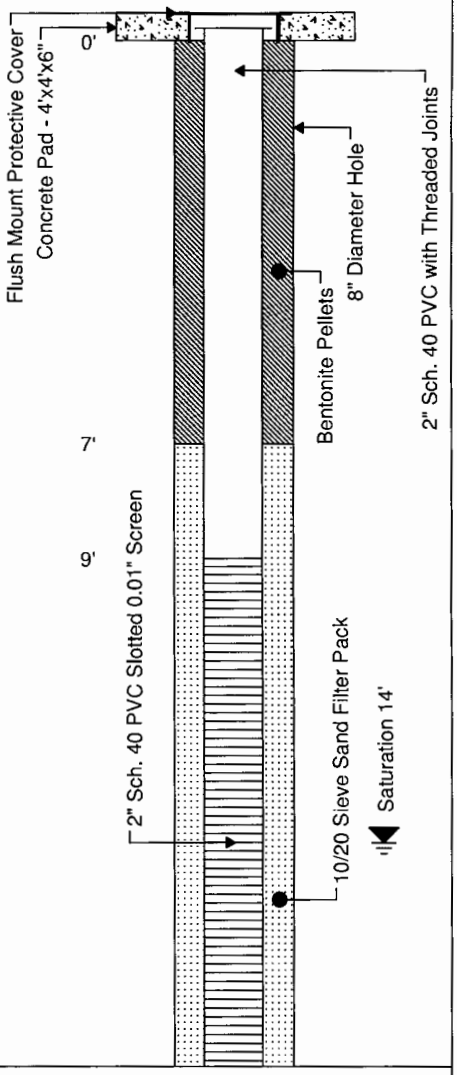
Well No.: MKTF-15
Start Date: 10/29/2013 09:30
Finish Date: 10/29/2013 12:15

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Five-Foot Core Barrel
Comments: N 35°29.343' W 108°25.708'; Boring ID - SB31

Total Depth: 22' bgl
Ground Water: Saturated @ 14' bgl
Elev., TOC (ft. msl): 6943.48
Elev., PAD (ft. msl): 6943.74
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,845.57 **E** 2,545,934.58

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
-1					Ground Surface
1	6.7			0	**Fill (Clay and Gravel)** No recovery
3	14.6			90	**Fill (Clay and Gravel)** Reddish brown
5				90	**Fill (Clay and Gravel)** Similar to above, no odor
7	823			90	**Fill (Silty Clay)** Reddish brown, hydrocarbon odor
9	1004			90	**Silty Sandy Clay (CL)** Low plasticity, firm to soft, damp, reddish brown, hydrocarbon odor
11	293			70	**Silty Sand (SM)** Fine grain, compact, damp, light reddish brown, no odor
13	221	▼ 14'		80	**Sand (SP)** Similar to above, odor, moist to very moist
15				80	**Sand (SP)** Fine to medium grain, loose, saturated, brown, hydrocarbon odor, phase-separated hydrocarbon present
17				60	**Sandy Silt (ML)** Low plasticity, very soft, damp to moist, brown, hydrocarbon odor

Completion Results



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WELL INSTALLATION

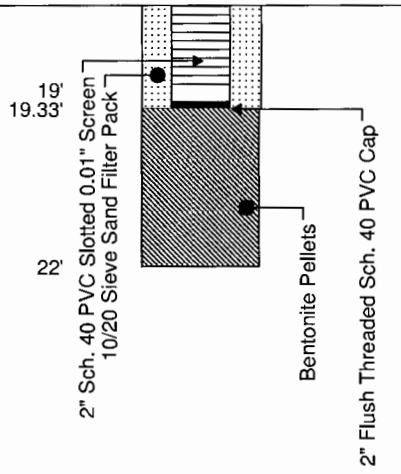
Well No.: MKTF-15
Start Date: 10/29/2013 09:30
Finish Date: 10/29/2013 12:15

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Five-Foot Core Barrel
Comments: N 35°29.343' W 108°25.708'; Boring ID - SB31

Total Depth: 22' bgl
Ground Water: Saturated @ 14' bgl
Elev., TOC (ft. msl): 6943.48
Elev., PAD (ft. msl): 6943.74
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,845.57 **E** 2,545,934.58

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
19				90	**Sandy Silt/Silty Sand (ML/SM)** Fine grain, loose to compact, moist to saturated, hydrocarbon odor, dark brown to black
21				90	**Sandy Silt/Silty Sand (ML/SM)** Similar to above, saturated in silty sand lenses, hydrocarbon odor
23					**Silty Clay (CL)** Low plasticity, firm, damp, brown, faint odor
25					**Silty Clay (CL)** Similar to above, odor
27					Total Depth = 22' BGL
29					
31					
33					
35					

Completion Results



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512/347-7588
512/347-8243

WELL INSTALLATION

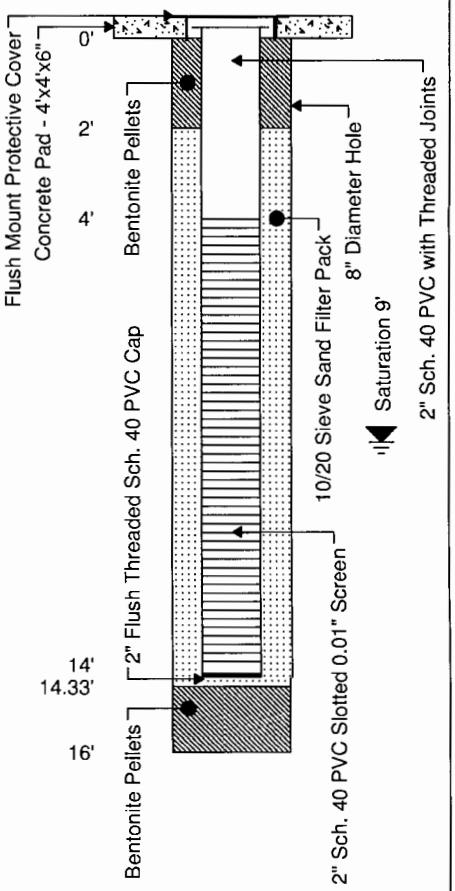
Well No.: MKTF-16
Start Date: 11/7/2013 08:40
Finish Date: 11/7/2013 11:00

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.323' W 108°25.680'; Boring ID - SB32

Total Depth: 16' bgl
Ground Water: Saturated @ 9' bgl
Elev., TOC (ft. msl): 6950.58
Elev., PAD (ft. msl): 6951.00
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,718.14 **E** 2,546,068.55

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
					Ground Surface
1				0	**Fill (Clay/Gravel)** No recovery
3	469			10	**Fill (Clay/Gravel)** Similar to above
5				0	**Fill (Clay/Gravel)** Similar to baove
7				0	**Fill (Clay/Gravel)** Similar to above
9	1445	▼ 9'		90	**Fill (Clay/Gravel)** Saturated at 9' bgl, black discoloration, hydrocarbon odor
11	1255			90	**Gravelly Sand (SW)** High plasticity, firm, damp, dark brown, hydrocarbon odor
13	1412			40	**Clayey Sand (SC)** Similar to above, hydrocarbon odor
15	439			80	**Clayey Sand (SC)** Moderate plasticity, firm, damp, brown, hydrocarbon odor
					Total Depth = 16' BGL

Completion Results



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512/347-8243

WELL INSTALLATION

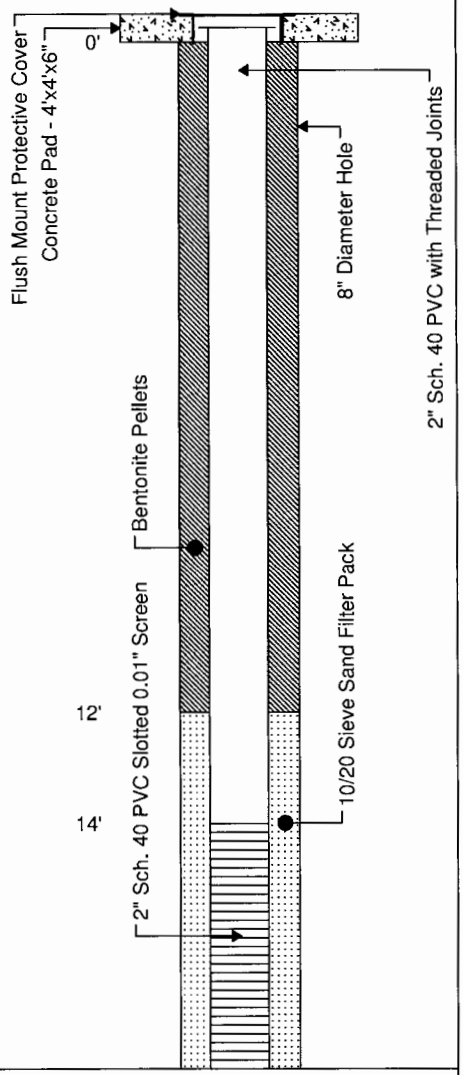
Well No.: MKTF-17
Start Date: 11/14/2013 13:00
Finish Date: 11/14/2013 15:00

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.248' W 108°25.724'; Boring ID - SB33

Total Depth: 25' bgl
Ground Water: Saturated @ 20' bgl
Elev., TOC (ft. msl): 6945.76
Elev., PAD (ft. msl): 6945.79
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,268.93 **E** 2,545,850.73

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
-1					Ground Surface
1				10	**Fill (Asphalt/Base/Clay)** Low plasticity, soft, damp, brown
3	150			10	**Fill (Clay)** Similar to above
5	157			90	**Fill (Sand/Gravel/Clay)** Moist to very moist, reddish brown, no odor
7	92.1			20	**Fill (Sand/Gravel/Clay)** Similar to above, saturated, odor
9	65.9			90	**Clay (CH)** High plasticity, firm, damp, faint odor, brown
11	17			60	**Clay (CH)** Similar to above
13	55			70	**Clay (CH)** High plasticity, soft, damp, dark brown and black, odor
15	17.5			60	**Clay (CH)** Similar to above, faint odor
17	11.3			10	**Clay (CH)** Similar to above, trace fine grain sand

Completion Results



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512/347-7588
512/347-8243

WELL INSTALLATION

Well No.: MKTF-17
Start Date: 11/14/2013 13:00
Finish Date: 11/14/2013 15:00

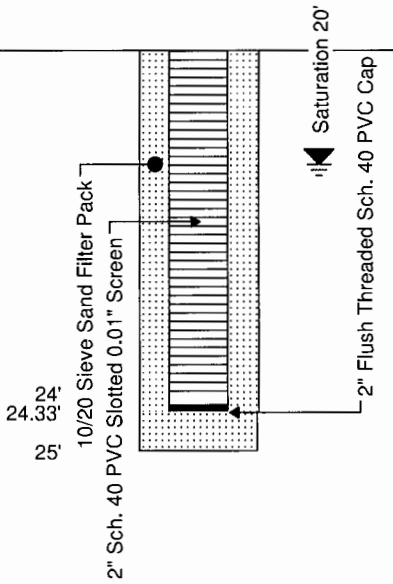
Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon

Total Depth: 25' bgl
Ground Water: Saturated @ 20' bgl
Elev., TOC (ft. msl): 6945.76
Elev., PAD (ft. msl): 6945.79
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,268.93 **E** 2,545,850.73

Comments: N 35°29.248' W 108°25.724'; Boring ID - SB33

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
20	17.2	20'		10	**Clay (CH)** High plasticity, soft, damp, brown
	17.5			70	**Sandy Clay (CH)** Moderate plasticity, soft, very moist to saturated in sand seams
22				80	**Silty Clayey Gravel (GM)** Compact to loose, medium grain sand to 1/4" gravel - angular, saturated, brown
24				90	**Clay (CH)** Moderate plasticity, firm to stiff, damp, greenish gray
					Total Depth = 25' BGL

Completion Results



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512/347-8243

WELL INSTALLATION

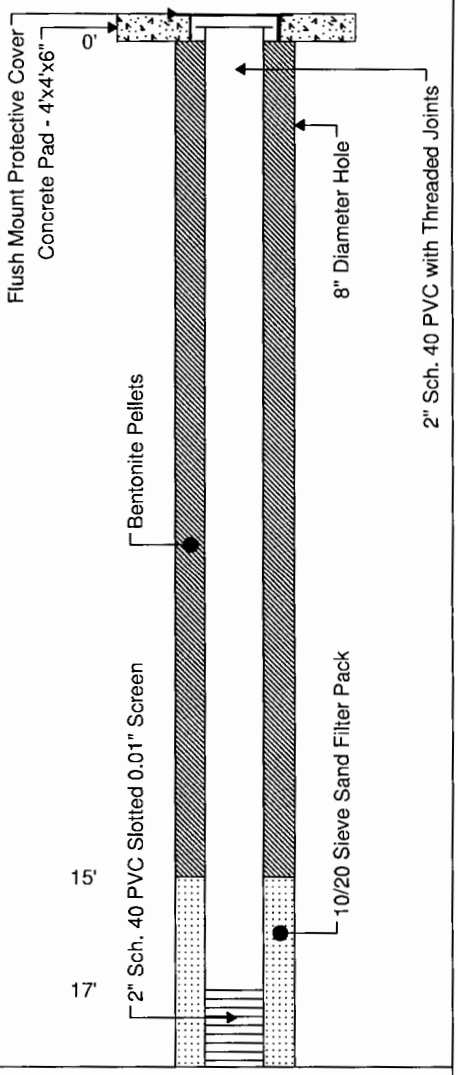
Well No.: MKTF-18
Start Date: 11/15/2013 10:00
Finish Date: 11/15/2013 15:00

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.288' W 108°25.692'; Boring ID - SB34

Total Depth: 27' bgl
Ground Water: Saturated @ 23' bgl
Elev., TOC (ft. msl): 6950.65
Elev., PAD (ft. msl): 6950.97
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,497.53 **E** 2,546,006.29

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
-1					Ground Surface
1				--	**Fill (Gravel and Silty Clay)**
3	1009			20	**Fill (Gravel and Silty Clay)** Similar to above, strong hydrocarbon odor, damp
5	693			60	**Fill (Gravel and Silty Clay)** Similar to above
7	1108			70	**Fill (Silty Clay)** Low plasticity, firm, damp, brown, gravel present, strong hydrocarbon odor
9	901			90	**Fill (Clay/Sand/Gravel)** Similar to above, saturated, odor, sheen observed
11	803			60	**Clay (CH)** High plasticity, stiff, damp, brown, hydrocarbon odor
13	254			70	**Clay (CH)** Similar to above, very fine grain, sand in partings
15	200			30	**Clay (CH)** Similar to above
17				--	No recovery

Completion Results



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512/347-8243

WELL INSTALLATION

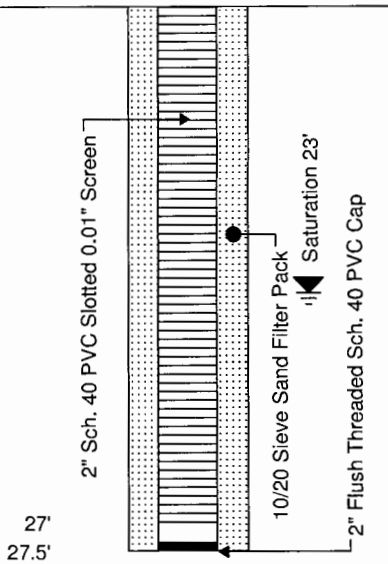
Well No.: MKTF-18
Start Date: 11/15/2013 10:00
Finish Date: 11/15/2013 15:00

Client: Western Refining Southwest, Inc.
Site: Gallup Refinery - Seep West of Tank 102
Job No.: UEC01809
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 35°29.288' W 108°25.692'; Boring ID - SB34

Total Depth: 27' bgl
Ground Water: Saturated @ 23' bgl
Elev., TOC (ft. msl): 6950.65
Elev., PAD (ft. msl): 6950.97
Elev., GL (ft. msl): --
Site Coordinates:
N 1,633,497.53 **E** 2,546,006.29

Depth (ft.)	PID (ppm)	Saturation	USCS Class	Recovery (%)	Sample Description
20	112			30	**Clay (CH)** High plasticity, firm, damp, brown, faint odor
	55			20	**Clay (CH)** Similar to above
22		▼ 23'			**Clay (CH)** Similar to above
	323			80	**Sandy Clay/Clayey Sand (SC/CL)** Fine grain, compact, very moist to saturated, brown, hydrocarbon present
24					**Clayey Sand (SC)** Similar to above, saturated
				90	
26					**Sandy Clay (CL)** Low plasticity, firm, damp, hydrocarbon odor, greenish gray
28					Total Depth = 27' BGL
30					
32					
34					
36					

Completion Results



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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 01, 2013

Cheryl Johnson
Western Refining Southwest, Gallup
Rt. 3 Box 7
Gallup, NM 87301
TEL: (505) 722-0231
FAX (505) 722-0210

RE: Seep West of Tank 102 OrderNo.: 1307C30

Dear Cheryl Johnson:

Hall Environmental Analysis Laboratory received 2 sample(s) on 7/26/2013 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1307C30**
Date Reported: **8/1/2013**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB18
Project: Seep West of Tank 102
Collection Date: 7/25/2013 1:30:00 PM
Lab ID: 1307C30-001 **Matrix:** AQUEOUS **Received Date:** 7/26/2013 9:07:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **JME**	
Diesel Range Organics (DRO)	73	1.0		mg/L	1	7/29/2013 4:35:51 PM	8599
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	7/29/2013 4:35:51 PM	8599
Surr: DNOP	119	70.1-140		%REC	1	7/29/2013 4:35:51 PM	8599
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	73	10	P	mg/L	200	7/30/2013 4:17:20 AM	R12268
Surr: BFB	98.5	51.5-151	P	%REC	200	7/30/2013 4:17:20 AM	R12268

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB19
Project: Seep West of Tank 102
Collection Date: 7/25/2013 1:45:00 PM
Lab ID: 1307C30-002 **Matrix:** AQUEOUS **Received Date:** 7/26/2013 9:07:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **JME**	
Diesel Range Organics (DRO)	30	1.0		mg/L	1	7/29/2013 4:57:45 PM	8599
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	7/29/2013 4:57:45 PM	8599
Surr: DNOP	127	70.1-140		%REC	1	7/29/2013 4:57:45 PM	8599
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	19	10		mg/L	200	7/30/2013 4:47:38 AM	R12268
Surr: BFB	93.8	51.5-151		%REC	200	7/30/2013 4:47:38 AM	R12268

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

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1307C30**

01-Aug-13

Client: Western Refining Southwest, Gallup

Project: Seep West of Tank 102

Sample ID **MB-8599**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Diesel Range**
Client ID: **PBW**	Batch ID: **8599**	RunNo: **12239**
Prep Date: **7/29/2013**	Analysis Date: **7/29/2013**	SeqNo: **348455** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	1.0								
Motor Oil Range Organics (MRO)	ND	5.0								
Surr: DNOP	1.1		1.000		113	70.1	140			

Sample ID **LCS-8599**	SampType: **LCS**	TestCode: **EPA Method 8015D: Diesel Range**
Client ID: **LCSW**	Batch ID: **8599**	RunNo: **12239**
Prep Date: **7/29/2013**	Analysis Date: **7/29/2013**	SeqNo: **348473** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	5.2	1.0	5.000	0	105	89.1	151			
Surr: DNOP	0.42		0.5000		84.7	70.1	140			

Sample ID **LCSD-8599**	SampType: **LCSD**	TestCode: **EPA Method 8015D: Diesel Range**
Client ID: **LCSS02**	Batch ID: **8599**	RunNo: **12239**
Prep Date: **7/29/2013**	Analysis Date: **7/29/2013**	SeqNo: **348474** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	5.3	1.0	5.000	0	106	89.1	151	1.59	20	
Surr: DNOP	0.44		0.5000		88.4	70.1	140	0	0	

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1307C30**

01-Aug-13

Client: Western Refining Southwest, Gallup

Project: Seep West of Tank 102

Sample ID **5ML RB**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBW**	Batch ID: **R12268**	RunNo: **12268**
Prep Date:	Analysis Date: **7/29/2013**	SeqNo: **348886** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	0.050								
Surr: BFB	18		20.00		92.3	51.5	151			

Sample ID **2.5UG GRO LCS**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSW**	Batch ID: **R12268**	RunNo: **12268**
Prep Date:	Analysis Date: **7/29/2013**	SeqNo: **348887** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.51	0.050	0.5000	0	103	80	120			
Surr: BFB	20		20.00		99.1	51.5	151			

Qualifiers:

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

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 Gallup Work Order Number: 1307C30 RcptNo: 1

Received by/date: MG 07/26/13

Logged By: Anne Thorne 7/26/2013 9:07:00 AM Anne Thorne

Completed By: Anne Thorne 7/26/2013 Anne Thorne

Reviewed By: 07/29/13

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	FedEx		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

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

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. Cooler Information

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

Chain-of-Custody Record

Client: WESTERN REFINING
GALLUP REFINERY
Mailing Address: ROUTE 3 BOX 7
GALLUP, NM 87301
Phone #: 505-722-3833
email or Fax#: 505-863-0930
QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other
☐ EDD (Type)

Turn-Around Time:
☐ Standard ☐ Rush
Project Name: SEEP WEST OF TANK 102
Project #:
Project Manager: CHERYL JOHNSON
Sampler: TRACY PAYNE
On Ice: ☑ Yes ☐ No
Sample Temperature: 7.0

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

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1307630	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Air Bubbles (Y or N)
7-25-13	1330	GW	SB18	3 40mL VOA	HCL	-001			X									
↓	1345	GW	SB19	↓	HCL	-002			X									

Date	Time	Relinquished by:	Received by:	Date	Time
7/26/13	0907	RP			
Date:	Time:	Relinquished by:	Received by:	07/26/13 Date	0907 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 06, 2013

Cheryl Johnson
Western Refining Southwest, Gallup
92 Giant Crossing Road
Gallup, NM 87301
TEL: (505) 722-0231
FAX (505) 722-0210

RE: Seep West of Tank 102 OrderNo.: 1311044

Dear Cheryl Johnson:

Hall Environmental Analysis Laboratory received 5 sample(s) on 11/2/2013 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1311044**
Date Reported: **11/6/2013**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Project: Seep West of Tank 102
Lab ID: 1311044-001 **Matrix:** AQUEOUS

Client Sample ID: SB26
Collection Date: 11/1/2013 1:45:00 PM
Received Date: 11/2/2013 8:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **BCN**	
Diesel Range Organics (DRO)	1.5	1.0		mg/L	1	11/5/2013 12:04:38 PM	10156
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	11/5/2013 12:04:38 PM	10156
Surr: DNOP	135	70.1-140		%REC	1	11/5/2013 12:04:38 PM	10156
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	8.4	1.0		mg/L	20	11/4/2013 3:16:02 PM	R14541
Surr: BFB	116	80.4-118		%REC	20	11/4/2013 3:16:02 PM	R14541
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	1200	20		µg/L	20	11/4/2013 3:16:02 PM	R14541
Toluene	ND	20		µg/L	20	11/4/2013 3:16:02 PM	R14541
Ethylbenzene	230	20		µg/L	20	11/4/2013 3:16:02 PM	R14541
Xylenes, Total	ND	40		µg/L	20	11/4/2013 3:16:02 PM	R14541
Surr: 4-Bromofluorobenzene	113	85-136		%REC	20	11/4/2013 3:16:02 PM	R14541

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB27
Project: Seep West of Tank 102
Collection Date: 11/1/2013 1:55:00 PM
Lab ID: 1311044-002 **Matrix:** AQUEOUS **Received Date:** 11/2/2013 8:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **BCN**	
Diesel Range Organics (DRO)	5.8	1.0		mg/L	1	11/5/2013 12:35:50 PM	10156
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	11/5/2013 12:35:50 PM	10156
Surr: DNOP	139	70.1-140		%REC	1	11/5/2013 12:35:50 PM	10156
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	37	2.5		mg/L	50	11/4/2013 12:14:33 PM	R14541
Surr: BFB	105	80.4-118		%REC	50	11/4/2013 12:14:33 PM	R14541
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	1800	50		µg/L	50	11/4/2013 12:14:33 PM	R14541
Toluene	200	50		µg/L	50	11/4/2013 12:14:33 PM	R14541
Ethylbenzene	1500	50		µg/L	50	11/4/2013 12:14:33 PM	R14541
Xylenes, Total	6400	100		µg/L	50	11/4/2013 12:14:33 PM	R14541
Surr: 4-Bromofluorobenzene	110	85-136		%REC	50	11/4/2013 12:14:33 PM	R14541

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB28
Project: Seep West of Tank 102
Collection Date: 11/1/2013 2:10:00 PM
Lab ID: 1311044-003
Matrix: AQUEOUS
Received Date: 11/2/2013 8:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **BCN**	
Diesel Range Organics (DRO)	1.4	1.0		mg/L	1	11/5/2013 1:07:02 PM	10156
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	11/5/2013 1:07:02 PM	10156
Surr: DNOP	121	70.1-140		%REC	1	11/5/2013 1:07:02 PM	10156
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	8.4	1.0		mg/L	20	11/4/2013 3:46:06 PM	R14541
Surr: BFB	116	80.4-118		%REC	20	11/4/2013 3:46:06 PM	R14541
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	1400	20		µg/L	20	11/4/2013 3:46:06 PM	R14541
Toluene	ND	20		µg/L	20	11/4/2013 3:46:06 PM	R14541
Ethylbenzene	160	20		µg/L	20	11/4/2013 3:46:06 PM	R14541
Xylenes, Total	ND	40		µg/L	20	11/4/2013 3:46:06 PM	R14541
Surr: 4-Bromofluorobenzene	115	85-136		%REC	20	11/4/2013 3:46:06 PM	R14541

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB29
Project: Seep West of Tank 102
Collection Date: 11/1/2013 2:20:00 PM
Lab ID: 1311044-004
Matrix: AQUEOUS
Received Date: 11/2/2013 8:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **BCN**	
Diesel Range Organics (DRO)	ND	1.0		mg/L	1	11/5/2013 1:37:45 PM	10156
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	11/5/2013 1:37:45 PM	10156
Surr: DNOP	135	70.1-140		%REC	1	11/5/2013 1:37:45 PM	10156
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	1.7	0.050		mg/L	1	11/4/2013 1:15:02 PM	R14541
Surr: BFB	192	80.4-118	S	%REC	1	11/4/2013 1:15:02 PM	R14541
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	570	10		µg/L	10	11/4/2013 4:16:22 PM	R14541
Toluene	8.0	1.0		µg/L	1	11/4/2013 1:15:02 PM	R14541
Ethylbenzene	150	10		µg/L	10	11/4/2013 4:16:22 PM	R14541
Xylenes, Total	2.0	2.0		µg/L	1	11/4/2013 1:15:02 PM	R14541
Surr: 4-Bromofluorobenzene	153	85-136	S	%REC	1	11/4/2013 1:15:02 PM	R14541

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB31
Project: Seep West of Tank 102
Collection Date: 11/1/2013 2:35:00 PM
Lab ID: 1311044-005 **Matrix:** AQUEOUS **Received Date:** 11/2/2013 8:55:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **BCN**	
Diesel Range Organics (DRO)	2.4	1.0		mg/L	1	11/5/2013 2:08:31 PM	10156
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	11/5/2013 2:08:31 PM	10156
Surr: DNOP	120	70.1-140		%REC	1	11/5/2013 2:08:31 PM	10156
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	65	2.5		mg/L	50	11/4/2013 1:45:17 PM	R14541
Surr: BFB	106	80.4-118		%REC	50	11/4/2013 1:45:17 PM	R14541
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	12000	200		µg/L	200	11/4/2013 11:49:30 PM	R14541
Toluene	12000	200		µg/L	200	11/4/2013 11:49:30 PM	R14541
Ethylbenzene	1500	50		µg/L	50	11/4/2013 1:45:17 PM	R14541
Xylenes, Total	4800	100		µg/L	50	11/4/2013 1:45:17 PM	R14541
Surr: 4-Bromofluorobenzene	113	85-136		%REC	50	11/4/2013 1:45:17 PM	R14541

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

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1311044**

06-Nov-13

Client: Western Refining Southwest, Gallup

Project: Seep West of Tank 102

Sample ID **MB-10156**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Diesel Range**
Client ID: **PBW**	Batch ID: **10156**	RunNo: **14573**
Prep Date: **11/4/2013**	Analysis Date: **11/5/2013**	SeqNo: **418892** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	1.0								
Motor Oil Range Organics (MRO)	ND	5.0								
Surr: DNOP	1.2		1.000		117	70.1	140			

Sample ID **LCS-10156**	SampType: **LCS**	TestCode: **EPA Method 8015D: Diesel Range**
Client ID: **LCSW**	Batch ID: **10156**	RunNo: **14573**
Prep Date: **11/4/2013**	Analysis Date: **11/5/2013**	SeqNo: **418893** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	7.0	1.0	5.000	0	140	73.3	145			
Surr: DNOP	0.61		0.5000		121	70.1	140			

Sample ID **LCSD-10156**	SampType: **LCSD**	TestCode: **EPA Method 8015D: Diesel Range**
Client ID: **LCSS02**	Batch ID: **10156**	RunNo: **14573**
Prep Date: **11/4/2013**	Analysis Date: **11/5/2013**	SeqNo: **418894** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
;el Range Organics (DRO)	6.0	1.0	5.000	0	119	73.3	145	15.6	20	
Surr: DNOP	0.52		0.5000		103	70.1	140	0	0	

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1311044**

06-Nov-13

Client: Western Refining Southwest, Gallup

Project: Seep West of Tank 102

Sample ID **B7**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBW**	Batch ID: **R14541**	RunNo: **14541**
Prep Date:	Analysis Date: **11/4/2013**	SeqNo: **418164** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	0.050								
Surr: BFB	19		20.00		93.8	80.4	118			

Sample ID **2.5UG GRO LCS**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSW**	Batch ID: **R14541**	RunNo: **14541**
Prep Date:	Analysis Date: **11/4/2013**	SeqNo: **418165** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.49	0.050	0.5000	0	97.7	80	120			
Surr: BFB	21		20.00		104	80.4	118			

Sample ID **1311044-001AMS**	SampType: **MS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **SB26**	Batch ID: **R14541**	RunNo: **14541**
Prep Date:	Analysis Date: **11/4/2013**	SeqNo: **418172** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	18	1.0	10.00	8.436	91.4	67.7	128			
Surr: BFB	490		400.0		122	80.4	118			S

Sample ID **1311044-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **SB26**	Batch ID: **R14541**	RunNo: **14541**
Prep Date:	Analysis Date: **11/4/2013**	SeqNo: **418173** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	17	1.0	10.00	8.436	88.0	67.7	128	2.00	20	
Surr: BFB	470		400.0		118	80.4	118	0	0	S

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1311044**

06-Nov-13

Client: Western Refining Southwest, Gallup

Project: Seep West of Tank 102

Sample ID **B7**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **R14541**	RunNo: **14541**
Prep Date:	Analysis Date: **11/4/2013**	SeqNo: **418215** 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								
Xylenes, Total	ND	2.0								
Surr: 4-Bromofluorobenzene	20		20.00		102	85	136			

Sample ID **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **R14541**	RunNo: **14541**
Prep Date:	Analysis Date: **11/4/2013**	SeqNo: **418216** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	20	1.0	20.00	0	99.8	80	120			
Toluene	20	1.0	20.00	0	100	80	120			
Ethylbenzene	20	1.0	20.00	0	101	80	120			
Xylenes, Total	62	2.0	60.00	0	103	80	120			
Surr: 4-Bromofluorobenzene	22		20.00		108	85	136			

Sample ID **1311044-002AMS**	SampType: **MS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **SB27**	Batch ID: **R14541**	RunNo: **14541**
Prep Date:	Analysis Date: **11/4/2013**	SeqNo: **418223** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	2900	50	1000	1764	109	73.4	119			
Toluene	1200	50	1000	201.5	100	80	120			
Ethylbenzene	2600	50	1000	1526	107	80	120			
Xylenes, Total	9500	100	3000	6401	105	80	120			
Surr: 4-Bromofluorobenzene	1100		1000		114	85	136			

Sample ID **1311044-002AMSD**	SampType: **MSD**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **SB27**	Batch ID: **R14541**	RunNo: **14541**
Prep Date:	Analysis Date: **11/4/2013**	SeqNo: **418224** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	2800	50	1000	1764	108	73.4	119	0.260	20	
Toluene	1200	50	1000	201.5	101	80	120	0.497	20	
Ethylbenzene	2600	50	1000	1526	107	80	120	0.262	20	
Xylenes, Total	9600	100	3000	6401	105	80	120	0.0701	20	
Surr: 4-Bromofluorobenzene	1100		1000		114	85	136	0	0	

Qualifiers:

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

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 Gallup Work Order Number: 1311044 RcptNo: 1

Received by/date: AF 11/02/13

Logged By: **Michelle Garcia** 11/2/2013 8:55:00 AM Michelle Garcia

Completed By: **Michelle Garcia** 11/4/2013 8:34:11 AM Michelle Garcia

Reviewed By: 11/04/13

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☑	No ☐	Not Present ☐
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	Client		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

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

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. **Cooler Information**

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

Chain of Custody Record

Client: WESTERN REFINING SW
GALLUP REFINERY
Mailing Address: ROUTE 3 BOX 7
JAMESTOWN NM 87301
Phone #: 505-722-3833
email or Fax#: 505.863.0930
QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other
☐ EDD (Type)

☐ Standard ☑ Rush 24hr
Project Name: SEEP WEST OF TANK 102
Project #:
Project Manager: CHERYL JOHNSON
Sampler: TRACY PAYNE
On Ice: ☒ Yes ☐ No
Sample Temperature: 1.2°C

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

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 131044	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	BTEX				Air Bubbles (Y or N)
11/1/13	1345	GW	SB26	4-40ML VOA	HCL & NEAT	-001			✓									✓				
	1355		SB27			-002			✓									✓				
	1410		SB28			-003			✓									✓				
	1420		SB29			-004			✓									✓				
	1435		SB31			-005			✓									✓				

Date:	Time:	Relinquished by:	Received by:	Date	Time
11/1/13	0855			11/2/13	0855
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 27, 2013

Cheryl Johnson
Western Refining Southwest, Gallup
92 Giant Crossing Road
Gallup, NM 87301
TEL: (505) 722-0231
FAX (505) 722-0210

RE: Seep West of Tank 102 OrderNo.: 1311905

Dear Cheryl Johnson:

Hall Environmental Analysis Laboratory received 5 sample(s) on 11/20/2013 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB32
Project: Seep West of Tank 102
Collection Date: 11/19/2013 9:30:00 AM
Lab ID: 1311905-001 **Matrix:** AQUEOUS **Received Date:** 11/20/2013 9:40:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **BCN**	
Diesel Range Organics (DRO)	4.2	1.0		mg/L	1	11/25/2013 4:45:18 PM	10460
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	11/25/2013 4:45:18 PM	10460
Surr: DNOP	113	70.1-140		%REC	1	11/25/2013 4:45:18 PM	10460
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **RAA**	
Gasoline Range Organics (GRO)	68	2.5		mg/L	50	11/22/2013 6:09:44 PM	R15041
Surr: BFB	106	80.4-118		%REC	50	11/22/2013 6:09:44 PM	R15041
EPA METHOD 8021B: VOLATILES						Analyst: **RAA**	
Benzene	9900	500		µg/L	500	11/25/2013 4:03:31 PM	R15067
Toluene	8200	500		µg/L	500	11/25/2013 4:03:31 PM	R15067
Ethylbenzene	1900	50		µg/L	50	11/22/2013 6:09:44 PM	R15041
Xylenes, Total	9800	100		µg/L	50	11/22/2013 6:09:44 PM	R15041
Surr: 4-Bromofluorobenzene	117	85-136		%REC	50	11/22/2013 6:09:44 PM	R15041

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB33
Project: Seep West of Tank 102
Collection Date: 11/19/2013 10:15:00 AM
Lab ID: 1311905-002
Matrix: AQUEOUS
Received Date: 11/20/2013 9:40:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **BCN**	
Diesel Range Organics (DRO)	5.8	1.0		mg/L	1	11/25/2013 5:07:17 PM	10460
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	11/25/2013 5:07:17 PM	10460
Surr: DNOP	116	70.1-140		%REC	1	11/25/2013 5:07:17 PM	10460
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **RAA**	
Gasoline Range Organics (GRO)	17	2.5		mg/L	50	11/22/2013 6:39:50 PM	R15041
Surr: BFB	104	80.4-118		%REC	50	11/22/2013 6:39:50 PM	R15041
EPA METHOD 8021B: VOLATILES						Analyst: **RAA**	
Benzene	1800	50		µg/L	50	11/22/2013 6:39:50 PM	R15041
Toluene	1600	50		µg/L	50	11/22/2013 6:39:50 PM	R15041
Ethylbenzene	710	50		µg/L	50	11/22/2013 6:39:50 PM	R15041
Xylenes, Total	2700	100		µg/L	50	11/22/2013 6:39:50 PM	R15041
Surr: 4-Bromofluorobenzene	116	85-136		%REC	50	11/22/2013 6:39:50 PM	R15041

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB23
Project: Seep West of Tank 102
Collection Date: 11/19/2013 10:50:00 AM
Lab ID: 1311905-003
Matrix: AQUEOUS
Received Date: 11/20/2013 9:40:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **BCN**	
Diesel Range Organics (DRO)	2.1	1.0		mg/L	1	11/25/2013 5:29:07 PM	10460
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	11/25/2013 5:29:07 PM	10460
Surr: DNOP	109	70.1-140		%REC	1	11/25/2013 5:29:07 PM	10460
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **RAA**	
Gasoline Range Organics (GRO)	6.5	0.25		mg/L	5	11/25/2013 4:33:48 PM	R15067
Surr: BFB	107	80.4-118		%REC	5	11/25/2013 4:33:48 PM	R15067
EPA METHOD 8021B: VOLATILES						Analyst: **RAA**	
Benzene	1300	50		µg/L	50	11/22/2013 7:09:53 PM	R15041
Toluene	7.5	5.0		µg/L	5	11/25/2013 4:33:48 PM	R15067
Ethylbenzene	72	5.0		µg/L	5	11/25/2013 4:33:48 PM	R15067
Xylenes, Total	16	10		µg/L	5	11/25/2013 4:33:48 PM	R15067
Surr: 4-Bromofluorobenzene	113	85-136		%REC	5	11/25/2013 4:33:48 PM	R15067

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB30
Project: Seep West of Tank 102
Collection Date: 11/19/2013 12:15:00 PM
Lab ID: 1311905-004
Matrix: AQUEOUS
Received Date: 11/20/2013 9:40:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **BCN**	
Diesel Range Organics (DRO)	ND	1.0		mg/L	1	11/25/2013 5:51:04 PM	10460
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	11/25/2013 5:51:04 PM	10460
Surr: DNOP	114	70.1-140		%REC	1	11/25/2013 5:51:04 PM	10460
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **RAA**	
Gasoline Range Organics (GRO)	ND	0.050		mg/L	1	11/25/2013 5:34:09 PM	R15067
Surr: BFB	100	80.4-118		%REC	1	11/25/2013 5:34:09 PM	R15067
EPA METHOD 8021B: VOLATILES						Analyst: **RAA**	
Benzene	ND	1.0		µg/L	1	11/25/2013 5:34:09 PM	R15067
Toluene	ND	1.0		µg/L	1	11/25/2013 5:34:09 PM	R15067
Ethylbenzene	ND	1.0		µg/L	1	11/25/2013 5:34:09 PM	R15067
Xylenes, Total	ND	2.0		µg/L	1	11/25/2013 5:34:09 PM	R15067
Surr: 4-Bromofluorobenzene	108	85-136		%REC	1	11/25/2013 5:34:09 PM	R15067

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB34
Project: Seep West of Tank 102
Collection Date: 11/19/2013 1:15:00 PM
Lab ID: 1311905-005
Matrix: AQUEOUS
Received Date: 11/20/2013 9:40:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **BCN**	
Diesel Range Organics (DRO)	11	1.0		mg/L	1	11/25/2013 6:12:56 PM	10460
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	11/25/2013 6:12:56 PM	10460
Surr: DNOP	120	70.1-140		%REC	1	11/25/2013 6:12:56 PM	10460
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **RAA**	
Gasoline Range Organics (GRO)	4.0	2.5		mg/L	50	11/22/2013 8:10:07 PM	R15041
Surr: BFB	102	80.4-118		%REC	50	11/22/2013 8:10:07 PM	R15041
EPA METHOD 8021B: VOLATILES						Analyst: **RAA**	
Benzene	330	50		µg/L	50	11/22/2013 8:10:07 PM	R15041
Toluene	370	50		µg/L	50	11/22/2013 8:10:07 PM	R15041
Ethylbenzene	130	50		µg/L	50	11/22/2013 8:10:07 PM	R15041
Xylenes, Total	470	100		µg/L	50	11/22/2013 8:10:07 PM	R15041
Surr: 4-Bromofluorobenzene	108	85-136		%REC	50	11/22/2013 8:10:07 PM	R15041

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

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1311905**

27-Nov-13

Client: Western Refining Southwest, Gallup

Project: Seep West of Tank 102

Sample ID **MB-10460**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Diesel Range**
Client ID: **PBW**	Batch ID: **10460**	RunNo: **15015**
Prep Date: **11/21/2013**	Analysis Date: **11/25/2013**	SeqNo: **434392** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	1.0								
Motor Oil Range Organics (MRO)	ND	5.0								
Surr: DNOP	1.1		1.000		107	70.1	140			

Sample ID **LCS-10460**	SampType: **LCS**	TestCode: **EPA Method 8015D: Diesel Range**
Client ID: **LCSW**	Batch ID: **10460**	RunNo: **15015**
Prep Date: **11/21/2013**	Analysis Date: **11/25/2013**	SeqNo: **434404** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	5.3	1.0	5.000	0	106	73.3	145			
Surr: DNOP	0.52		0.5000		104	70.1	140			

Sample ID **LCSD-10460**	SampType: **LCSD**	TestCode: **EPA Method 8015D: Diesel Range**
Client ID: **LCSS02**	Batch ID: **10460**	RunNo: **15015**
Prep Date: **11/21/2013**	Analysis Date: **11/25/2013**	SeqNo: **434671** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
el Range Organics (DRO)	6.1	1.0	5.000	0	122	73.3	145	13.9	20	
urr: DNOP	0.59		0.5000		118	70.1	140	0	0	

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1311905**

27-Nov-13

Client: Western Refining Southwest, Gallup

Project: Seep West of Tank 102

Sample ID **5ML-RB**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBW**	Batch ID: **R15041**	RunNo: **15041**
Prep Date:	Analysis Date: **11/22/2013**	SeqNo: **434271** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	0.050								
Surr: BFB	20		20.00		97.6	80.4	118			

Sample ID **2.5UG GRO LCS**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSW**	Batch ID: **R15041**	RunNo: **15041**
Prep Date:	Analysis Date: **11/22/2013**	SeqNo: **434272** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.51	0.050	0.5000	0	101	80	120			
Surr: BFB	21		20.00		107	80.4	118			

Sample ID **5ML-RB**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBW**	Batch ID: **R15067**	RunNo: **15067**
Prep Date:	Analysis Date: **11/25/2013**	SeqNo: **434884** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	0.050								
Surr: BFB	21		20.00		106	80.4	118			

Sample ID **2.5UG GRO LCS**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSW**	Batch ID: **R15067**	RunNo: **15067**
Prep Date:	Analysis Date: **11/25/2013**	SeqNo: **434885** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.44	0.050	0.5000	0	87.1	80	120			
Surr: BFB	21		20.00		106	80.4	118			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1311905**

27-Nov-13

Client: Western Refining Southwest, Gallup
Project: Seep West of Tank 102

Sample ID **5ML-RB**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **R15041**	RunNo: **15041**
Prep Date:	Analysis Date: **11/22/2013**	SeqNo: **434285** 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								
Xylenes, Total	ND	2.0								
Surr: 4-Bromofluorobenzene	22		20.00		108	85	136			

Sample ID **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **R15041**	RunNo: **15041**
Prep Date:	Analysis Date: **11/22/2013**	SeqNo: **434286** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	19	1.0	20.00	0	93.8	80	120			
Toluene	19	1.0	20.00	0	94.6	80	120			
Ethylbenzene	19	1.0	20.00	0	95.1	80	120			
Xylenes, Total	58	2.0	60.00	0	96.0	80	120			
Surr: 4-Bromofluorobenzene	22		20.00		112	85	136			

ımple ID **5ML-RB**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **R15067**	RunNo: **15067**
Prep Date:	Analysis Date: **11/25/2013**	SeqNo: **434905** 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								
Xylenes, Total	ND	2.0								
Surr: 4-Bromofluorobenzene	24		20.00		118	85	136			

Sample ID **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **R15067**	RunNo: **15067**
Prep Date:	Analysis Date: **11/25/2013**	SeqNo: **434906** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	19	1.0	20.00	0	95.1	80	120			
Toluene	19	1.0	20.00	0	95.2	80	120			
Ethylbenzene	19	1.0	20.00	0	94.0	80	120			
Xylenes, Total	58	2.0	60.00	0	96.5	80	120			
Surr: 4-Bromofluorobenzene	22		20.00		110	85	136			

Qualifiers:

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

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 Gallup Work Order Number: 1311905 RcptNo: 1

Received by/date: LM 11/20/13

Logged By: Anne Thorne 11/20/2013 9:40:00 AM Anne Thorne

Completed By: Anne Thorne 11/20/2013 Anne Thorne

Reviewed By: IO 11/21/2013

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☑	No ☐	Not Present ☐
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	Client		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

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

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. **Cooler Information**

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

Chain-of-Custody Record

Client: WESTERN REFINING SW
GALLUP REFINERY
Mailing Address: ROUTE 3 BOX 7
JAMESTOWN, NM 87301
Phone #: 505-722-3833
email or Fax#: CHERYL JOHNSON, WNR.COM
QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other _____
☐ EDD (Type) _____

Turn-Around Time:
☑ Standard ☐ Rush _____
Project Name: SEEP WEST OF TANK 102
Project #:
Project Manager: CHERYL JOHNSON
Sampler: L. PAYNE
On Ice: ☑ Yes ☐ No
Sample Temperature: 1.0

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

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1311905
11/19/13	0930	GW	SB32	4 40ML VOA	HCL & NEAT	-001
	1015		SB33			-002
	1050		SB23			-003
	1215		SB30			-004
↓	1315	↓	SB34	↓	↓	-005

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	BTEX				Air Bubbles (Y or N)
		X									X				
		X									X				
		X									X				
		X									X				
		X									X				

Date:	Time:	Relinquished by:	Received by:	Date	Time
11.20.13	0940			11/20/13	09:40
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
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ANALYSIS
LABORATORY

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

July 16, 2013

Cheryl Johnson
Western Refining Southwest, Gallup
Rt. 3 Box 7
Gallup, NM 87301
TEL: (505) 722-0231
FAX: (505) 722-0210

RE: Seep West of 102 OrderNo.: 1307269

Dear Cheryl Johnson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 7/8/2013 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1307269**
Date Reported: **7/16/2013**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: Seep Hole #6
Project: Seep West of 102
Collection Date: 7/8/2013 9:45:00 AM
Lab ID: 1307269-001
Matrix: PRODUCT
Received Date: 7/8/2013 1:20:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
DRO BY 8015D						Analyst: **JME**	
Diesel Range Organics (DRO)	55	2.0		wt%	20	7/9/2013 4:30:52 PM	8285
Motor Oil Range Organics (MRO)	ND	10		wt%	20	7/9/2013 4:30:52 PM	8285
Surr: DNOP	0	76.7-135	S	%REC	20	7/9/2013 4:30:52 PM	8285
GRO BY 8015D						Analyst: **NSB**	
Gasoline Range Organics (GRO)	49	2.5		wt%	1	7/10/2013 11:07:52 AM	8284
Surr: BFB	127	65.4-138		%REC	1	7/10/2013 11:07:52 AM	8284
EPA METHOD 300.0: ANIONS						Analyst: **JRR**	
Fluoride	ND	2.0		mg/L	20	7/9/2013 3:15:53 AM	R11809
Chloride	ND	10		mg/L	20	7/9/2013 3:15:53 AM	R11809
Nitrogen, Nitrite (As N)	ND	2.0		mg/L	20	7/9/2013 3:15:53 AM	R11809
Bromide	ND	2.0		mg/L	20	7/9/2013 3:15:53 AM	R11809
Nitrogen, Nitrate (As N)	ND	2.0		mg/L	20	7/9/2013 3:15:53 AM	R11809
Phosphorus, Orthophosphate (As P)	ND	10		mg/L	20	7/9/2013 3:15:53 AM	R11809
Sulfate	ND	10		mg/L	20	7/9/2013 3:15:53 AM	R11809
EPA METHOD 200.7: METALS						Analyst: **JLF**	
Calcium	ND	50		mg/L	1	7/11/2013 1:47:54 PM	8317
Magnesium	ND	50		mg/L	1	7/11/2013 1:47:54 PM	8317
Potassium	65	50		mg/L	1	7/11/2013 1:47:54 PM	8317
Sodium	100	50		mg/L	1	7/11/2013 1:47:54 PM	8317
SM4500-H+B: PH						Analyst: **JML**	
pH	7.04	1.68	H	pH units	1	7/12/2013 4:29:00 PM	R11906

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

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1307269**

16-Jul-13

Client: Western Refining Southwest, Gallup

Project: Seep West of 102

Sample ID: **MB-8317**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Metals**
Client ID: **PBW**	Batch ID: **8317**	RunNo: **11877**
Prep Date: **7/11/2013**	Analysis Date: **7/11/2013**	SeqNo: **337575** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								
Magnesium	ND	1.0								
Potassium	ND	1.0								
Sodium	ND	1.0								

Sample ID: **LCS-8317**	SampType: **LCS**	TestCode: **EPA Method 200.7: Metals**
Client ID: **LCSW**	Batch ID: **8317**	RunNo: **11877**
Prep Date: **7/11/2013**	Analysis Date: **7/11/2013**	SeqNo: **337576** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50	1.0	50.00	0	99.4	85	115			
Magnesium	50	1.0	50.00	0	99.6	85	115			
Potassium	49	1.0	50.00	0	97.6	85	115			
Sodium	49	1.0	50.00	0	98.8	85	115			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1307269**

16-Jul-13

Client: Western Refining Southwest, Gallup

Project: Seep West of 102

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R11809**	RunNo: **11809**
Prep Date:	Analysis Date: **7/9/2013**	SeqNo: **335617** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.10								
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Bromide	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Phosphorus, Orthophosphate (As P)	ND	0.50								
Sulfate	ND	0.50								

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R11809**	RunNo: **11809**
Prep Date:	Analysis Date: **7/9/2013**	SeqNo: **335618** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.53	0.10	0.5000	0	107	90	110			
Chloride	4.8	0.50	5.000	0	95.5	90	110			
Nitrogen, Nitrite (As N)	0.96	0.10	1.000	0	95.5	90	110			
Bromide	2.5	0.10	2.500	0	99.0	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	100	90	110			
Phosphorus, Orthophosphate (As P)	4.8	0.50	5.000	0	95.3	90	110			
Sulfate	9.7	0.50	10.00	0	96.6	90	110			

Sample ID: **1307280-001AMS**	SampType: **MS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R11809**	RunNo: **11809**
Prep Date:	Analysis Date: **7/9/2013**	SeqNo: **335622** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.1	0.10	0.5000	0.6427	96.1	76.9	114			
Chloride	11	0.50	5.000	5.375	105	89.9	119			
Nitrogen, Nitrite (As N)	0.97	0.10	1.000	0	96.6	84.3	102			
Bromide	2.6	0.10	2.500	0.08490	101	92	104			
Nitrogen, Nitrate (As N)	3.4	0.10	2.500	0.8637	103	93	113			
Phosphorus, Orthophosphate (As P)	4.9	0.50	5.000	0	98.6	73.9	120			
Sulfate	31	0.50	10.00	19.89	109	90.1	116			

Sample ID: **1307280-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R11809**	RunNo: **11809**
Prep Date:	Analysis Date: **7/9/2013**	SeqNo: **335623** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.1	0.10	0.5000	0.6427	95.4	76.9	114	0.339	20	
Chloride	11	0.50	5.000	5.375	104	89.9	119	0.603	20	

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1307269**

16-Jul-13

Client: Western Refining Southwest, Gallup

Project: Seep West of 102

Sample ID: **1307280-001AMSD** SampType: **MSD** TestCode: **EPA Method 300.0: Anions**

Client ID: **BatchQC** Batch ID: **R11809** RunNo: **11809**

Prep Date: Analysis Date: **7/9/2013** SeqNo: **335623** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrite (As N)	0.96	0.10	1.000	0	95.8	84.3	102	0.884	20	
Bromide	2.6	0.10	2.500	0.08490	101	92	104	0.398	20	
Nitrogen, Nitrate (As N)	3.4	0.10	2.500	0.8637	102	93	113	0.600	20	
Phosphorus, Orthophosphate (As P)	4.8	0.50	5.000	0	96.4	73.9	120	2.29	20	
Sulfate	31	0.50	10.00	19.89	106	90.1	116	0.814	20	

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1307269**

16-Jul-13

Client: Western Refining Southwest, Gallup

Project: Seep West of 102

Sample ID: **LCS-8285**	SampType: **LCS**	TestCode: **DRO by 8015D**							
Client ID: **LCSW**	Batch ID: **8285**	RunNo: **11794**							
Prep Date: **7/9/2013**	Analysis Date: **7/9/2013**	SeqNo: **335851**	Units: **wt%**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	0.40	0.10	0.5000	0	80.5	80	120			
Surr: DNOP	0.040		0.05000		79.3	76.7	135			

Sample ID: **LCSD-8285**	SampType: **LCSD**	TestCode: **DRO by 8015D**							
Client ID: **LCSS02**	Batch ID: **8285**	RunNo: **11794**							
Prep Date: **7/9/2013**	Analysis Date: **7/9/2013**	SeqNo: **335852**	Units: **wt%**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	0.43	0.10	0.5000	0	85.7	80	120	6.34	20	
Surr: DNOP	0.043		0.05000		85.8	76.7	135	0	0	

Sample ID: **MB-8285**	SampType: **MBLK**	TestCode: **DRO by 8015D**							
Client ID: **PBW**	Batch ID: **8285**	RunNo: **11794**							
Prep Date: **7/9/2013**	Analysis Date: **7/9/2013**	SeqNo: **335853**	Units: **wt%**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	0.10								
Motor Oil Range Organics (MRO)	ND	0.50								
Surr: DNOP	0.082		0.1000		82.1	76.7	135			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1307269**

16-Jul-13

Client: Western Refining Southwest, Gallup

Project: Seep West of 102

Sample ID: **MB-8284**	SampType: **MBLK**	TestCode: **GRO by 8015D**							
Client ID: **PBW**	Batch ID: **8284**	RunNo: **11829**							
Prep Date: **7/9/2013**	Analysis Date: **7/10/2013**	SeqNo: **336360**	Units: **wt%**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	2.5								
Surr: BFB	940		1000		94.1	65.4	138			

Sample ID: **LCS-8284**	SampType: **LCS**	TestCode: **GRO by 8015D**							
Client ID: **LCSW**	Batch ID: **8284**	RunNo: **11829**							
Prep Date: **7/9/2013**	Analysis Date: **7/10/2013**	SeqNo: **336361**	Units: **wt%**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	2.5	25.00	0	106	67.5	133			
Surr: BFB	1000		1000		99.7	65.4	138			

Sample ID: **LCSD-8284**	SampType: **LCSD**	TestCode: **GRO by 8015D**							
Client ID: **LCSS02**	Batch ID: **8284**	RunNo: **11829**							
Prep Date: **7/9/2013**	Analysis Date: **7/10/2013**	SeqNo: **336362**	Units: **wt%**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	2.5	25.00	0	103	67.5	133	3.10	8.39	
`urr: BFB	1000		1000		101	65.4	138	0	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- ` Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- 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
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1307269**

16-Jul-13

Client: Western Refining Southwest, Gallup

Project: Seep West of 102

Sample ID: **1307269-001ADUP**	SampType: **DUP**	TestCode: **SM4500-H+B: pH**							
Client ID: **Seep Hole #6**	Batch ID: **R11906**	RunNo: **11906**							
Prep Date:	Analysis Date: **7/12/2013**	SeqNo: **338410**	Units: **pH units**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.03	1.68						0.142		H

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **Western Refining Gallup** Work Order Number: **1307269** RcptNo: **1**

Received by/date: LM 07/08/13

Logged By: **Ashley Gallegos** 7/8/2013 1:20:00 PM AG

Completed By: **Ashley Gallegos** 7/8/2013 1:49:57 PM AG

Reviewed By: IO 07/08/13

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ✓	No	Not Present
2. Is Chain of Custody complete?	Yes ✓	No	Not Present
3. How was the sample delivered?	Client		

Log In

4. Was an attempt made to cool the samples?	Yes ✓	No	NA
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ✓	No	NA
6. Sample(s) in proper container(s)?	Yes ✓	No	
7. Sufficient sample volume for indicated test(s)?	Yes ✓	No	
8. Are samples (except VOA and ONG) properly preserved?	Yes ✓	No	
9. Was preservative added to bottles?	Yes	No ✓	NA
10. VOA vials have zero headspace?	Yes ✓	No	No VOA Vials
11. Were any sample containers received broken?	Yes	No ✓	# of preserved bottles checked for pH:
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ✓	No	-001A, -001B
13. Are matrices correctly identified on Chain of Custody?	Yes ✓	No	Adjusted? UNABLE TO BRING TO ACCEPTABLE PH - AK
14. Is it clear what analyses were requested?	Yes ✓	No	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ✓	No	Checked by:

(2 or >12 unless noted)

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes No NA ✓

Person Notified: Date:

By Whom: Via: eMail Phone Fax In Person

Regarding:

Client Instructions:

17. Additional remarks:

18. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.5	Good	Not Present			

Chain-of-Custody Record

Client: Western Refining Company

GALLUP REFINERY

Mailing Address:

RT 3 BOX 7, GALLUP, NM 87301

Phone #: 505-722-3833

email or Fax#: 505-863-0930

QA/QC Package:

☐ Standard ☐ Level 4 (Full Validation)

Accreditation:

☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:

Standard X Rush__ASAP__

Project Name:

Seep West of 102

Project #:

Seep Hole #6

Project Manager:

C. JOHNSON (cheryl.johnson@wnr.com)

Sampler: C. JOHNSON

On Ice: ☑ Yes ☐ No

Sample Temperature: 2.5

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1307269	Analysis Request: 8260+MTBE	8015B (GRO/DRO/ORO)	8270 + Phenols	WQCC Metals - Total	WQCC Metals - Dissolved (Filtered)	Major Cations/Anions	8021B + MTBE	Air Bubbles (Y or N)
7/8/2013	0945	Aqueous	Seep Hole #6			-001		X				X		

Date: 7/8/13 Time: 1000 Relinquished by: Received by: Date Time

Date: 7/08/13 Time: 13:20 Relinquished by: Received by: 07/08/13 1320

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 05, 2013

Cheryl Johnson
Western Refining Southwest, Gallup
92 Giant Crossing Road
Gallup, NM 87301
TEL: (505) 722-0231
FAX (505) 722-0210

RE: Seep West Of Tank 102 OrderNo.: 1310D69

Dear Cheryl Johnson:

Hall Environmental Analysis Laboratory received 5 sample(s) on 10/29/2013 for the analyses presented in the following report.

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

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

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1310D69**
Date Reported: **11/5/2013**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB14
Project: Seep West Of Tank 102
Collection Date: 10/28/2013 9:15:00 AM
Lab ID: 1310D69-001
Matrix: AQUEOUS
Received Date: 10/29/2013 12:29:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **JME**	
Diesel Range Organics (DRO)	87	10		mg/L	10	10/30/2013 3:43:44 PM	10098
Motor Oil Range Organics (MRO)	ND	50		mg/L	10	10/30/2013 3:43:44 PM	10098
Surr: DNOP	0	70.1-140	S	%REC	10	10/30/2013 3:43:44 PM	10098
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	71	5.0		mg/L	100	11/1/2013 12:42:12 AM	R14497
Surr: BFB	102	51.5-151		%REC	100	11/1/2013 12:42:12 AM	R14497
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	460	250		µg/L	100	11/1/2013 12:42:12 AM	R14497
Benzene	12000	500		µg/L	500	11/4/2013 2:45:47 PM	R14541
Toluene	14000	500		µg/L	500	11/4/2013 2:45:47 PM	R14541
Ethylbenzene	960	100		µg/L	100	11/1/2013 12:42:12 AM	R14497
Xylenes, Total	4700	200		µg/L	100	11/1/2013 12:42:12 AM	R14497
1,2,4-Trimethylbenzene	590	100		µg/L	100	11/1/2013 12:42:12 AM	R14497
1,3,5-Trimethylbenzene	150	100		µg/L	100	11/1/2013 12:42:12 AM	R14497
Surr: 4-Bromofluorobenzene	110	85-136		%REC	100	11/1/2013 12:42:12 AM	R14497

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB15
Project: Seep West Of Tank 102
Collection Date: 10/28/2013 9:35:00 AM
Lab ID: 1310D69-002
Matrix: AQUEOUS
Received Date: 10/29/2013 12:29:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **JME**	
Diesel Range Organics (DRO)	4.8	1.0		mg/L	1	10/30/2013 2:37:42 PM	10098
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	10/30/2013 2:37:42 PM	10098
Surr: DNOP	117	70.1-140		%REC	1	10/30/2013 2:37:42 PM	10098
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	46	5.0		mg/L	100	11/1/2013 1:12:29 AM	R14497
Surr: BFB	100	51.5-151		%REC	100	11/1/2013 1:12:29 AM	R14497
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	890	250		µg/L	100	11/1/2013 1:12:29 AM	R14497
Benzene	7300	100		µg/L	100	11/1/2013 1:12:29 AM	R14497
Toluene	7600	100		µg/L	100	11/1/2013 1:12:29 AM	R14497
Ethylbenzene	920	100		µg/L	100	11/1/2013 1:12:29 AM	R14497
Xylenes, Total	4600	200		µg/L	100	11/1/2013 1:12:29 AM	R14497
1,2,4-Trimethylbenzene	790	100		µg/L	100	11/1/2013 1:12:29 AM	R14497
1,3,5-Trimethylbenzene	220	100		µg/L	100	11/1/2013 1:12:29 AM	R14497
Surr: 4-Bromofluorobenzene	109	85-136		%REC	100	11/1/2013 1:12:29 AM	R14497

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB12
Project: Seep West Of Tank 102
Collection Date: 10/28/2013 10:00:00 AM
Lab ID: 1310D69-003
Matrix: AQUEOUS
Received Date: 10/29/2013 12:29:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **JME**	
Diesel Range Organics (DRO)	110	10		mg/L	10	10/30/2013 4:05:46 PM	10098
Motor Oil Range Organics (MRO)	ND	50		mg/L	10	10/30/2013 4:05:46 PM	10098
Surr: DNOP	0	70.1-140	S	%REC	10	10/30/2013 4:05:46 PM	10098
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	22	5.0		mg/L	100	11/1/2013 1:42:43 AM	R14497
Surr: BFB	99.7	51.5-151		%REC	100	11/1/2013 1:42:43 AM	R14497
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	3500	250		µg/L	100	11/1/2013 1:42:43 AM	R14497
Benzene	2600	100		µg/L	100	11/1/2013 1:42:43 AM	R14497
Toluene	130	100		µg/L	100	11/1/2013 1:42:43 AM	R14497
Ethylbenzene	820	100		µg/L	100	11/1/2013 1:42:43 AM	R14497
Xylenes, Total	3000	200		µg/L	100	11/1/2013 1:42:43 AM	R14497
1,2,4-Trimethylbenzene	870	100		µg/L	100	11/1/2013 1:42:43 AM	R14497
1,3,5-Trimethylbenzene	260	100		µg/L	100	11/1/2013 1:42:43 AM	R14497
Surr: 4-Bromofluorobenzene	108	85-136		%REC	100	11/1/2013 1:42:43 AM	R14497

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: SB07
Project: Seep West Of Tank 102
Collection Date: 10/28/2013 10:20:00 AM
Lab ID: 1310D69-004
Matrix: AQUEOUS
Received Date: 10/29/2013 12:29:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **JME**	
Diesel Range Organics (DRO)	24	1.0		mg/L	1	10/30/2013 4:27:56 PM	10098
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	10/30/2013 4:27:56 PM	10098
Surr: DNOP	124	70.1-140		%REC	1	10/30/2013 4:27:56 PM	10098
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	21	5.0		mg/L	100	11/1/2013 2:13:02 AM	R14497
Surr: BFB	100	51.5-151		%REC	100	11/1/2013 2:13:02 AM	R14497
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	4500	250		µg/L	100	11/1/2013 2:13:02 AM	R14497
Benzene	3200	100		µg/L	100	11/1/2013 2:13:02 AM	R14497
Toluene	ND	100		µg/L	100	11/1/2013 2:13:02 AM	R14497
Ethylbenzene	1200	100		µg/L	100	11/1/2013 2:13:02 AM	R14497
Xylenes, Total	1600	200		µg/L	100	11/1/2013 2:13:02 AM	R14497
1,2,4-Trimethylbenzene	1000	100		µg/L	100	11/1/2013 2:13:02 AM	R14497
1,3,5-Trimethylbenzene	160	100		µg/L	100	11/1/2013 2:13:02 AM	R14497
Surr: 4-Bromofluorobenzene	109	85-136		%REC	100	11/1/2013 2:13:02 AM	R14497

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

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Gallup
Client Sample ID: HA3
Project: Seep West Of Tank 102
Collection Date: 10/28/2013 10:40:00 AM
Lab ID: 1310D69-005 **Matrix:** AQUEOUS **Received Date:** 10/29/2013 12:29:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: DIESEL RANGE						Analyst: **JME**	
Diesel Range Organics (DRO)	ND	1.0		mg/L	1	10/30/2013 4:49:51 PM	10098
Motor Oil Range Organics (MRO)	ND	5.0		mg/L	1	10/30/2013 4:49:51 PM	10098
Surr: DNOP	118	70.1-140		%REC	1	10/30/2013 4:49:51 PM	10098
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	3.8	1.0		mg/L	20	11/1/2013 2:43:15 AM	R14497
Surr: BFB	98.6	51.5-151		%REC	20	11/1/2013 2:43:15 AM	R14497
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Methyl tert-butyl ether (MTBE)	ND	50		µg/L	20	11/1/2013 2:43:15 AM	R14497
Benzene	690	20		µg/L	20	11/1/2013 2:43:15 AM	R14497
Toluene	ND	20		µg/L	20	11/1/2013 2:43:15 AM	R14497
Ethylbenzene	55	20		µg/L	20	11/1/2013 2:43:15 AM	R14497
Xylenes, Total	160	40		µg/L	20	11/1/2013 2:43:15 AM	R14497
1,2,4-Trimethylbenzene	190	20		µg/L	20	11/1/2013 2:43:15 AM	R14497
1,3,5-Trimethylbenzene	26	20		µg/L	20	11/1/2013 2:43:15 AM	R14497
Surr: 4-Bromofluorobenzene	107	85-136		%REC	20	11/1/2013 2:43:15 AM	R14497

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

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1310D69**

05-Nov-13

Client: Western Refining Southwest, Gallup

Project: Seep West Of Tank 102

Sample ID **MB-10098**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Diesel Range**
Client ID: **PBW**	Batch ID: **10098**	RunNo: **14432**
Prep Date: **10/30/2013**	Analysis Date: **10/30/2013**	SeqNo: **415120** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	1.0								
Motor Oil Range Organics (MRO)	ND	5.0								
Surr: DNOP	1.2		1.000		115	70.1	140			

Sample ID **LCS-10098**	SampType: **LCS**	TestCode: **EPA Method 8015D: Diesel Range**
Client ID: **LCSW**	Batch ID: **10098**	RunNo: **14432**
Prep Date: **10/30/2013**	Analysis Date: **10/30/2013**	SeqNo: **415196** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	5.7	1.0	5.000	0	113	73.3	145			
Surr: DNOP	0.55		0.5000		111	70.1	140			

Sample ID **LCSD-10098**	SampType: **LCSD**	TestCode: **EPA Method 8015D: Diesel Range**
Client ID: **LCSS02**	Batch ID: **10098**	RunNo: **14432**
Prep Date: **10/30/2013**	Analysis Date: **10/30/2013**	SeqNo: **415197** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
sel Range Organics (DRO)	6.0	1.0	5.000	0	120	73.3	145	5.65	20	
Surr: DNOP	0.57		0.5000		113	70.1	140	0	0	

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1310D69**

05-Nov-13

Client: Western Refining Southwest, Gallup

Project: Seep West Of Tank 102

Sample ID **5ML RB**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBW**	Batch ID: **R14497**	RunNo: **14497**
Prep Date:	Analysis Date: **10/31/2013**	SeqNo: **416401** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	0.050								
Surr: BFB	19		20.00		92.8	51.5	151			

Sample ID **2.5UG GRO LCS**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSW**	Batch ID: **R14497**	RunNo: **14497**
Prep Date:	Analysis Date: **10/31/2013**	SeqNo: **416402** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0.50	0.050	0.5000	0	100	80	120			
Surr: BFB	20		20.00		101	51.5	151			

Sample ID **B7**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBW**	Batch ID: **R14541**	RunNo: **14541**
Prep Date:	Analysis Date: **11/4/2013**	SeqNo: **418164** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	19		20.00		93.8	80.4	118			

Sample ID **2.5UG GRO LCS**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSW**	Batch ID: **R14541**	RunNo: **14541**
Prep Date:	Analysis Date: **11/4/2013**	SeqNo: **418165** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	21		20.00		104	80.4	118			

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1310D69**

Hall Environmental Analysis Laboratory, Inc.

05-Nov-13

Client: Western Refining Southwest, Gallup
Project: Seep West Of Tank 102

Sample ID **5ML RB**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **R14497**	RunNo: **14497**
Prep Date:	Analysis Date: **10/31/2013**	SeqNo: **416431** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	2.5								
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Xylenes, Total	ND	2.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
Surr: 4-Bromofluorobenzene	20		20.00		102	85	136			

Sample ID **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **R14497**	RunNo: **14497**
Prep Date:	Analysis Date: **10/31/2013**	SeqNo: **416432** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	19	2.5	20.00	0	94.0	76.8	124			
Benzene	18	1.0	20.00	0	91.2	80	120			
Toluene	18	1.0	20.00	0	92.0	80	120			
ylbenzene	19	1.0	20.00	0	94.2	80	120			
ylenes, Total	58	2.0	60.00	0	96.0	80	120			
1,2,4-Trimethylbenzene	19	1.0	20.00	0	96.0	80	120			
1,3,5-Trimethylbenzene	20	1.0	20.00	0	98.4	80	120			
Surr: 4-Bromofluorobenzene	21		20.00		103	85	136			

Sample ID **B7**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBW**	Batch ID: **R14541**	RunNo: **14541**
Prep Date:	Analysis Date: **11/4/2013**	SeqNo: **418215** 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								
Surr: 4-Bromofluorobenzene	20		20.00		102	85	136			

Sample ID **100NG BTEX LCS**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSW**	Batch ID: **R14541**	RunNo: **14541**
Prep Date:	Analysis Date: **11/4/2013**	SeqNo: **418216** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	20	1.0	20.00	0	99.8	80	120			
Toluene	20	1.0	20.00	0	100	80	120			
Surr: 4-Bromofluorobenzene	22		20.00		108	85	136			

Qualifiers:

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

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 Gallup Work Order Number: 1310D69 RcptNo: 1

Received by/date: AG 10/29/13

Logged By: **Lindsay Mangin** 10/29/2013 12:29:00 PM

Completed By: **Lindsay Mangin** 10/29/2013 1:17:35 PM

Reviewed By: AT 10/30/13

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☑	No ☐	Not Present ☐
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	Client		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

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

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.9	Good	Yes			

Chain-of-Custody Record

Client: WESTERN REFINING
GALLUP REFINERY
Mailing Address: ROUTE 3 BOX 7
TAMESTOWN, NM 87301
Phone #: 505-722-3833
email or Fax#: 505-863-0930
QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other _____
☐ EDD (Type) _____

Turn-Around Time:
☒ Standard ☐ Rush _____
Project Name: SEEP WEST OF TANK 102
Project #:
Project Manager: CHERYL JOHNSON
Sampler: TRACY PAYNE
On Ice: ☑ Yes ☐ No
Sample Temperature: 2.9

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. B10D69	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	BTEX & TPH (GRO DRO MRO)			Air Bubbles (Y or N)
10-28-13	0915	GW	SB14	4 40mL VOA	HCL/NEAT	-001												✓			
	0935		SB15			-002												✓			
	1000		SB12			-003												✓			
	1020		SB07			-004												✓			
	1040		HA3			-005												✓			

Date	Time	Relinquished by:	Received by:	Date	Time
10/29/13	7:10			10/29/13	1229
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.

DePauli Engineering
& Surveying, LLC.
Civil Engineers and Land Surveyors

Phone: 505-863-5440 • Fax: 505-863-1919 • www.depauliengineering.com
307 South 4th Street • Gallup, NM 87301
PO BOX 876 • Gallup, NM 87305

February 11, 2014

Mr. Ed Riege, Environmental Manager
Western Refining-Gallup Refinery
Route 3 Box 7
Gallup, NM 87301

Re: Western Refining Monitoring Wells

Dear Mr. Riege:

DePauli Engineering & Surveying, LLC completed the field survey of the 18 monitoring wells at Western Refining-Gallup Refinery on January 21, 2014. The wells were surveyed for the following parameter: ground level elevation, ground level elevation inside steel sleeve, center top steel lid elevation, well casing rim elevation and corresponding measuring point description associated with each elevation. Survey conducted enlisted NM Surveyor in Training and a Technician (under my direct supervision), from DePauli Engineering Surveying, LLC and one Gallup Refinery representative to assist with the location of the wells.

The instruments used to complete the survey consisted of a Leica VIVA GS10 GPS (global positing system) and System 1200 GPS. The method used to survey the wells was Real-time Kinematic GPS Surveying (RTK). RTK surveying requires that two or more receivers are operated simultaneously. The aspect of the procedure involves a radio transmitting a signal from the base station. The base station's coordinates are utilized to make the appropriate corrections to the error involved with the GPS signals. The rover receives the corrections thence giving the rover observation corrected valves. The horizontal and vertical positions are determined by differential GPS involving the base line surveyed from local base station to survey position. The base line measurements are surveyed for one minute (60 observations). This is verified by surveying known local control points and bench marks.

The horizontal and vertical positions of the top of the PVC casing (unless otherwise noted) and the vertical positions for the lid, ground elevation inside the steel casing, and the surrounding ground elevation is shown on the attached sheet labeled "Western Refining Monitoring Wells January 21, 2014." The horizontal position is NAD 83 datum and the vertical positions are NGVD 1929. Elevations were taken using the concrete pad surrounding each well and locations

noted on the report. Ground elevation was taken using the concrete pad surrounding each well and locations shown on the report.

The requested field survey was complete on January 21, 2014 in accordance with sections 500.1 through 500.12 of the Regulations and Rules of the Board of Registration for Professional Engineers and Surveyors Minimum Standards for Surveying in New Mexico; which horizontal positions were measured to the nearest 0.1-ft and vertical elevations were measured to an accuracy of 0.01-ft.

If you have any questions concerning this survey please do not hesitate to contact our office.

Sincerely,

Marc DePauli

Marc DePauli, PE/PS

Western Refining Monitoring Wells January 21, 2014

Well #	Northing	Easting	Elevation	Description
MKTF-10	1,633,807.47	2,545,853.54	6937.16	North edge PVC casing
			6937.51	Center steel lid
			6936.63	North side ground elev. inside steel sleeve
			6937.51	Average corner elevation of concrete collar
MKTF-15	1,633,845.57	2,545,934.58	6943.48	North edge PVC casing
			6943.73	Center steel lid
			6943.19	North side ground elev. inside steel sleeve
			6943.74	**Average elevation of concrete collar
			** Concrete collar is in general circular shape	
MKTF-16	1,633,718.14	2,546,068.55	6950.58	North edge PVC casing
			6950.97	Center steel lid
			6950.58	North side ground elev. inside steel sleeve
			6951.00	Average corner elevation of concrete collar
MKTF-11	1,633,806.93	2,545,754.77	6931.34	South edge PVC casing
			6931.61	Center steel lid
			6930.86	North side ground elev. inside steel sleeve
			6931.61	Average corner elevation of concrete collar
MKTF-03	1,633,746.53	2,545,756.87	6931.31	North edge PVC casing
			6931.69	Center steel lid
			6930.85	North side ground elev. inside steel sleeve
			6931.73	Average corner elevation of concrete collar
MKTF-04	1,633,649.46	2,545,752.83	6933.57	North edge PVC casing
			6933.91	Center steel lid
			6933.24	North side ground elev. inside steel sleeve
			6933.90	Average corner elevation of concrete collar
MKTF-05	1,633,472.30	2,545,769.95	6942.22	North edge PVC casing
			6942.80	Center steel lid
			6941.95	South side ground elev. inside steel sleeve
			6939.49	Average corner elevation of concrete collar
MKTF-09	1,633,681.33	2,545,895.93	6946.50	North edge PVC casing
			6947.21	Center steel lid
			6945.90	South side ground elev. inside steel sleeve
			6943.57	Average corner elevation of concrete collar

Well #	Northing	Easting	Elevation	Description
MKTF-08	1,633,598.94	2,545,885.02	6947.09	North edge PVC casing
			6947.48	Center steel lid
			6942.67	South side ground elev. inside steel sleeve
			6944.02	Average corner elevation of concrete collar
MKTF-07	1,633,555.11	2,545,885.42	6947.18	North edge PVC casing
			6947.84	Center steel lid
			6947.06	South side ground elev. inside steel sleeve
			6944.40	Average corner elevation of concrete collar
MKTF-06	1,633,556.28	2,545,811.85	6946.81	North edge PVC casing
			6947.29	Center steel lid
			6946.63	South side ground elev. inside steel sleeve
			6944.24	Average corner elevation of concrete collar
MKTF-18	1,633,497.53	2,546,006.29	6950.65	**North edge PVC casing
			6950.96	Center steel lid
			6950.17	North side ground elev. inside steel sleeve
			6950.97	Average corner elevation of concrete collar
				** Mark was existing on PVC casing
MKTF-12	1,633,542.07	2,545,688.29	6942.11	North edge PVC casing
			6942.84	Center steel lid
			6941.88	South side ground elev. inside steel sleeve
			6939.70	Average corner elevation of concrete collar
MKTF-13	1,633,625.25	2,545,697.39	6935.18	**North edge PVC casing
			6936.89	Center steel lid
			6934.83	South side ground elev. inside steel sleeve
			6933.67	Average corner elevation of concrete collar
				** PVC casing not typical
MKTF-14	1,633,719.43	2,545,625.96	6928.02	North edge PVC casing
			6928.75	Center steel lid
			6927.80	South side ground elev. inside steel sleeve
			6925.65	Average corner elevation of concrete collar
MKTF-01	1,633,864.41	2,545,561.73	6920.67	**North edge PVC casing
			6921.68	Center steel lid
			6920.67	South side ground elev. inside steel sleeve
			6918.28	**Average corner elevation of concrete collar
				** Inside ground elev. is flush with PVC casing

Well #	Northing	Easting	Elevation	Description
MKTF-02	1,633,946.93	2,545,530.46	6917.45	** North edge PVC casing
			6918.31	Center steel lid
			6917.18	South side ground elev. inside steel sleeve
			6915.00	Average corner elevation of concrete collar
				** PVC casing not typical
MKTF-17	1,633,268.93	2,545,850.73	6945.76	North edge PVC casing
			6946.00	Center steel lid
			6945.64	North side ground elev. inside steel sleeve
			6945.79	** Average corner elevation of concrete collar
			**	Concrete collar is in general circular shape

Marc DePauli

Marc DePauli PS13606

2-11-2014

Date

FIGURES

Figure 1: Regional map showing the location of the Gallup Refinery (red star along Interstate-40, 20 miles east of the City of Gallup).

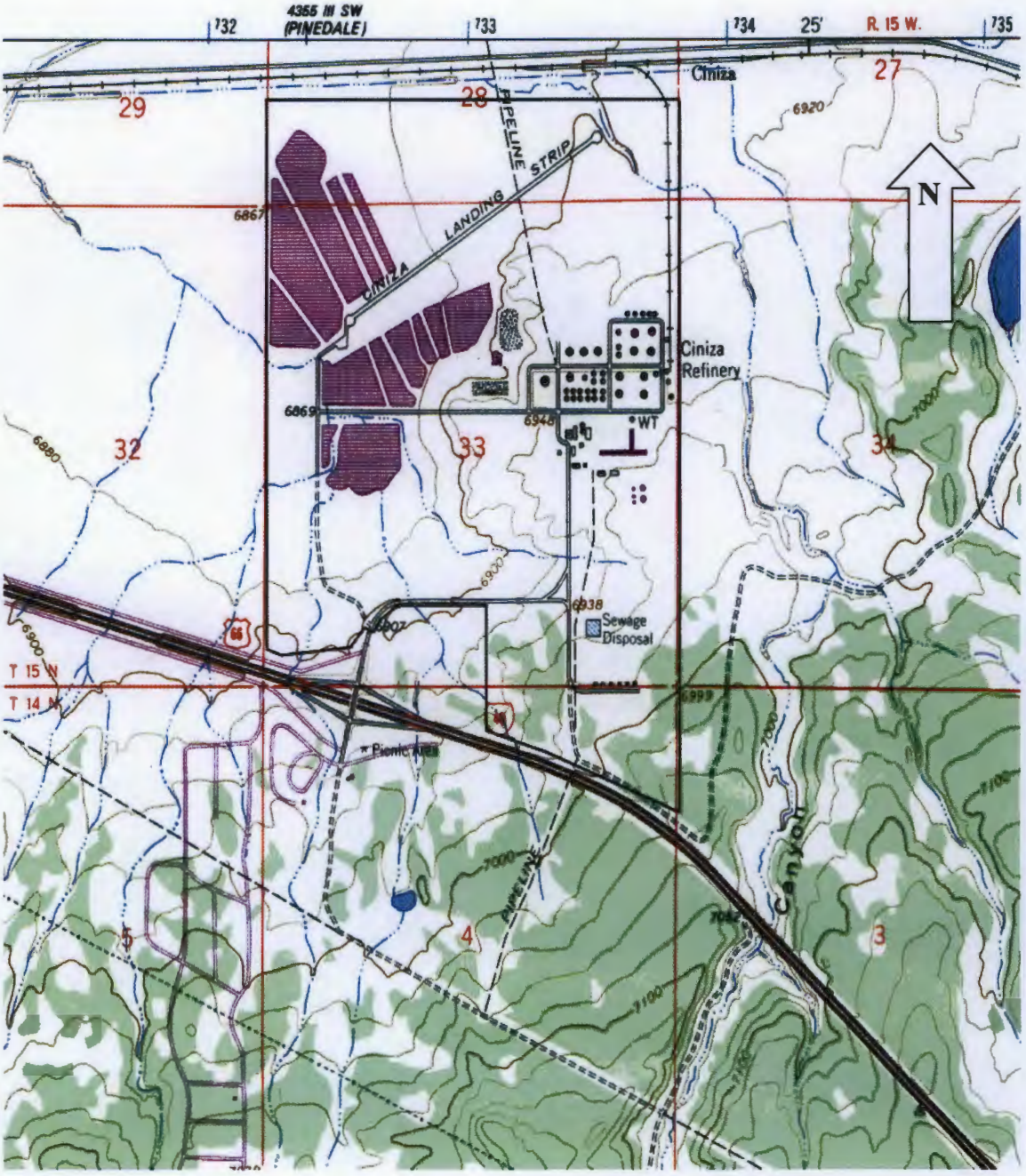

Figure 2: Topographic Map of the Gallup Refinery Site - USGS Topographical Map - Gallup Quadrangle (Revised 1980)

FIGURE 3 CURRENTLY BEING REVISED

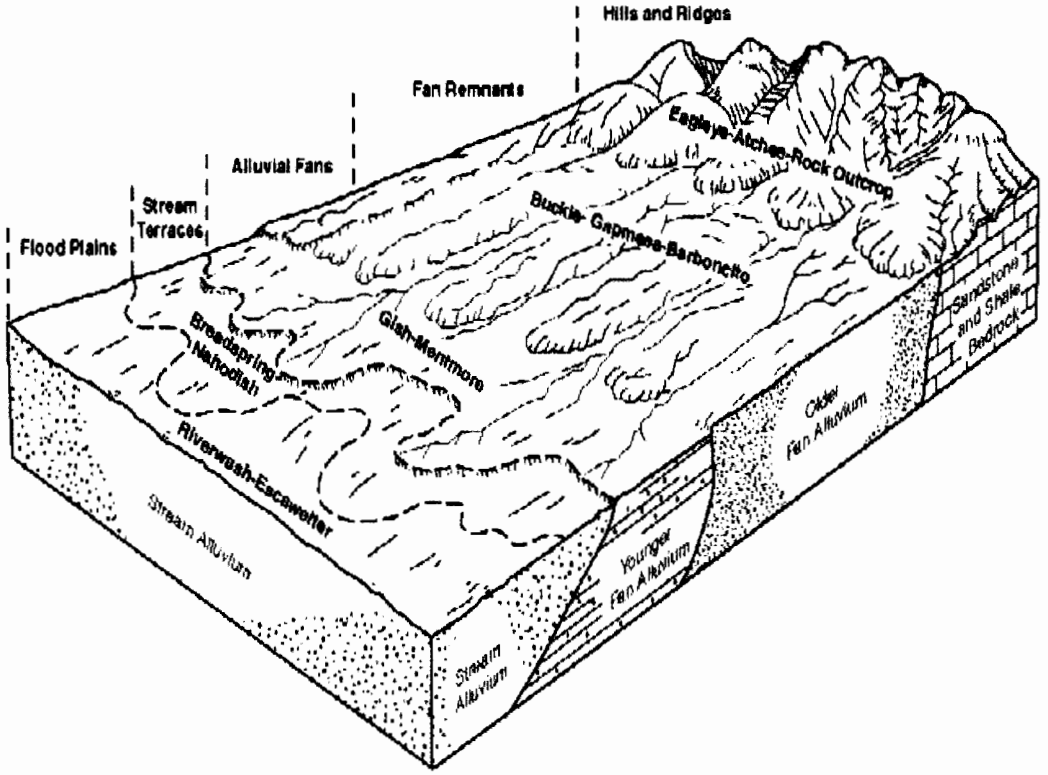

Figure 4: Generalized relationship of soils in the Gallup Refinery area: from NRCS/USDA Soil Survey of McKinley County.

FIGURES 5 & 6 CURRENTLY BEING REVISED