GW - ____001_____

WORK PLAN
GROUP 8

(SWMUs 3 Underground Piping in Use & 6 Abandoned Underground Piping)

December 2010

Western Refining
LOGISTICS

WNR LISTED NYSE

July 22, 2013

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

RECEIVED OCD
2013 AUG -5 P 2: 20

Certified Mail #: 7007 2560 0002 5890 7215

RE: Response to May 8, 2013 Approval
Investigation Report Group 8 (SWMU No. 3 Underground Piping Currently in Use and SWMU No. 6 Abandoned Underground Piping), June 2012
Western Refining Southwest Inc., Bloomfield Refinery
EPA ID# NMD089416416
HWB-WRB-12-004

Dear Mr. Kieling:

Western Refining Southwest, Inc. – Bloomfield (Western) has prepared the following responses to your comments (dated May 8, 2013) received on the above referenced investigation report.

NMED Comment 1 - Section 3.1 (Soil Boring Installation and Sample Collection), page 9, paragraph 2:

Western's Statement: *"NMED was contacted on February 2, 1012 to request changes to the proposed scope of work."*

NMED's Comment: *There is a typographical error in reporting the date of the correspondence with NMED. Western meant 2012. No revision is necessary.*

Western's Comment 1 Response: The text has been revised. Replacement pages are enclosed.

NMED Comment 2 - Section 3.1 (Soil Boring Installation and Sample Collection), SWMU 6-1, 6-2, and 6-3, page 11, paragraph 1:

Western's Statement: *"[a] 10-foot deep hydro-excavated trench extending north approximately 20 feet from the piping manifold south of Tank 13 feet did not reveal any underground piping in the area."*

NMED's Comment: *There appears to be a typographical error in this statement. It is unclear if Western is referencing "Tank 13" or describing a distance "13 feet" and did not report the tank number. Clarify the statement and provide a replacement page with the correct information.*

Western's Comment 2 Response: The text has been revised to clarify the description of field activities. A replacement page is enclosed.

NMED Comment 3 - Section 5 (Regulatory Criteria), page 29, paragraph 3:

Western's Statement: *"[b]ecause the specific type of products (e.g., diesel fuel or jet fuel)*

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that were potentially released from the various underground pipelines is not always known, "unknown oil" was selected from Table 6-2 for comparison to the diesel range analytical results. There are no screening levels for comparison to results reported in the gasoline range, but rather individual constituents (e.g., [benzene, toluene, ethylbenzene, and xylene (BTEX)]) are evaluated."

NMED's Comment: *There appears to be a typographical error associated with the statement that "[t]here are no screening levels for comparison to results reported in the gasoline range" because in Table 3 (Ground Water Analytical Results Summary), Western reports a screening level of 1.34 mg/L for #3 and #6 fuel oils from the NMED Total Petroleum Hydrocarbons (TPH) Screening Guidelines (October 2006) Table 2a (TPH Screening Guidelines for Potable Groundwater (GW-1)) to compare to the gasoline range organics (GRO) data results. In addition, NMED reviewed the 2006 drinking water standards from the Massachusetts Department of Environmental Protection (MADEP) website and did not find screening levels equivalent to the #3 and #6 fuel oils screening levels found in NMED's TPH guidance documents. Explain why the #3 and #6 fuel oils screening level was chosen to evaluate the GRO data and provide replacement pages that contain the discussion in the appropriate sections of the Report and future reports.*

Western's Comment 3 Response: The screening levels shown in Table 3 for the TPH-GRO are incorrect. As noted in the text, there are no screening levels for GRO but rather individual constituents are evaluated per NMED guidance. Table 3 has been revised to remove the screening levels included for GRO and the updated version is enclosed.

NMED Comment 4 - Section 6.1 (Soil Sampling Chemical Analytical Results), SWMU No. 6 Abandoned Underground Piping, page 34, paragraph 2:

Western's Statement: *"[s]oil boring SWMU 15-3 is located along an active underground hydrocarbon pipeline but is also near the end of an abandoned underground hydrocarbon pipeline. Arsenic and chromium were the only constituents detected at concentrations above the screening levels from this location in a sample collected from 0.5 to 2'. The arsenic and chromium results are discussed above under SWMU No. 3."*

NMED's Comment: *The chromium results for soil boring SWMU 15-3 are not discussed in the referenced section above. In future reports, discuss relevant samples in the appropriate sections. No revision is necessary.*

Western's Comment 4 Response: None required.

NMED Comment 5 - Section 7.2 (Recommendations), page 38, paragraph 2:

Western's Statement: "[a]fter background values have been established, the site data for arsenic, chromium, and cobalt should be reassessed to determine if some analytical results are actually representative of background conditions and not site-related impacts. If some of the highest chromium values exceed background concentrations, then these locations may need to be reassessed to determine if chromium in soils is present as chromium III or VI."

NMED's Comment: *Past investigations have stated the need to speciate chromium but Western has not proposed methods for speciating chromium at the facility and when it will be carried out. Briefly explain the method Western plans to use to speciate chromium at the facility and propose a schedule to complete the task, if appropriate.*

Western's Comment 5 Response: Western proposed to collect soil samples at Group 6 and Group 9 locations and analyze the soil samples for both total chromium and chromium VI to speciate chromium at the facility. The investigation work plans for these sample collection activities were recently approved by NMED on May 8, 2013 and the field work for Group 6 was conducted in June 2013. The analytical results for the soil samples collected at Group 6 indicate that all results for chromium VI are non-detect, while total chromium results did indicate that chromium is present in all of the samples analyzed. This information is included in the recently revised Group 6 Investigation Report.

NMED Comment 6 - Section 7.2 (Recommendations), page 38, paragraph 3:

Western's Statement: *"[t]he sampling data does not indicate any releases from the underground pipelines investigated as part of Group 8. Western recommends that SWMUs 3 and 6 be approved for Corrective Action Complete [(CAC)] Without Controls once a demonstration is made that chromium does not pose an unacceptable threat."*

NMED Comment: *NMED does not believe that a Corrective Action Complete without Controls determination is possible for the Group 8 SWMUs at this time because groundwater contamination is present beneath the sites and the underground piping at SWMU 3 remains in use. Western has demonstrated that no further work is warranted for SWMUs 3 and 6 and may petition for a Corrective Action Complete with Controls determination, which would include the continuation of groundwater monitoring at the facility and maintaining and testing the active underground pipelines at SWMU 3 throughout the duration of their use. Any future releases from SWMU 3 will be addressed at that time.*

Western's Comment 6 Response: Western respectfully requests that NMED reconsider its position that these SWMUs cannot qualify for Corrective Action Complete without Controls based on the following considerations:

1. The investigation results do not show any evidence of a release from the underground pipelines that has caused or contributed to the impacted groundwater that occurs in some locations where piping is also present. If it is NMED's position that a SWMU or AOC cannot qualify for Corrective Action Complete without Controls while an unrelated groundwater plume is present in the area of the subject SWMU/AOC, then it appears that very few of the SWMUs/AOCs at the Bloomfield Refinery could possibly qualify for Corrective Action Complete without Controls until the groundwater is remediated. Where a SWMU or AOC has been investigated, found not to require corrective action, and there is no indication of any contribution from the subject SWMU/AOC to the underlying groundwater plume, Western would like clarification as to why NMED would continue to prevent termination of the Corrective Action Process at any such SWMUs/AOCs. It is assumed that NMED has authority to require "continuation of groundwater monitoring at the facility" and remediation of the affected groundwater without having to rely upon some regulatory link to an overlying SMWU/AOC, which has not contributed to the groundwater impacts. Western does not understand what benefit to human health and the environment, or even to NMED's regulatory process, is achieved by not approving Corrective Action Complete without Controls where no threat to human health or the environment is found to exist.
2. It is Western's position that a SWMU or AOC at a location in which solid wastes are still being managed should not automatically be disqualified from being able to obtain Corrective Action Complete without Controls if in fact there is no evidence of

a release that requires corrective action or any such releases have been remediated to residential standards. If this is NMED's intention that "active" SWMUs will have to be investigated again in the future once all waste management activities have ceased to once again demonstrate that there is no release that requires corrective action, then Western requests that all further investigation at active SWMUs be postponed until all waste management activities have ceased at the Bloomfield Refinery to avoid duplicative requirements. Western maintains a stringent Health and Safety Plan to ensure protection of on-site workers and site visitors. Western believes that the existing site investigation data is more than adequate to ensure that any necessary actions are taken to ensure protection of any potential off-site receptors. This would allow Western to focus its resources on the SWMUs/AOCs, which could possibly qualify for Corrective Action Complete without Controls, thus resulting in termination of the Corrective Action Process at these SMWUs/AOCs. We assume that NMED's goal is the same as Western's goal which is to move toward completion of the Corrective Action Process, as opposed to receiving temporary requiring "controls" where no controls are actually required (i.e., concentrations of constituents in environmental media are below applicable screening levels).

Western notes that, as explained in the Investigation Work Plan and Investigation Report for Group 8, active underground piping is routinely inspected and tested to maintain the piping in good working order to prevent releases. There are existing regulatory requirements to conduct inspections on active piping by the New Mexico Oil Conservation Division (NMOCD). Western complies with these requirements, but is not aware that the Hazardous Waste Bureau has regulatory authority over the operation of these pipelines. As shown in Table 1, the vast majority of the underground lines that remain in service are used to transfer crude oil and/or petroleum products, neither of which is a Solid Waste (40 Code of Federal Regulations §261.2). The pipelines that carry recovered groundwater or wastewater to the permitted injection well are inspected under the requirements of the NMOCD, which has jurisdiction over the operations of the associated injection well. If the Hazardous Waste Bureau has specific regulatory authority over the operation/inspections of pipelines at Western's refineries in New Mexico, then please provide the citation of your regulations so that Western can ensure full compliance with all directly applicable pipeline regulations. Otherwise, Western is not aware of any authority that the Hazardous Waste Bureau has to require "maintaining and testing the active underground pipelines at SWMU 3 throughout the duration of their use."

Western also understands that if SWMU No. 3 (Underground Piping Currently in Use) were approved for Corrective Action Complete without Controls and at some future time there was a release noted from this underground piping that the SWMU would have to reenter the Corrective Action Process with investigation and remediation, as necessary. It is Western's opinion that the potential for a future release should not serve as justification for not approving Corrective Action Complete without Controls.

NMED Comment 7 - Table 1 (Description and Inspection Schedule of Underground Pipelines):

NMED's Comment: *Revise Table 1 to address the typographical errors and missing information as listed in the comments below:*

a. *"Effluent," "Hydrotest," "Naptha," "Premium," "Gasoline," "Nozzle," and "Unleaded" are misspelled in Table 1.*

b. *Provide a footnote section at the end of the Table 1 to define all symbols and blank cells.*
c. *Include a section on the table that provides the installation date for the pipelines and the out of service date.*
d. *Define LPG, ULSD, VRU, and DHT in the footnote section of Table 1.*

Western's Comment 7 Response: Table 1 has been revised as directed, with the exception of inclusion of pipeline installation dates. The Bloomfield facility has evolved into what exists today since the 1950's. Over the years piping as been replaced, rerouted, removed, and decommissioned based on the operational and maintenance needs at the time. In addition, the personnel who were primarily responsible for piping changes and additions are no longer with Western following the suspension of refining operation in 2009. Therefore, it is not possible to determine the installation dates for each existing segment of underground piping at the facility.

At current, the piping designated as "Temporarily Out of Service" is to reflect the piping no longer in-service as a result of the suspension of refining operations in November 2009. A notation has been added to Table 1 to reflect this fact. Also, the fact that Table 1 includes information only for SWMU No. 3 is discussed in Section 2 of the Investigation Report. Please find two copies of the revised table enclosed.

NMED Comment 8 - Tables 2 (Existing Soil Analytical Results) and 7 (Group 8 Soil Analytical Results Summary):

NMED's Comment: *Revise Tables 2 and 7 to address the typographical errors and missing information as listed in the comments below:*

a. *In the footnote section of Tables 2 and 7, Western defines bolded values that were above non-residential screening levels and yellow highlighted values that were above the leachate. (DAF) screening levels. The chromium VI results included highlighted and bolded values that were above the DAF and residential screening levels. Apply the appropriate formats in the revised table.*
b. *1,2,4-trimethylbenzene is missing from Table 2.*
c. *There are two sets of volatile organic compound (VOC) data in Table 2; however, the units for the first set appear to be mislabeled as "mg/kg" instead of "mg/kg-dry." Provide the correct units or explain why there are two sets of VOC data in the table and, if appropriate, provide a revised table.*
d. *"Unknown" is misspelled in the footnote section of both tables.*

Western's Comment 8 Response:

a. A review of the highlighted and bolded results indicates the results were correctly displayed in the tables; however, copying of the tables for inclusion in the reports may have made it more difficult to distinguish between bolded and non-bolded values. New printouts of the tables are enclosed.
b. The new printout of Table 2 includes 1,2,4-trimethlybenzene.
c. There are actually two sets of volatile organic results reported by the laboratory due to the fact that samples with relatively low concentrations of volatile organics can be reported at lower limits than samples with high concentrations. The lab may perform two separate analyses for volatiles using different extraction fluids if samples with both high and low concentrations are included in the same lab report and the results

are reported in different units. Table 2 is revised to more accurately reflect the laboratory reports.

d. The misspelling of unknown in the footnotes has been corrected.

NMED Comment 9 - Table 3 (Ground Water Analytical Results Summary):

NMED's Comment: *Table 3 does not define all symbols and highlights in the table. Provide these definitions in the revised table.*

Western's Comment 9 Response: Table 3 has been revised to include all symbols in the footnotes. It is noted that highlighting was removed from some of the analytical results for MW-52, which were already bolded to indicate an exceedence of the screening level.

NMED Comment 10 - Appendix H (Quality Assurance/Quality Control Review), Section 2.7(MS/MSD Recovery and Relative Percent Difference), bullet 2:

Western's Statement: *"[i]f the MS or MSD recovery for an analyte was above acceptance limits and the analyte was detected in the associated analytical batch, then analyte results were qualified "J+" to account for a potential low bias."*

NMED's Comment: *There is a typographical error in reporting the "J" qualified information. "J+" is qualified to account for a potential high bias and "J-" for a potential low bias. In future reports, ensure the correct information is presented in their appropriate sections.*

Western's Comment 10 Response: This will be corrected in future reports.

You will please find enclosed two hard copies of the replacement pages. In addition, an electronic version of the revised report text (redline strikeout format) is enclosed that identifies where changes were made to the body of the report. If you have questions regarding the above responses or the enclosures, please contact me at (505) 632-4171.

Sincerely,

James R. Schmaltz
HSER Director
Western Refining Southwest, Inc., Bloomfield Refinery

cc: Dave Cobrain – NMED HWB
Neelam Dhawan – NMED HWB
Leona Tsinnajinnie – NMED HWB
Carl Chavez - NMOCD
Allen Hains – Western Refining El Paso
Kelly Robinson – Western Refining Bloomfield

Western Refining

BLOOMFIELD LOGISTICS

INVESTIGATION REPORT
GROUP 8

(SWMU No. 3 Underground Piping Currently in Use and SWMU No. 6 Abandoned Underground Piping)

Bloomfield Refinery
Western Refining Southwest, Inc.
#50 Rd 4990
Bloomfield, New Mexico 87413

June 2012
(Revised August 2013)

James R. Schmaltz
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Section 3
Scope of Activities

3.1 Soil Boring Installation and Sample Collection

Pursuant to Section IV of the Order and the approved Group 8 Investigation Work Plan, an investigation of soils was conducted to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil borings were installed at SWMUs 3 and 6 (Figure 2). No groundwater samples were collected under this scope of work, as groundwater samples are routinely collected and analyzed on a semiannual basis as part of the Facility-Wide Groundwater Monitoring Plan from much of this area. As outlined in the work plan, there is the potential for constituents to have been released to soils at known locations at SWMUs 3 and 6, and therefore a judgmental sampling design was implemented. Examples of these areas include pipe connections (e.g., fittings and valves). Western routinely tests underground pipelines for leaks. All recent tests have passed and therefore no additional potential target investigation locations were determined from integrity test results.

Fifteen soil borings were proposed along the SWMU No. 3 active wastewater pipelines and thirteen soil borings were proposed along the active hydrocarbon pipelines. Four soil borings were proposed along the SWMU No. 6 abandoned pipelines. Prior to installing the soil borings, the actual location and depth of the pipelines were identified in the field and based on these observations, NMED was contacted on February 2, 1012 to request changes to the proposed scope of work. The changes affected four separate areas and each are explained below.

SWMU 3-2

The piping from Tank 37 to the API separator is an underground PVC pipeline that conveys recovered water from Tank 37 (located north of the Hammond Ditch) to the API separator. The jog in the piping as reflected by proposed soil boring location identified as 3-2 on Figure 2 was found to be physically located under the concrete slab of one of the process units. In this same vicinity there exists an active high voltage power line that is known to be in PVC conduit and not protected by concrete, and there also exists a high-pressure fire water system manifold used to supply fire water to the adjacent process units.

successful in locating this abandoned line. A 10-foot deep hydro-excavated trench extending north approximately 20 feet from the piping manifold, which is located south of Tank 13, did not reveal any underground piping in the area. Additional interviews with both on-site and former Western personnel gave reason to believe that this abandoned pipe was originally located in the same trench as the fire water line, which runs west-east along the Tank Farm roadway south of Tanks 11 through 14. Western personnel also indicated that this line has since been removed. The line has not been in-service since the 1980's. Recent hydro-excavation along the current fire-water line did not find the pipeline, confirming the pipeline has been removed.

Western requested permission to not collect soil samples from the proposed soil boring locations indicated as 6-1, 6-2, and 6-3 on Figure 2 since the pipeline cannot be located in the field. NMED responded to Western's request and asked about the possibility of collecting samples along the fire water line where the former wastewater line was previously located. Western elected not to collect samples during this mobilization to allow further investigation of the actual location of this former line to ensure samples are collected in the correct location. Because the original depth could not be verified, it was not possible to select sample depths pursuant to the work plan.

The soil borings were proposed to be drilled to a minimum depth of six feet below the bottom depth of the adjacent pipeline. If there was screening evidence of impacted soils (e.g., petroleum odor, staining, or elevated photo-ionization detector or a combustible gas indicator readings) at six feet below the pipeline, then the boring was extended deeper until there was either no evidence of impact or groundwater was encountered.

In accordance with the work plan, the following soil borings were installed to a minimum depth of six feet below the bottom depth of the adjacent pipeline using hollow-stem augering (HSA) drilling and sampling methodology:

- SWMU 3-1 – This boring is located adjacent to an active hydrocarbon pipeline. The pipeline in this area makes a 90° turn. The pipeline was hydroexcavated and the bottom of the pipeline was found to be 2.5 feet below ground level (bgl). The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 3.5 – 4.5 feet and 7.5 – 8.5 feet.

- SWMU 3-5 – This boring is located adjacent to an active wastewater pipeline. The pipeline was hydroexcavated and the bottom was found to be 3.5 feet bgl. The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 4.5 – 5.5 feet and 8.5 – 9.5 feet.

Table 1
Description and Inspection Schedule of Underground Pipelines
SWMU Group 8 Investigation Report
Western Refining Southwest - Bloomfield Refinery

Line Number	Description (Service)	Line Size (inch)	Line Length (feet)	Starting Location	End Location	Drawing Reference	Construction Material	Next Inspection Scheduled	Last Inspection Date	Inspection Results Pass/Fail	Test/ Inspection Method	Repairs/ Maintenance Needed	Repairs-Maintenance Completion date
1	Effluent Water Transfer Line	6	3250	Effluent Pond Outlet Pump P-616	Effluent Transfer P-671	D-500-800-031	PVC	2015	Jul-10	Pass	Hydrostatic	None	N/A
2	Effluent Water Transfer Pump	6	908	North Evaporation Pond Outlet	Effluent Transfer Pump P-671	D-500-800-031	PVC	2013					
3	Effluent Water Pump Discharge	6	2797	Effluent Transfer P-671	Injection Well Building	D-500-800-031	PVC	2014	Oct-09	Pass	Hydrostatic	None	N/A
4	Injection Well Recirculation Line	6	2512	Injection Well Building	North Evaporation Pond	D-500-800-031	PVC	2013					
5	River Terrace Transfer Line	2	277	River Terrace Processing Skid	River Pump Building Water Basin	D-500-800-043	PVC	2016	Aug-11	Pass	Hydrostatic	None	N/A
6	Crude Transfer Line	10	215	Pipe Rack East Of LPG Storage Tanks	Pipe Rack Southwest of Tank 31	D-700-800-106 (F-2)	Carbon steel	2013	May-08	Pass	Praxair	None	N/A
7	Steam Header at Terminals	6	215	Pipe Rack Southwest of Tank 31	Pipe Rack East Of LPG Storage Tanks	N/A	Carbon steel	2013					
8	Condensate Return Header	4	215	Pipe Rack East Of LPG Storage Tanks	Pipe Rack Southwest of Tank 31	N/A	Carbon steel	2013					
9	Premium Receipts to Tank 32/36	4	218	Pipe Rack East Of LPG Bullets	Pipe Rack Southwest of Tank 31	D-600-800-118 (H-17)	Carbon steel	2017	May-12	Pass	Hydrostatic	None	N/A
10	ULSD Sales Line	10	218	Pipe Rack Southwest of Tank 31	Filter Pad Area North Of Loading Pad	D-700-800-100 (D-2)	Carbon steel	2017	Praxair 2012	Pass	Praxair	None	N/A
11	Unleaded Gasoline Sales	10	218	Pipe Rack Southwest of Tank 31	Filter Pad Area North Of Loading Pad	D-700-800-100 (C-2)	Carbon steel	2017	Praxair 2012	Pass	Praxair	None	N/A
12	Transmix Sales from Tank 30	10	218	Pipe Rack Southwest of Tank 31	Filter Pad Area North Of Loading Pad	D-700-800-100 (C-2)	Carbon steel	2013					
13	Subgrade receipts to Tanks 13 / 14	4	218	Pipe Rack Southwest of Tank 31	Area Northeast of B-21	D-600-800-118 (G-17)	Carbon steel	2017	Apr-12	Pass	Hydrostatic	None	N/A
14	VRU Effluent	3	275	Pipe Rack Southwest of Tank 31	East of B-21	D-600-800-114 (D-1)	Carbon steel	2015	Aug-10	Pass	Hydrostatic	None	N/A
26	VRU Effluent	4	410	East of B-21	Manifold at VRU Unit	D-700-800-106 (D-17)	Carbon steel	2013	May-08	Pass	Hydrostatic	None	N/A
15	VRU Return (Former Poly Feed Lines)	2	---	Area Northeast of B- 21	Pipe Rack Southwest of Tank 31	N/A	Carbon steel	*Temporarily Out of Service					
16	LPG Rerun Line	2	---	Area Northeast of B-21	Pipe Rack Southwest of Tank 31	N/A	Carbon steel	*Temporarily Out of Service					
17	Saturate To Storage	2	---	Pipe Rack Southwest of Tank 31	Area Northeast of B-21	N/A	Carbon steel	*Temporarily Out of Service					
18	C-4 To Storage	2	---	Pipe Rack Southwest of Tank 31	Area Northeast of B-21	N/A	Carbon steel	*Temporarily Out of Service					
19	C-3 To Storage	2	---	Pipe Rack Southwest of Tank 31		N/A	Carbon steel	*Temporarily Out of Service					
20	Sour Naphtha Sales From Tank 23	8	534	Pipe Rack Southwest of Tank 31	Filter Pad Area North Of Loading Pad	D-700-800-100 (C-3)	Carbon steel	2017	Praxair 2012	Pass	Praxair	None	N/A
21	Dyed Diesel Sales From Tank 18	6	534	Pipe Rack Southwest of Tank 31	Filter Pad Area North Of Loading Pad	D-700-800-100 (C-2)	Carbon steel	2017	Praxair 2012	Pass	Praxair	None	N/A
23	ULSD/Naphtha receipts	6	750	South West Of Tank 25	West of Truck Unload Rack	D-600-800-118 (J-1)	Carbon steel	2017	Dec-12	Pass	Hydrostatic	None	N/A
24	BLINDED	8	---	Pipe Rack West Of Tank 36	Filter Pad Area North Of Loading Pad	D-700-800-100 (E-3)	Carbon steel	*Temporarily Out of Service					
25	Premium Sales from Tank 32	6	392	Pipe Rack West Of Tank 36	Filter Pad Area North Of Loading Pad	D-700-800-100 (E-3)	Carbon steel	2017	Praxair 2012	Pass	Praxair	None	N/A
27	Naphtha Feed To VRU Unit	4	---	Transfer Pump at Tank 44	Manifold at VRU Unit	NewTech 595-M-601	Carbon steel	*Temporarily Out of Service					

Table 1
Description and Inspection Schedule of Underground Pipelines
SWMU Group 8 Investigation Report
Western Refining Southwest - Bloomfield Refinery

Line Number	Description (Service)	Line Size (inch)	Line Length (feet)	Starting Location	End Location	Drawing Reference	Construction Material	Next Inspection Scheduled	Last Inspection Date	Inspection Results Pass/Fail	Test/ Inspection Method	Repairs/ Maintenance Needed	Repairs-Maintenance Completion date
28	BLINDED	4	---	Manifold at VRU Unit	Naphtha Fill Line To Tank 44	NewTech 595-M-601	Carbon steel	*Temporarily Out of Service					
29	Off-Road Diesel To Bays #1 & 2	8	150	From F-706 Filter Piping	To Meter Spools at Bays # 1&2	D-700-800-100 (C-17)	Carbon steel	2017	Praxair 2012	Pass	Praxair	None	N/A
30	Off road diesel To Bay # 3	6	150	From F-706 Filter Piping	To Meter Spools at Bays # 3	D-700-800-100 (C-17)	Carbon steel	2017	Praxair 2012	Pass	Praxair	None	N/A
31	Premium Sales Line	10	150	From F-705 Filter Piping	To Meter Spools at Bays # 1,2 & 3	D-700-800-100 (C-17)	Carbon steel	2017	Praxair 2012	Pass	Praxair	None	N/A
32	Unleaded Gasoline Sales Line	10	150	From F-704 Filter Piping	To Meter Spools at Bays # 1,2 & 3	D-700-800-100 (C-17)	Carbon steel	2017	Praxair 2012	Pass	Praxair	None	N/A
33	ULSD To Bay # 4	8	150	From F-703 Filter Piping	To Meter Spool at Bay # 4	D-700-800-100 (D-17)	Carbon steel	2017	Praxair 2012	Pass	Praxair	None	N/A
34	Ethanol Pump Suction Line	8	160	From Tank 45 Outlet Nozzle	To P-707 & P-707A Pump Suction	D-700-800-007	Carbon steel	2017	Praxair 2012	Pass	Praxair	None	N/A
35	Ethanol Unloading Line	4	160	From P-706 Pump Discharge	To Tank 45 Inlet Nozzle	D-700-800-007	Carbon steel	2017	Praxair 2012	Pass	Praxair	None	N/A
36	Naphtha Unloading Line	6	---	Suction Manifold at P-607A	Unloading line at Tank 18 and 19	B-600-500-296	Carbon steel	*Temporarily Out of Service					
37	Naphtha Rundown To Tank 35	3	---	Line From North Pipe Rack Area	To Tank 35 Fill Nozzle	B-600-500-232	Carbon steel	*Temporarily Out of Service					
38	Naphtha Feed Line to Unit	4	---	From P-607A Pump Discharge	To North Pipe Rack Feed To Units	B-600-500-236	Carbon steel	*Temporarily Out of Service					
39	Cooling Water Supply Line	12	---	From # 1 Cooling Tower Pumps	To Rack Area @ Reformer Unit	D-500-500-011	Carbon steel	*Temporarily Out of Service					
40	Cooling Water Return Line	12	---	From Rack Area at Reformer	To #1 Cooling Tower Water Inlet	D-500-500-011	Carbon steel	*Temporarily Out of Service					
41	Cooling Water Supply Line	20	---	From # 2 Cooling Tower Pumps	To S. End of FCC Unit at Tower. 207 Area	D-201-500-123	Carbon steel	*Temporarily Out of Service					
42	Cooling Water Return Line	20	---	From South End of FCC Unit	To # 2 Cooling Tower Water Inlet	D-201-500-123	Carbon steel	*Temporarily Out of Service					
43	Sewer Transfer Line	10	54	From Main Sewer Box # 12	To Main Sewer Box # 11	D-500-500-402	Carbon steel	2013					
44	Sewer Transfer Line	10	46	From Main Sewer Box # 11	To Observation Access Can # 10	D-500-500-402	Carbon steel	2015	Jul-10	Pass	Hydrostatic	None	N/A
45	Sewer Transfer Line	12	33	From Observation Access Can #10	To Observation Access Can # 6	D-500-500-402	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
46	Sewer Transfer Line	12	73	From Observation Access Can # 6	To Main Sewer Box # 5	D-500-500-402	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
47	Sewer Transfer Line	14	69	From Main Sewer Box # 5	To Observation Access Can # 4	D-500-500-402	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
48	Sewer Transfer Line	14	86	From Observation Access Can #4	To Main Sewer Box # 3	D-500-500-402	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
49	Sewer Transfer Line	12	62	From Main Sewer Box # 9	To Main Sewer Box # 8	D-500-500-402	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
50	Sewer Transfer Line	12	66	From Main Sewer Box # 8	To Main Sewer Box # 7	D-500-500-402	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
51	Sewer Transfer Line	14	86	From Main Sewer Box # 7	To Main Sewer Box # 3	D-500-500-402	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
52	Sewer Transfer Line	14	145	From Main Sewer Box # 3	To Observation Access Can #2	D-500-500-402	Carbon steel	2013					
53	Sewer Transfer Line	14	100	From Observation Access Can #2	To Main Sewer Box # 1	D-500-500-402	Carbon steel	2013					

Table 1
Description and Inspection Schedule of Underground Pipelines
SWMU Group 8 Investigation Report
Western Refining Southwest - Bloomfield Refinery

Line Number	Description (Service)	Line Size (inch)	Line Length (feet)	Starting Location	End Location	Drawing Reference	Construction Material	Next Inspection Scheduled	Last Inspection Date	Inspection Results Pass/Fail	Test/ Inspection Method	Repairs/ Maintenance Needed	Repairs-Maintenance Completion date
54	Sewer Transfer Line	12 to 10	56	From Main Sewer Box # 1	To Inlet at API Separator	D-500-500-106	Carbon steel	2013					
55	Sewer Collection Manifold	8 to 4	56	Area East Side of # 4 Boiler	To North Side of Sewer Box # 12	D-500-500-402	Carbon steel	2015	Jul-10	Pass	Hydrostatic	None	N/A
56	Sewer Collection Manifold	10 to 4	164	Area at and Around Crude Tower.	To North Side Of Sewer Box # 11	D-500-500-402	Carbon steel	2015	Jul-10	Pass	Hydrostatic	None	N/A
57	Sewer Collection Manifold	8 to 4	100	Area at and Around E-106A & B	To Northwest Of Sewer Box # 10	D-500-500-402	Carbon steel	2015	Jul-10	Pass	Hydrostatic	None	N/A
58	Sewer Collection Manifold	6	10	Area at V-101A Desalter	To East Side Of Sewer Box # 10	D-500-500-402	Carbon steel	2015	Jul-10	Pass	Hydrostatic	None	N/A
59	Sewer Collection Manifold	10 to 4	452	Area Thru Reformer Pump Row	To Observation Access Can # 6	D-500-500-098	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
60	Sewer Collection Manifold	10 to 4	316	Area Along East Side of Reformer	To Observation Access Can # 6	D-500-500-098	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
61	Sewer Collection Manifold	8 to 4	60	Area at and Around V101 Desalter	To Observation Access Can #4	D-500-500-402	Carbon steel	2015	Jul-10	Pass	Hydrostatic	None	N/A
62	Sewer Collection Manifold	8 to 4	140	Area at and Around T-101 Tower	To West Side Of Sewer Box # 9	D-500-500-402	Carbon steel	2015	Jul-10	Pass	Hydrostatic	None	N/A
63	Sewer Collection Manifold	8 to 4	104	Area at and Around P101 Charge P.	To North Side Of Sewer Box # 9	D-500-500-402	Carbon steel	2015	Jul-10	Pass	Hydrostatic	None	N/A
64	Sewer Collection Manifold	8 to 4	88	Area at and Around T-103 Tower	To Northwest Side Of Sewer Box # 8	D-500-500-402	Carbon steel	2015	Jul-10	Pass	Hydrostatic	None	N/A
65	Sewer Collection Manifold	8 to 4	92	Area at and Around Heavy Oil Exch.	To North Side Of Sewer Box # 8	D-500-500-402	Carbon steel	2015	Jul-10	Pass	Hydrostatic	None	N/A
66	Sewer Collection Manifold	8 to 4	41	Area at and Around Main Air Blower	To Northwest Side Of Sewer Box # 3	D-500-500-134	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
67	Sewer Collection Manifold	6 to 3	324	Area at Burner Fuel Loading and Manifold	To Observation Access Can (Precipitator)	D-600-500-127	Carbon steel	2013					
68	Sewer Collection Manifold	4	141	Area Drains at Air Building	To Sewer Transfer Line(Box # 1 to API)	D-500-500-160	Carbon steel	2013					
69	Sewer Collection Manifold	4	86	P-224 Pump & Cat Surface Drain	To Sewer Transfer Line From FCC Process	D-201-500-001	Carbon steel	2014	Jul-09	Pass	Hydrostatic	None	N/A
70	Sewer Collection/Transfer Line	6	896	Gas Con Unit Collection M.H.	To FCC Sewer Box Manhole # 13 (Roadway)	D-201-500-001	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
71	Sewer Transfer Line	10	35	From FCC Sewer Box M.H. # 13	To FCC Sewer Box # 14 (Roadway)	D-201-500-001	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
72	Sewer Transfer Line	10	235	From FCC Sewer Box M.H. #14	To 20-inch Inlet at API	D-500-500-106	Carbon steel	2013					
73	Sewer Collection Manifold	6 to 4	335	Area @ & Around Gas Con. Unit	To Gas Con. Unit Sewer Collection Manhole	D-200-200-233	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
74	Sewer Transfer Line	10	159	From Treater Main Sewer Box # 16	To Sewer Box #15 - S.E. Of C-204	D-500-500-166	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
75	Sewer Transfer Line	10	162	Sewer Box #15 - S.E. Of C-204	To 20-inch Inlet at API	D-500-500-105	Carbon steel	2013					
76	Sewer Collection Manifold	10 to 4	411	Area In & Around Treater Unit	To Treater Sewer Box At South Side Of Unit	D-500-500-122	Carbon steel	2016	Aug-11	Pass	Hydrostatic	None	N/A
77	Sewer Collection Manifold	6 to 2	---	Area In & Around Poly Unit	To Inlet Bay at API	D-500-500-126	Carbon steel	out of service	May-09	Pass	Hydrostatic	None	N/A

Table 1
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SWMU Group 8 Investigation Report
Western Refining Southwest - Bloomfield Refinery

Line Number	Description (Service)	Line Size (inch)	Line Length (feet)	Starting Location	End Location	Drawing Reference	Construction Material	Next Inspection Scheduled	Last Inspection Date	Inspection Results Pass/Fail	Test/ Inspection Method	Repairs/ Maintenance Needed	Repairs-Maintenance Completion date
78	Sewer Transfer Line	10	130	From Sewer Box # 17 at DHT Unit	To Sewer Box # 18 at S.E. Corner of Poly	D-500-500-097	Carbon steel	2016	Aug-11	Pass	Replaced with Stainless Steel Piping	None	N/A
79	Sewer Transfer Line	12	35	From Sewer Box # 18	To Inlet Manifold at API Basin Area	Not Available	Carbon steel	2013					
80	Sewer Collection Manifold	10 to 4	635	Area In & Around DHT/Larox Unit	To Sewer Box # 18 at S.E. Corner of DHT	Not Available	Carbon steel	2016	Aug-11	Pass	Hydrotest	None	N/A
81	Crude Transfer Line	12	99	Pipe Rack East Of LPG Storage Tanks	Pipe Rack South of Crude Unloading Bays	D-000-900-023	Carbon steel	2013	May-08	Pass	Praxair	None	N/A
82	Crude Transfer Line	12	194	Pipe Rack South of Crude Unloading Bays	Berm South of Tank 43	D-000-900-023	Carbon steel	2013	May-08	Pass	Praxair	None	N/A
83	Sewer Transfer Line	4	822	Discharge at Tank 37	Valve box at corner Northeast of DHT	AMEC 6/7	Carbon Steel/PVC	2015	Jun-10	Pass	Hydrostatic	None	N/A
84	Sales Line from Tank 3 & 4	8	300	Area West of API Separator	DHT Option City	Not Available	Carbon Steel	2013	Nov-07	Pass	Praxair	None	N/A
85	Diesel Receipts (truck)	6	25	Roadway SW of Tank 17	Pipe rack between Tank 34 and Tank 25	D-800-600-104(F-1)	Carbon Steel	2015	Jun-10	Pass	Hydro test	None	N/A
86	Premium/Unleaded Receipts	6	25	Roadway SW of Tank 17	Pipe rack between Tank 24 and Tank 25	D-600-800-099 D-600-800-113	Carbon Steel	2015	Jun-10	Pass	Hydro test	None	N/A
87	Groundwater Recovery Transfer Line	3	970	Tank 38	Slop Line NE of Tank 31	D-600-800-121	Carbon Steel	2015	Aug-10	Pass	Hydro test	None	N/A
88	Injection Well Transfer	4	45	Injection Well Building	Down hole Injection Well	D-500-800-031	Carbon Steel	2015	Oct-10	Pass	Hydro test	None	N/A
89	VRU Return to Tanks 13 and 14	3	32	Pipe Bridge South of Tanks 13 and 14	Exits inside South Wall of Containment Berm	B-600-500-532	Carbon Steel	2016	Jan-11	Pass	Hydrostatic	None	N/A
90	Tie-in Tank 11 Crude to LACT	6	116	Pipe Bridge North of LACT Unit	10 feet East of Tie-in to LACT Unit	B-600-500-561	Carbon Steel	2016	Dec-11	Pass	Hydrostatic	None	N/A
91	Crude to Tank 11	6	34	Under Pipe Rack South of Tank 11	Exits Berm South of Tank 11	B-600-500-558	Carbon Steel	2016	11-Nov	Pass	Hydrostatic	None	N/A

Notes:
1. Ths summary represents a five year cycle of underground line testing.
2. Blank entries represent the fifth year cycle testing yet to be completed.

* = All lines that are temporarily out of service are due to suspension of refining operations which occurred in November 2009. The out of service lines have been steamed out and are hydrocarbon free.
ULSD = Ultra Low Sulfur Diesel
VRU = Vapor Recovery Unit
LPG = Liquid Petroleum Gas
DHT = Diesel Hydro Treater
M.H. = Man Hole
--- = Line length not included in linear piping since assocaited pipelines are not currenlty in-service.

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	AOC 22-15 (1.0-1.5')	AOC 22-15 (1.5-2.0')	AOC 22-15 (30-32')	AOC 22-15 (34-36')	AOC 26-8 (0-1.0')	AOC 26-8 (1.5-2.0')	AOC 26-8 (32-36')	SWMU 7-1 (0-0.5')	SWMU 7-1 (10-12')	SWMU 7-1 (4-5')	SWMU 7-1 (5-7')	SWMU 8-6 (0-0.5')	SWMU 8-6 (1.5-2.0')	SWMU 8-6a (33-34)	SWMU 8-8 (0-0.5')	SWMU 8-8 (1.5-2.0')	SWMU 8-10 (0-0.5')	SWMU 8-10 (1.5-2.0')	SWMU 10-1 (0-0.5')	SWMU 10-1 (1.5-2.0')	SWMU 10-2 (0-0.5')
							4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/16/2009	4/16/2009	4/16/2009	8/17/2010	8/17/2010	8/17/2010	8/17/2010	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	8/17/2010	8/17/2010	8/17/2010
Metals (mg/kg)																											
Antimony	3.13E+01	(1)	1.24E+02	(5)	7.44E+00	(8)	<2.5	<2.5	<2.5	<2.5	<13	<2.5	<2.5	<5.0	<5.0	<5.0	<2.5	<2.6	<2.7	<2.9	<2.6	<2.6	<2.6	<2.6	<2.6	<2.5	<2.5	<2.5
Arsenic	3.90E+00	(1)	1.77E+01	(4)	1.48E-01	(8)	<13	<2.5	<2.5	<2.5	<13	<2.5	<2.5	<5.0	<5.0	<5.0	3.1	<2.6	3	<2.9	<2.6	<2.6	3	<2.6	<2.5	<2.5	2.7
Barium	1.56E+04	(1)	4.35E+03	(5)	3.39E+03	(8)	160	160	190	230	380	280	230	120	200	150	110	210	200	130	190	180	440	350	75	59	61
Beryllium	1.56E+02	(1)	1.44E+02	(5)	6.49E+02	(8)	0.26	0.39	0.18	<0.15	<0.75	0.29	<0.15	0.37	0.42	0.42	0.29	0.43	0.44	<0.18	0.42	0.43	0.5	0.47	0.29	0.17	0.22
Cadmium	7.03E+01	(1)	2.77E+02	(5)	1.55E+01	(8)	<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	<0.20	<0.20	<0.20	<0.10	<0.11	<0.11	<0.12	<0.11	<0.11	<0.11	<0.10	<0.10	<0.10	<0.10
Chromium III	1.17E+05	(1)	4.65E+05	(5)	1.11E+09	(8)	4.4	4.8	4.7	2.2	2.4	4.2	2.5	6.3	6.6	14	4.2	85	100	7.7	83	100	6.1	6.4	4.2	2.7	3.1
Chromium VI	2.97E+00	(1)	6.31E+01	(4)	9.34E-02	(8)	4.4	4.8	4.7	2.2	2.4	4.2	2.5	6.3	6.6	14	4.2	85	100	7.7	83	100	6.1	6.4	4.2	2.7	3.1
Cobalt	2.30E+01	(2)	3.00E+02	(6)	5.51E+00	(9)	3.5	3.8	2.9	2.2	3.1	3.5	2.3	3.2	3.9	3.5	1.8	4.2	4.5	2.2	4.1	4	4.8	5.4	2.2	1.5	1.9
Cyanide	4.69E+01	(1)	1.86E+02	(5)	2.48E+00	(8)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50	<0.50
Lead	4.00E+02	(1)	8.00E+02	(4)	-	-	5.3	4.3	3.9	2.1	2.8	3.2	3.1	4.7	4	5	1.4	6.1	5.6	3.8	5.8	5.7	5.1	4.8	2.6	2.3	2.3
Mercury	1.56E+01	(1)	1.36E+01	(5)	3.68E-01	(8)	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.17	<0.033	0.64	<0.033	0.046	0.045	<0.039	0.044	0.053	<0.035	<0.035	<0.033	<0.033	<0.033
Nickel	1.56E+03	(1)	6.19E+03	(5)	5.36E+02	(8)	5	5.7	3.8	1.7	3	4.8	1.8	4.7	5.1	6.1	3	8.5	7.8	2.2	7.4	7	7.2	7.1	3.5	2.9	2.8
Selenium	3.91E+02	(1)	1.55E+03	(5)	1.09E+01	(8)	<13	<13	<2.5	<2.5	<13	<12	<12	<5.0	<5.0	<5.0	<2.5	<26	<27	<2.9	<26	<26	<26	<26	<2.5	<2.5	<2.5
Silver	3.91E+02	(1)	1.55E+03	(5)	1.76E+01	(8)	<0.25	<0.25	<0.25	<0.25	<1.3	<0.25	<0.25	<0.50	<0.50	<0.50	<0.25	<0.26	<0.27	<0.29	<0.26	<0.26	<0.26	<0.26	<0.25	<0.25	<0.25
Vanadium	3.91E+02	(1)	1.55E+03	(5)	2.05E+03	(8)	12	15	15	11	<13	13	10	17	24	18	12	18	18	12	17	16	20	22	13	8.5	9.3
Zinc	2.35E+04	(1)	9.29E+04	(5)	7.67E+03	(8)	18	24	21	12	22	24	14	28	24	69	13	89	88	14	84	84	32	32	16	11	12
Volatile Organic Compounds - (EPA Method 8260) mg/kg																											
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,1,2,2-Tetrachloroethane	8.02E+00	(1)	4.35E+01	(4)	2.80E-05	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,1-Dichloropropene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2,3-Trichlorobenzene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	--	--	--	0.69	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	--	--	--	0.26	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,3-Dichlorobenzene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	--	--	<0.20	--	--	--	--	--	--	--
1-Methylnaphthalene	2.20E+01	(3)	9.90E+02	(7)	1.69E-01	(9)	--	--	--	--	--	--	--	--	--	<0.20	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
2,2-Dichloropropane	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	--	--	--	--	--	--	--	--	--	<0.50	--	<0.00467	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446	--	--	--
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
2-Hexanone	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.50	--	<0.00467	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446	--	--	--
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	--	--	--	--	--	--	--	--	--	<0.20	--	--	--	<0.20	--	--	--	--	--	--	--
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
4-Isopropyltoluene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
4-Methyl-2-pentanone	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.50	--	<0.00467	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446	--	--	--
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	--	--	--	--	--	--	--	--	--	<0.75	--	0.0669	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446	--	--	--
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	--	--	--	--	--	--	--	--	--	<0.50	--	<0.00467	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446	--	--	--
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Chloroethane	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
cis-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	AOC 22-15 (1.0-1.5')	AOC 22-15 (1.5-2.0')	AOC 22-15 (30-32')	AOC 22-15 (34-36')	AOC 26-8 (0-1.0')	AOC 26-8 (1.5-2.0')	AOC 26-8 (32-36')	SWMU 7-1 (0-0.5')	SWMU 7-1 (10-12')	SWMU 7-1 (4-5')	SWMU 7-1 (5-7')	SWMU 8-6 (0-0.5')	SWMU 8-6 (1.5-2.0')	SWMU 8-6a (33-34)	SWMU 8-8 (0-0.5')	SWMU 8-8 (1.5-2.0')	SWMU 8-10 (0-0.5')	SWMU 8-10 (1.5-2.0')	SWMU 10-1 (0-0.5')	SWMU 10-1 (1.5-2.0')	SWMU 10-2 (0-0.5')
							4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/16/2009	4/16/2009	4/16/2009	8/17/2010	8/17/2010	8/17/2010	8/17/2010	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	8/17/2010	8/17/2010	8/17/2010
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	--	--	--	--	--	--	--	--	--	<0.15	--	<0.00234	<0.00225	<0.00249	<0.00224	<0.00232	<0.00238	<0.00223	--	--	--
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
n-Butylbenzene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
n-Propylbenzene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
sec-Butylbenzene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
tert-Butylbenzene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
trans-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	0.00214	<0.00112	<0.00124	<0.00112	0.00417	<0.00119	<0.00112	--	--	--
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Volatile Organic Compounds - (EPA Method 8260) mg/kg-dry																											
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,1,2,2-Tetrachloroethane	-	(1)	2.90E+00	(6)	2.80E-05	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloropropene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	<0.000924	<0.001	<0.000976	--	0.00433	<0.00109	0.0032	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	<0.000924	<0.001	<0.000976	--	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
2,2-Dichloropropane	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	<0.0037	<0.00401	<0.0039	<0.00403	<0.00371	<0.00436	0.00958	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	-	-	-	-	-	-	<0.0037	<0.00401	<0.0039	<0.00403	<0.00371	<0.00436	<0.00365	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Isopropyltoluene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	--	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	-	-	-	-	-	-	<0.0037	<0.00401	<0.0039	<0.00403	<0.00371	<0.00436	<0.00365	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	0.00984	0.00614	0.015	0.205	<0.00371	<0.00436	0.0424	0.00342	0.0115	--	<0.00173	--	--	--	--	--	--	--	<0.00188	0.00567	<0.00208
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000966	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	<0.0037	<0.00401	<0.0039	<0.00403	<0.00371	<0.00436	<0.00365	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Chloroethane	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
cis-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	AOC 22-15 (1.0-1.5')	AOC 22-15 (1.5-2.0')	AOC 22-15 (30-32')	AOC 22-15 (34-36')	AOC 26-8 (0-1.0')	AOC 26-8 (1.5-2.0')	AOC 26-8 (32-36')	SWMU 7-1 (0-0.5')	SWMU 7-1 (10-12')	SWMU 7-1 (4-5')	SWMU 7-1 (5-7')	SWMU 8-6 (0-0.5')	SWMU 8-6 (1.5-2.0')	SWMU 8-6a (33-34)	SWMU 8-8 (0-0.5')	SWMU 8-8 (1.5-2.0')	SWMU 8-10 (0-0.5')	SWMU 8-10 (1.5-2.0')	SWMU 10-1 (0-0.5')	SWMU 10-1 (1.5-2.0')	SWMU 10-2 (0-0.5')
							4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/16/2009	4/16/2009	4/16/2009	8/17/2010	8/17/2010	8/17/2010	8/17/2010	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	8/17/2010	8/17/2010	8/17/2010
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	<0.000924	<0.001	<0.000976	<0.00005	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	<0.000924	<0.001	<0.000976	<0.00005	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	<0.000924	<0.001	0.0281	0.00707	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	0.0163	0.011	0.0121	0.0156	0.00824	0.00976	0.00838	0.0266	0.0303	–	0.0294	–	–	–	–	–	–	–	0.0037	0.00687	0.00338
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.000924	<0.001	<0.000976	0.0001	0.00182	<0.00109	0.00234	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
n-Butylbenzene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	0.00015	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–
n-Propylbenzene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	0.000084	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–
sec-Butylbenzene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00005	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
tert-Butylbenzene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	<0.000924	<0.001	<0.000976	0.00159	0.00392	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	<0.000942	<0.000931	0.00115
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
trans-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	<0.000924	<0.001	<0.000976	0.00022	<0.000928	<0.00109	0.00254	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
Semi Volatile Organics - (EPA Method 8270) mg/kg																											
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
1,3-Dichlorobenzene	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	6.11E+03	(1)	2.38E+04	(5)	1.17E+02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
2,4,6-Trichlorophenol	6.11E+01	(1)	2.38E+02	(5)	1.17E+00	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
2,4-Dichlorophenol	1.83E+02	(1)	7.15E+02	(5)	1.12E+00	(8)	<2.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<2.0	<0.40	<2.1	<2.1	<0.47	<2.1	<2.1	<0.42	<0.42	<0.40	<0.40	<0.40
2,4-Dimethylphenol	1.22E+03	(1)	4.76E+03	(5)	7.48E+00	(8)	<1.5	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<1.5	<0.30	<1.6	<1.6	<0.35	<1.6	<1.6	<0.32	<0.31	<0.30	<0.30	<0.30
2,4-Dinitrophenol	1.22E+02	(1)	4.76E+02	(5)	7.10E-01	(8)	<2.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<2.0	<0.40	<2.1	<2.1	<0.47	<2.1	<2.1	<0.42	<0.42	<0.40	<0.40	<0.40
2,4-Dinitrotoluene	1.57E+01	(1)	6.18E+01	(4)	2.53E-02	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
2,6-Dinitrotoluene	6.11E+01	(1)	2.38E+02	(5)	4.33E-01	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
2-Chloronaphthalene	-	(1)	8.20E+04	(6)	2.03E+02	(9)	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	–	–	–	–	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26	<0.25	<0.25	<0.25
2-Chlorophenol	3.91E+02	(1)	1.55E+03	(5)	1.30E+00	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<1.3	<0.25	<0.25	0.63	<0.25	<0.25	<0.25	–	–	–	–	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26	<0.20	<0.20	<0.20
2-Methylphenol	3.10E+03	(2)	3.10E+04	(6)	2.25E+01	(9)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
2-Nitroaniline	1.80E+02	(2)	1.80E+03	(6)	3.71E-01	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
2-Nitrophenol	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
3,3´-Dichlorobenzidine	1.08E+01	(1)	4.26E+01	(4)	8.33E-02	(8)	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	–	–	–	–	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26	<0.25	<0.25	<0.25
3+4-Methylphenol	3.10E+02	(2)	3.10E+03	(6)	2.14E+00	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
3-Nitroaniline	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
4-Bromophenyl phenyl ether	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
4-Chloro-3-methylphenol	-	-	-	-	-	-	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
4-Chloroaniline	2.40E+00	(3)	8.60E+01	(7)	1.35E-03	(9)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
4-Nitroaniline	2.40E+01	(3)	8.60E+02	(7)	1.13E-02	(9)	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	–	–	–	–	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26	<0.25	<0.25	<0.25
4-Nitrophenol	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Acenaphthene	3.44E+03	(1)	1.86E+04	(5)	1.90E+02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Acenaphthylene	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Aniline	8.50E+01	(3)	3.00E+03	(7)	3.83E-02	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Anthracene	1.72E+04	(1)	6.68E+04	(5)	3.04E+03	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Azobenzene	4.90E+00	(3)	2.20E+02	(7)	5.74E-03	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Benz(a)anthracene	1.48E+00	(1)	2.34E+01	(4)	8.81E-01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Benzo(a)pyrene	1.48E-01	(1)	2.34E+00	(4)	2.92E-01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	1.3	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Benzo(b)fluoranthene	1.48E+00	(1)	2.34E+01	(4)	2.98E+00	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	-	-	-	-	-	-	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.20	<0.20	<0.20
Benzo(k)fluoranthene	1.48E+01	(1)	2.34E+02	(4)	2.92E+01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Benzoic acid	2.40E+05	(2)	2.50E+06	(6)	3.71E+02	(9)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
Benzyl alcohol	3.10E+04	(2)	3.10E+05	(6)	4.73E+01	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Bis(2-chloroethoxy)methane	1.80E+02	(2)	1.80E+03	(6)	2.59E-01	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Bis(2-chloroethyl)ether	2.68E+00	(1)	1.42E+01	(4)	2.96E-04	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	4.54E+02	(4)	2.62E-02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Bis(2-ethylhexyl)phthalate	3.47E+02	(1)	1.37E+03	(4)	9.70E+01	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
Butyl benzyl phthalate	2.60E+02	(3)	9.10E+03	(7)	7.54E+00	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	AOC 22-15 (1.0-1.5')	AOC 22-15 (1.5-2.0')	AOC 22-15 (30-32')	AOC 22-15 (34-36')	AOC 26-8 (0-1.0')	AOC 26-8 (1.5-2.0')	AOC 26-8 (32-36')	SWMU 7-1 (0-0.5')	SWMU 7-1 (10-12')	SWMU 7-1 (4-5')	SWMU 7-1 (5-7')	SWMU 8-6 (0-0.5')	SWMU 8-6 (1.5-2.0')	SWMU 8-6a (33-34)	SWMU 8-8 (0-0.5')	SWMU 8-8 (1.5-2.0')	SWMU 8-10 (0-0.5')	SWMU 8-10 (1.5-2.0')	SWMU 10-1 (0-0.5')	SWMU 10-1 (1.5-2.0')	SWMU 10-2 (0-0.5')
							4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/16/2009	4/16/2009	4/16/2009	8/17/2010	8/17/2010	8/17/2010	8/17/2010	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	8/17/2010	8/17/2010	8/17/2010
Carbazole	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	--	--	--	--	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Chrysene	1.48E+02	(1)	2.34E+03	(4)	8.99E+01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	1.7	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	1.48E-01	(1)	2.34E+00	(4)	9.52E-01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Dibenzofuran	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	--	--	--	--	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Diethyl phthalate	4.89E+04	(1)	1.91E+05	(5)	1.09E+02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Dimethyl phthalate	6.11E+05	(1)	2.38E+06	(5)	9.06E+02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	--	--	--	--	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Di-n-butyl phthalate	6.11E+03	(1)	2.38E+04	(5)	7.84E+01	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	--	--	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
Di-n-octyl phthalate	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	--	--	--	--	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.25	<0.25	<0.25
Fluoranthene	2.29E+03	(1)	8.91E+03	(5)	1.37E+03	(8)	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.20	<0.20	<1.0	<0.20	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26	<0.20	<0.20	<0.20
Fluorene	2.29E+03	(1)	8.91E+03	(5)	2.29E+02	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.20	<0.20	<1.0	<0.20	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.20	<0.20	<0.20
Hexachlorobenzene	3.04E+00	(1)	1.20E+01	(4)	4.48E-02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Hexachlorobutadiene	6.20E+00	(3)	2.20E+02	(7)	2.14E-02	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	--	--	--	--	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Hexachlorocyclopentadiene	3.67E+02	(1)	8.11E+02	(5)	5.92E+00	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Hexachloroethane	4.28E+01	(1)	1.67E+02	(5)	9.20E-02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Indeno(1,2,3-cd)pyrene	1.48E+00	(1)	2.34E+01	(4)	9.71E+00	(8)	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.20	<0.20	<1.0	<0.20	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26	<0.20	<0.20	<0.20
Isophorone	5.12E+03	(1)	4.75E+04	(5)	2.16E+00	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Nitrobenzene	5.35E+01	(1)	3.00E+02	(4)	7.02E-03	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
N-Nitrosodi-n-propylamine	6.90E-02	(3)	2.50E+00	(7)	1.24E-04	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	--	--	--	--	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
N-Nitrosodiphenylamine	9.93E+02	(1)	3.91E+03	(4)	6.36E+00	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Pentachlorophenol	8.94E+00	(1)	3.00E+01	(4)	1.44E-01	(8)	<2.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<2.0	<0.40	<2.1	<2.1	<0.47	<2.1	<2.1	<0.42	<0.42	<0.40	<0.40	<0.40
Phenanthrene	1.83E+03	(1)	7.15E+03	(5)	3.21E+02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	--	--	--	--	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Phenol	1.83E+04	(1)	6.88E+04	(5)	5.59E+01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Pyrene	1.72E+03	(1)	6.68E+03	(5)	1.01E+03	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	1.9	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Pyridine	7.80E+01	(2)	1.00E+03	(6)	1.09E-01	(9)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg																											
Diesel Range Organics (DRO)	1.00E+03	(11)	1.00E+03	(11)	1.00E+03	(11)	19	<10	<10	100	11	<10	<10	18	<10	470	<10	93	150	21	61	92	<11	<10	<10	19	280
Gasoline Range Organics (GRO)	--		--		--		<5.0	<5.0	<5.0	15	<5.0	<5.0	<5.0	81	<50	530	<50	<5.0	<5.0	<5.9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Motor Oil Range Organics (MRO)	3.00E+03	(12)	5.00E+03	(12)	3.00E+03	(12)	71	<50	<50	<50	160	64	<50	<5.0	<5.0	<5.0	<5.0	300	500	<59	200	270	<53	<52	<50	<50	<50
Ethanol							--	--	--	--	<1.0	<1.0	<1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--

-- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)

EPA - Regional Screening Levels (April 2009)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels (April 2009)

(7) EPA Industrial - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(8) SoilGW NMED Dilution Attenuation Factor (DAF) = 11.25

(9) SoilGW Risk-based EPA DAF = 11.25

(10) SoilGW MCL-based EPA DAF = 11.25

(11) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "unknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

(12) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "Waste Oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Non-Residential Screening Level

yellow highlight represents value above Leachate (DAF) Screening Level

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 10-2 (1.5-2.0')	SWMU 15-3 (0.5-2.0')	SWMU 15-3 (2-4')
							8/17/2010	8/19/2010	8/24/2010
Metals (mg/kg)									
Antimony	3.13E+01	(1)	1.24E+02	(5)	7.44E+00	(8)	<2.5	<5.0	--
Arsenic	3.90E+00	(1)	1.77E+01	(4)	1.48E-01	(8)	2.6	5.5	--
Barium	1.56E+04	(1)	4.35E+03	(5)	3.39E+03	(8)	60	220	--
Beryllium	1.56E+02	(1)	1.44E+02	(5)	6.49E+02	(8)	0.22	0.56	--
Cadmium	7.03E+01	(1)	2.77E+02	(5)	1.55E+01	(8)	<0.10	<0.20	--
Chromium III	1.17E+05	(1)	4.65E+05	(5)	1.11E+09	(8)	3	8.6	--
Chromium VI	2.97E+00	(1)	6.31E+01	(4)	9.34E-02	(8)	3	8.6	--
Cobalt	2.30E+01	(2)	3.00E+02	(6)	5.51E+00	(9)	1.8	4.9	--
Cyanide	4.69E+01	(1)	1.86E+02	(5)	2.48E+00	(8)	<0.50	<0.50	--
Lead	4.00E+02	(1)	8.00E+02	(4)	-	-	2.1	5.3	--
Mercury	1.56E+01	(1)	1.36E+01	(5)	3.68E-01	(8)	<0.033	<0.033	--
Nickel	1.56E+03	(1)	6.19E+03	(5)	5.36E+02	(8)	2.7	7.5	--
Selenium	3.91E+02	(1)	1.55E+03	(5)	1.09E+01	(8)	<2.5	<5.0	--
Silver	3.91E+02	(1)	1.55E+03	(5)	1.76E+01	(8)	<0.25	<0.50	--
Vanadium	3.91E+02	(1)	1.55E+03	(5)	2.05E+03	(8)	9.2	26	--
Zinc	2.35E+04	(1)	9.29E+04	(5)	7.67E+03	(8)	11	38	--
Volatile Organic Compounds - (EPA Method 8260) mg/kg									
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	--	--	--
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	--	--	--
1,1,2,2-Tetrachloroethane	8.02E+00	(1)	4.35E+01	(4)	2.80E-05	(8)	--	--	--
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	--	--	--
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	--	--	--
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	--	--	--
1,1-Dichloropropene	-	-	-	-	-	-	--	--	--
1,2,3-Trichlorobenzene	-	-	-	-	-	-	--	--	--
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	--	--	--
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	--	--	--
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	--	--	--
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	--	--	--
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	--	--	--
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	--	--	--
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	--	--	--
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	--	--	--
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	--	--	--
1,3-Dichlorobenzene	-	-	-	-	-	-	--	--	--
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	--	--	--
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	--	--	--
1-Methylnaphthalene	2.20E+01	(3)	9.90E+02	(7)	1.69E-01	(9)	--	--	--
2,2-Dichloropropane	-	-	-	-	-	-	--	--	--
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	--	--	--
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	--	--	--
2-Hexanone	-	-	-	-	-	-	--	--	--
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	--	--	--
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	--	--	--
4-Isopropyltoluene	-	-	-	-	-	-	--	--	--
4-Methyl-2-pentanone	-	-	-	-	-	-	--	--	--
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	--	--	--
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	--	--	--
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	--	--	--
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	--	--	--
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	--	--	--
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	--	--	--
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	--	--	--
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	--	--	--
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	--	--	--
Chloroethane	-	-	-	-	-	-	--	--	--
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	--	--	--
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	--	--	--
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	--	--	--
cis-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	--	--	--
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	--	--	--
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	--	--	--
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	--	--	--

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 10-2 (1.5-2.0')	SWMU 15-3 (0.5-2.0')	SWMU 15-3 (2-4')
							8/17/2010	8/19/2010	8/24/2010
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	--	--	--
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	--	--	--
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	--	--	--
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	--	--	--
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	--	--	--
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	--	--	--
n-Butylbenzene	-	-	-	-	-	-	--	--	--
n-Propylbenzene	-	-	-	-	-	-	--	--	--
sec-Butylbenzene	-	-	-	-	-	-	--	--	--
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	--	--	--
tert-Butylbenzene	-	-	-	-	-	-	--	--	--
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	--	--	--
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	--	--	--
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	--	--	--
trans-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	--	--	--
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	--	--	--
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	--	--	--
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	--	--	--
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	--	--	--
Volatile Organic Compounds - (EPA Method 8260) mg/kg-dry									
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	<0.0011	<0.000924	--
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	<0.0011	<0.000924	--
1,1,2,2-Tetrachloroethane	-	(1)	2.90E+00	(6)	2.80E-05	(8)	<0.0011	<0.000924	--
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	<0.0011	<0.000924	--
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	<0.0011	<0.000924	--
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	--	--	--
1,1-Dichloropropene	-	-	-	-	-	-	--	--	--
1,2,3-Trichlorobenzene	-	-	-	-	-	-	--	--	--
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	<0.0011	<0.000924	--
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.0011	<0.000924	--
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	--	--	--
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	<0.0011	<0.000924	--
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	--	--	--
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.0011	<0.000924	--
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	--	--	--
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	<0.0011	<0.000924	--
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	<0.0011	<0.000924	--
1,3-Dichlorobenzene	-	-	-	-	-	-	--	--	--
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	--	--	--
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.0011	<0.000924	--
2,2-Dichloropropane	-	-	-	-	-	-	--	--	--
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	<0.0011	<0.000924	--
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	--	--	--
2-Hexanone	-	-	-	-	-	-	--	--	--
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	--	--	--
4-Isopropyltoluene	-	-	-	-	-	-	--	--	--
4-Methyl-2-pentanone	-	-	-	-	-	-	--	--	--
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	<0.0022	<0.00185	--
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	<0.0011	<0.000924	--
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	<0.0011	<0.000924	--
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	<0.0011	<0.000924	--
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	--	--	--
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	<0.0011	<0.000924	--
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	<0.0011	<0.000924	--
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	<0.0011	<0.000924	--
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	<0.0011	<0.000924	--
Chloroethane	-	-	-	-	-	-	--	--	--
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	<0.0011	<0.000924	--
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	<0.0011	<0.000924	--
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	<0.0011	<0.000924	--
cis-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	--	--	--
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	<0.0011	<0.000924	--
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	--	--	--
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	<0.0011	<0.000924	--

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 10-2 (1.5-2.0')	SWMU 15-3 (0.5-2.0')	SWMU 15-3 (2-4')
							8/17/2010	8/19/2010	8/24/2010
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	<0.0011	<0.000924	--
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	--	--	--
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	--	--	--
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	--	--	--
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	0.00494	<0.000924	--
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.0011	<0.000924	--
n-Butylbenzene	-	-	-	-	-	-	--	--	--
n-Propylbenzene	-	-	-	-	-	-	--	--	--
sec-Butylbenzene	-	-	-	-	-	-	--	--	--
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	<0.0011	<0.000924	--
tert-Butylbenzene	-	-	-	-	-	-	--	--	--
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	--	--	--
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	<0.0011	<0.000924	--
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	<0.0011	<0.000924	--
trans-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	--	--	--
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	<0.0011	<0.000924	--
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	<0.0011	<0.000924	--
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	<0.0011	<0.000924	--
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	<0.0011	<0.000924	--
Semi Volatile Organics - (EPA Method 8270) mg/kg									
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.20	<0.20	--
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.20	<0.20	--
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.20	<0.20	--
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.20	<0.20	--
2,4,5-Trichlorophenol	6.11E+03	(1)	2.38E+04	(5)	1.17E+02	(8)	<0.20	<0.20	--
2,4,6-Trichlorophenol	6.11E+01	(1)	2.38E+02	(5)	1.17E+00	(8)	<0.20	<0.20	--
2,4-Dichlorophenol	1.83E+02	(1)	7.15E+02	(5)	1.12E+00	(8)	<0.40	<0.40	--
2,4-Dimethylphenol	1.22E+03	(1)	4.76E+03	(5)	7.48E+00	(8)	<0.30	<0.30	--
2,4-Dinitrophenol	1.22E+02	(1)	4.76E+02	(5)	7.10E-01	(8)	<0.40	<0.40	--
2,4-Dinitrotoluene	1.57E+01	(1)	6.18E+01	(4)	2.53E-02	(8)	<0.50	<0.50	--
2,6-Dinitrotoluene	6.11E+01	(1)	2.38E+02	(5)	4.33E-01	(8)	<0.50	<0.50	--
2-Chloronaphthalene	-	(1)	8.20E+04	(6)	2.03E+02	(9)	<0.25	<0.25	--
2-Chlorophenol	3.91E+02	(1)	1.55E+03	(5)	1.30E+00	(8)	<0.20	<0.20	--
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.20	<0.20	--
2-Methylphenol	3.10E+03	(2)	3.10E+04	(6)	2.25E+01	(9)	<0.50	<0.50	--
2-Nitroaniline	1.80E+02	(2)	1.80E+03	(6)	3.71E-01	(9)	<0.20	<0.20	--
2-Nitrophenol	-	-	-	-	-	-	<0.20	<0.20	--
3,3'-Dichlorobenzidine	1.08E+01	(1)	4.26E+01	(4)	8.33E-02	(8)	<0.25	<0.25	--
3+4-Methylphenol	3.10E+02	(2)	3.10E+03	(6)	2.14E+00	(9)	<0.20	<0.20	--
3-Nitroaniline	-	-	-	-	-	-	<0.20	<0.20	--
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	<0.50	<0.50	--
4-Bromophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20	--
4-Chloro-3-methylphenol	-	-	-	-	-	-	<0.50	<0.50	--
4-Chloroaniline	2.40E+00	(3)	8.60E+01	(7)	1.35E-03	(9)	<0.50	<0.50	--
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20	--
4-Nitroaniline	2.40E+01	(3)	8.60E+02	(7)	1.13E-02	(9)	<0.25	<0.25	--
4-Nitrophenol	-	-	-	-	-	-	<0.20	<0.20	--
Acenaphthene	3.44E+03	(1)	1.86E+04	(5)	1.90E+02	(8)	<0.20	<0.20	--
Acenaphthylene	-	-	-	-	-	-	<0.20	<0.20	--
Aniline	8.50E+01	(3)	3.00E+03	(7)	3.83E-02	(9)	<0.20	<0.20	--
Anthracene	1.72E+04	(1)	6.68E+04	(5)	3.04E+03	(8)	<0.20	<0.20	--
Azobenzene	4.90E+00	(3)	2.20E+02	(7)	5.74E-03	(9)	<0.20	<0.20	--
Benz(a)anthracene	1.48E+00	(1)	2.34E+01	(4)	8.81E-01	(8)	<0.20	<0.20	--
Benzo(a)pyrene	1.48E-01	(1)	2.34E+00	(4)	2.92E-01	(8)	<0.20	<0.20	--
Benzo(b)fluoranthene	1.48E+00	(1)	2.34E+01	(4)	2.98E+00	(8)	<0.20	<0.20	--
Benzo(g,h,i)perylene	-	-	-	-	-	-	<0.20	<0.20	--
Benzo(k)fluoranthene	1.48E+01	(1)	2.34E+02	(4)	2.92E+01	(8)	<0.20	<0.20	--
Benzoic acid	2.40E+05	(2)	2.50E+06	(6)	3.71E+02	(9)	<0.50	<0.50	--
Benzyl alcohol	3.10E+04	(2)	3.10E+05	(6)	4.73E+01	(9)	<0.20	<0.20	--
Bis(2-chloroethoxy)methane	1.80E+02	(2)	1.80E+03	(6)	2.59E-01	(9)	<0.20	<0.20	--
Bis(2-chloroethyl)ether	2.68E+00	(1)	1.42E+01	(4)	2.96E-04	(8)	<0.20	<0.20	--
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	4.54E+02	(4)	2.62E-02	(8)	<0.20	<0.20	--
Bis(2-ethylhexyl)phthalate	3.47E+02	(1)	1.37E+03	(4)	9.70E+01	(8)	<0.50	<0.50	--
Butyl benzyl phthalate	2.60E+02	(3)	9.10E+03	(7)	7.54E+00	(9)	<0.20	<0.20	--

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 10-2 (1.5-2.0')	SWMU 15-3 (0.5-2.0')	SWMU 15-3 (2-4')
							8/17/2010	8/19/2010	8/24/2010
Carbazole	-	-	-	-	-	-	<0.20	<0.20	--
Chrysene	1.48E+02	(1)	2.34E+03	(4)	8.99E+01	(8)	<0.20	<0.20	--
Dibenz(a,h)anthracene	1.48E-01	(1)	2.34E+00	(4)	9.52E-01	(8)	<0.20	<0.20	--
Dibenzofuran	-	-	-	-	-	-	<0.20	<0.20	--
Diethyl phthalate	4.89E+04	(1)	1.91E+05	(5)	1.09E+02	(8)	<0.20	<0.20	--
Dimethyl phthalate	6.11E+05	(1)	2.38E+06	(5)	9.06E+02	(8)	<0.20	<0.20	--
Di-n-butyl phthalate	6.11E+03	(1)	2.38E+04	(5)	7.84E+01	(8)	<0.50	<0.50	--
Di-n-octyl phthalate	-	-	-	-	-	-	<0.25	<0.25	--
Fluoranthene	2.29E+03	(1)	8.91E+03	(5)	1.37E+03	(8)	<0.20	<0.20	--
Fluorene	2.29E+03	(1)	8.91E+03	(5)	2.29E+02	(8)	<0.20	<0.20	--
Hexachlorobenzene	3.04E+00	(1)	1.20E+01	(4)	4.48E-02	(8)	<0.20	<0.20	--
Hexachlorobutadiene	6.20E+00	(3)	2.20E+02	(7)	2.14E-02	(9)	<0.20	<0.20	--
Hexachlorocyclopentadiene	3.67E+02	(1)	8.11E+02	(5)	5.92E+00	(8)	<0.20	<0.20	--
Hexachloroethane	4.28E+01	(1)	1.67E+02	(5)	9.20E-02	(8)	<0.20	<0.20	--
Indeno(1,2,3-cd)pyrene	1.48E+00	(1)	2.34E+01	(4)	9.71E+00	(8)	<0.20	<0.20	--
Isophorone	5.12E+03	(1)	4.75E+04	(5)	2.16E+00	(8)	<0.50	<0.50	--
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.20	<0.20	--
Nitrobenzene	5.35E+01	(1)	3.00E+02	(4)	7.02E-03	(8)	<0.50	<0.50	--
N-Nitrosodi-n-propylamine	6.90E-02	(3)	2.50E+00	(7)	1.24E-04	(9)	<0.20	<0.20	--
N-Nitrosodiphenylamine	9.93E+02	(1)	3.91E+03	(4)	6.36E+00	(8)	<0.20	<0.20	--
Pentachlorophenol	8.94E+00	(1)	3.00E+01	(4)	1.44E-01	(8)	<0.40	<0.40	--
Phenanthrene	1.83E+03	(1)	7.15E+03	(5)	3.21E+02	(8)	<0.20	<0.20	--
Phenol	1.83E+04	(1)	6.88E+04	(5)	5.59E+01	(8)	<0.20	<0.20	--
Pyrene	1.72E+03	(1)	6.68E+03	(5)	1.01E+03	(8)	<0.20	<0.20	--
Pyridine	7.80E+01	(2)	1.00E+03	(6)	1.09E-01	(9)	<0.50	<0.50	--
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg									
Diesel Range Organics (DRO)	1.00E+03	(11)	1.00E+03	(11)	1.00E+03	(11)	46	<10	<10
Gasoline Range Organics (GRO)	--		--		--		<5.0	<5.0	<5.0
Motor Oil Range Organics (MRO)	3.00E+03	(12)	5.00E+03	(12)	3.00E+03	(12)	<50	<50	<50
Ethanol							--	--	--

-- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)

EPA - Regional Screening Levels (April 2009)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels (April 2009)

(7) EPA Industrial - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(8) SoilGW NMED Dilution Attenuation Factor (DAF) = 11.25

(9) SoilGW Risk-based EPA DAF = 11.25

(10) SoilGW MCL-based EPA DAF = 11.25

(11) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "unknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

(12) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "Waste Oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Non-Residential Screening Level
yellow highlight represents value above Leachate (DAF) Screening Level

Table 3
Ground Water Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	AOC 22-12 (GW)	AOC 22-12/TW-01	AOC 22-13 (GW)	MW-52	MW-52	MW-55	MW-56	MW-61	MW-61	MW-63	MW-63	MW-65	MW-65
Sample Date				4/14/2009	7/29/2009	4/9/2009	10/28/2008	1/8/2009	5/5/2009	5/5/2009	5/13/2009	7/16/2009	5/13/2009	7/15/2009	5/12/2009	7/16/2009
Metals																
Antimony	0.006	(2)	mg/L	<0.001	<0.005	<0.001	<0.001	<0.0010	--	--	0.002	<0.005	<0.001	<0.001	0.001	<0.005
Arsenic	0.01	(2)	mg/L	**0.013**	**0.031**	**0.017**	**0.043**	**0.075**	<0.020	<0.020	**0.041**	**0.024**	0.007	0.005	**0.021**	**0.024**
Barium	1	(3)	mg/L	0.88	0.44	0.73	**1.1**	0.099	0.6	**1.2**	0.29	0.28	0.15	0.027	0.15	0.074
Beryllium	0.004	(2)	mg/L	<0.0030	<0.0030	<0.0030	0.002	<0.0030	--	--	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Cadmium	0.005	(2)	mg/L	<0.0020	<0.0020	<0.0020	<0.001	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Calcium *	--		mg/L	--	210	--	258	220	36	130	--	120	--	420	--	240
Calcium, Dissolved	--		mg/L	140	150	180	--	--	35	130	110	120	390	410	230	260
Chromium	0.05	(3)	mg/L	<0.0060	<0.0060	0.013	0.03	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.0063	<0.0060	<0.0060	<0.0060
Cobalt	0.05	(3)	mg/L	0.0083	0.0084	0.024	0.05	0.028	--	--	<0.0060	<0.0060	0.013	<0.0060	<0.0060	<0.0060
Cyanide, Total	0.2	(3)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.0050	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron, Dissolved	1	(3)	mg/L	**2.2**	**5.9**	**24**	0.54	**4.7**	0.88	0.26	0.14	**1.6**	0.35	0.028	0.98	**4**
Iron, Total	--		mg/L	10	17	61		41	3.3	2.9	1.2	2.8	21	1.5	3.5	5.3
Lead	0.015	(2)	mg/L	<0.0050	**0.018**	**0.038**	**0.02**	<0.0050	0.0098	<0.0050	**0.025**	**0.042**	0.0097	<0.0050	<0.0050	<0.0050
Magnesium	--		mg/L	--	78	--	69	56	12	42	--	44	--	130	--	82
Magnesium, Dissolved	--		mg/L	61	70	81	--	--	11	36	37	45	110	120	79	84
Manganese	0.2	(3)	mg/L	--	**5.4**	--	4.86	6.1	1.6	3.6	3.2	4.3	--	**4.6**	**2.7**	**3.8**
Manganese, Dissolved	--		mg/L	3.4	3.7	3.9	--	--	--	--	--	4.4	3	4.4	--	3.9
Mercury	0.002	(3)	mg/L	<0.00020	<0.00020	0.00045	<0.001	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Nickel	0.2	(3)	mg/L	0.011	0.013	0.034	0.12	0.074	--	--	<0.010	<0.010	0.021	0.012	<0.010	<0.010
Potassium *	--		mg/L	--	3.6	--	--	--	6	3.5	--	1.9	--	4.6	--	3.4
Potassium, Dissolved	--		mg/L	3.8	5.1	3.7	6	4.2	6	3.1	1.7	2.1	4.7	4.1	3.8	3.9
Selenium	0.05	(3)	mg/L	<0.050	<0.005	<0.050	0.038	0.0095	<0.050	<0.050	<0.25	<0.001	<0.25	0.026	<0.050	<0.001
Silver	0.05	(3)	mg/L	<0.0050	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium *	--		mg/L	--	410	--	--	--	220	420	--	110	--	540	--	520
Sodium, Dissolved	--		mg/L	380	400	360	577	490	220	430	130	110	510	510	480	520
Vanadium	0.26	(1)	mg/L	<0.050	<0.050	<0.050	<0.1	<0.050	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Zinc	10	(3)	mg/L	0.027	0.054	0.051	0.18	<0.020	--	--	<0.020	<0.020	0.074	<0.020	<0.020	<0.020
Volatile Organic Compounds - (EPA Method 8260)																
1,1,1,2-Tetrachloroethane	0.52	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,1,1-Trichloroethane	60	(3)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,1,2,2-Tetrachloroethane	10	(3)	µg/L	<100	<200	<200	<2.0	<2.0	<40	<10	<40	<20	<2.0	<2.0	<40	<20
1,1,2-Trichloroethane	5	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,1-Dichloroethane	25	(3)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,1-Dichloroethene	0.005	(3)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,1-Dichloropropene	--		µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,2,3-Trichlorobenzene	--		µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,2,3-Trichloropropane	0.0096	(1)	µg/L	<100	<200	<200	<2.0	<2.0	<40	<10	<40	<20	<2.0	<2.0	<40	<20
1,2,4-Trichlorobenzene	70	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,2,4-Trimethylbenzene	15	(1)	µg/L	**1500**	**1300**	**4800**	<1.0	<1.0	**510**	**340**	**2400**	**2900**	<1.0	<1.0	**1400**	**1300**
1,2-Dibromo-3-chloropropane	0.2	(2)	µg/L	<100	<200	<200	<2.0	<2.0	<40	<10	<40	<20	<2.0	<2.0	<40	<20
1,2-Dibromoethane (EDB)	0.05	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,2-Dichlorobenzene	600	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,2-Dichloroethane (EDC)	5	(2)	µg/L	**61**	<100	**220**	<1.0	<1.0	<20	<5.0	<20	<10	1.9	1.4	**220**	**270**
1,2-Dichloropropane	5	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,3,5-Trimethylbenzene	12	(1)	µg/L	**240**	<100	**1300**	<1.0	<1.0	**120**	**61**	**820**	**550**	<1.0	<1.0	**500**	**490**
1,3-Dichlorobenzene	--		µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,3-Dichloropropane	730	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,4-Dichlorobenzene	75	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1-Methylnaphthalene	2.3	(1)	µg/L	<200	<400	<400	<4.0	<4.0	**100**	**210**	**270**	**150**	<4.0	<4.0	**150**	**130**

Table 3
Ground Water Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	AOC 22-12 (GW)	AOC 22-12/TW-01	AOC 22-13 (GW)	MW-52	MW-52	MW-55	MW-56	MW-61	MW-61	MW-63	MW-63	MW-65	MW-65
2,2-Dichloropropane	--		µg/L	<100	<200	<200	<2.0	<2.0	<40	<10	<40	<20	<2.0	<2.0	<40	<20
2-Butanone	7100	(1)	µg/L	<500	<1000	<1000	<10	<10	<200	50	<200	<100	<10	<10	<200	<100
2-Chlorotoluene	730	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
2-Hexanone	--		µg/L	<500	<1000	<1000	<10	<10	<200	<50	<200	<100	<10	<10	<200	<100
2-Methylnaphthalene	150	(1)	µg/L	<200	<400	**710**	<4.0	<4.0	120	**260**	**450**	**260**	<4.0	<4.0	**220**	**210**
4-Chlorotoluene	2600	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
4-Isopropyltoluene	--		µg/L	<50	<100	<100	<1.0	<1.0	<20	8.2	22	13	<1.0	<1.0	<20	<10
4-Methyl-2-pentanone	--		µg/L	<500	<1000	<1000	<10	<10	<200	<50	<200	<100	<10	<10	<200	<100
Acetone	22000	(1)	µg/L	<500	<1000	<1000	<10	<10	<200	82	1100	3000	<10	<10	<200	110
Benzene	5	(2)	µg/L	**8600**	**8200**	**13000**	<1.0	<1.0	**10000**	**2800**	**49**	**48**	<1.0	<1.0	**6800**	**5400**
Bromobenzene	20	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Bromodichloromethane	0.12	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Bromoform	8.5	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Bromomethane	8.7	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Carbon disulfide	1000	(1)	µg/L	<500	<1000	<1000	<10	<10	<200	<50	<200	<100	<10	<10	<200	<100
Carbon Tetrachloride	5	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Chlorobenzene	100	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Chloroethane	--		µg/L	<100	<200	<200	<2.0	<2.0	<40	<10	<40	<20	<2.0	<2.0	<40	<20
Chloroform	100	(3)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Chloromethane	190	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
cis-1,2-DCE	70	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
cis-1,3-Dichloropropene	--		µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Dibromochloromethane	0.15	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Dibromomethane	370	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Dichlorodifluoromethane	390	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Ethylbenzene	700	(2)	µg/L	**2100**	**2200**	**4300**	<1.0	<1.0	**1300**	310	**1400**	**1500**	<1.0	<1.0	**1800**	**1400**
Hexachlorobutadiene	0.86	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Isopropylbenzene (Cumene)	680	(1)	µg/L	69	190	240	<1.0	<1.0	55	42	100	70	<1.0	<1.0	84	81
Methyl tert-butyl ether (MTBE)	12	(1)	µg/L	**20000**	**23000**	**14000**	<1.0	<1.0	**1900**	**2100**	**380**	**410**	**48**	**54**	**1700**	**1700**
Methylene Chloride	5	(2)	µg/L	<150	<300	<300	<3.0	<3.0	<60	<15	<60	<30	<3.0	<3.0	<60	<30
Naphthalene	0.14	(1)	µg/L	**380**	**480**	**800**	<2.0	<2.0	**330**	**360**	**690**	**500**	<2.0	<2.0	**480**	**450**
n-Butylbenzene	--		µg/L	<50	<100	420	<1.0	<1.0	<20	16	110	97	<1.0	<1.0	49	85
n-Propylbenzene	--		µg/L	200	180	700	<1.0	<1.0	98	71	310	240	<1.0	<1.0	230	260
sec-Butylbenzene	--		µg/L	<50	<100	110	<1.0	<1.0	<20	11	<20	15	<1.0	<1.0	<20	14
Styrene	100	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
tert-Butylbenzene	--		µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Tetrachloroethene (PCE)	5	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Toluene	750	(3)	µg/L	**870**	380	**16000**	<1.0	<1.0	**760**	5.5	<20	11	<1.0	<1.0	**2500**	150
trans-1,2-DCE	100	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
trans-1,3-Dichloropropene	0.43	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Trichloroethene (TCE)	5	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Trichlorofluoromethane	1300	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Vinyl chloride	1	(3)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Xylenes, Total	620	(3)	µg/L	**6100**	**5000**	**23000**	<1.5	<1.5	**1500**	390	**7300**	**6800**	<1.5	<1.5	**8500**	**6400**
Semi Volatile Organics - (EPA Method 8270)																
1,2,4-Trichlorobenzene	70	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
1,2-Dichlorobenzene	600	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
1,3-Dichlorobenzene	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
1,4-Dichlorobenzene	75	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2,4,5-Trichlorophenol	3700	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2,4,6-Trichlorophenol	6.1	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50

Table 3
Ground Water Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	AOC 22-12 (GW)	AOC 22-12/TW-01	AOC 22-13 (GW)	MW-52	MW-52	MW-55	MW-56	MW-61	MW-61	MW-63	MW-63	MW-65	MW-65
2,4-Dichlorophenol	110	(1)	µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<100
2,4-Dimethylphenol	730	(1)	µg/L	30	<50	<10	<10	<10	<10	<10	<50	130	<10	<10	24	<50
2,4-Dinitrophenol	73	(1)	µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<100
2,4-Dinitrotoluene	0.22	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2,6-Dinitrotoluene	37	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2-Chloronaphthalene	2900	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2-Chlorophenol	180	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2-Methylnaphthalene	150	(1)	µg/L	81	71	100	<10	<10	53	85	**17000**	**1200**	<10	<10	**160**	130
2-Methylphenol	1800	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2-Nitroaniline	110	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2-Nitrophenol	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
3,3´-Dichlorobenzidine	0.15	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
3+4-Methylphenol	180	(1)	µg/L	16	<50	10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
3-Nitroaniline	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
4,6-Dinitro-2-methylphenol	--		µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<100
4-Bromophenyl phenyl ether	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
4-Chloro-3-methylphenol	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
4-Chloroaniline	0.34	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
4-Chlorophenyl phenyl ether	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
4-Nitroaniline	3.4	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
4-Nitrophenol	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Acenaphthene	2200	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Acenaphthylene	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Aniline	12	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Anthracene	11000	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Azobenzene	0.12	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Benz(a)anthracene	0.029	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Benzo(a)pyrene	0.2	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Benzo(b)fluoranthene	0.029	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Benzo(g,h,i)perylene	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Benzo(k)fluoranthene	0.29	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Benzoic acid	150000	(1)	µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<100
Benzyl alcohol	18000	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Bis(2-chloroethoxy)methane	110	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Bis(2-chloroethyl)ether	0.012	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Bis(2-chloroisopropyl)ether	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Bis(2-ethylhexyl)phthalate	6	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	**140**	<50	<10	<10	<10	<50
Butyl benzyl phthalate	35	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Carbazole	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Chrysene	2.9	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Dibenz(a,h)anthracene	0.0029	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Dibenzofuran	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Diethyl phthalate	29000	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Dimethyl phthalate	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Di-n-butyl phthalate	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Di-n-octyl phthalate	--		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Fluoranthene	1500	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Fluorene	1500	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	300	<50	<10	<10	<10	<50
Hexachlorobenzene	1	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Hexachlorobutadiene	0.86	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Hexachlorocyclopentadiene	50	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50

Table 3
Ground Water Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	AOC 22-12 (GW)	AOC 22-12/TW-01	AOC 22-13 (GW)	MW-52	MW-52	MW-55	MW-56	MW-61	MW-61	MW-63	MW-63	MW-65	MW-65
Hexachloroethane	4.8	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Indeno(1,2,3-cd)pyrene	0.029	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Isophorone	71	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Naphthalene	0.14	(1)	µg/L	**250**	**220**	**110**	<10	<10	**200**	**120**	**7500**	**690**	<10	<10	**370**	**290**
Nitrobenzene	0.12	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
N-Nitrosodimethylamine	0.00042	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
N-Nitrosodi-n-propylamine	0.0096	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
N-Nitrosodiphenylamine	14	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Pentachlorophenol	1	(2)	µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<100
Phenanthrene	--		µg/L	<10	<50	<10	<10	<10	<10	<10	1500	130	<10	<10	<10	<50
Phenol	5	(3)	µg/L	**30**	<50	**19**	<10	<10	**15**	<10	<50	<50	<10	<10	**49**	<50
Pyrene	1100	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	58	<50	<10	<10	<10	<50
Pyridine	37	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Alkalinity, Total (As CaCO3)	--		mg/L CaCO3	1100	1200	1200	260	500	570	1100	590	520	640	630	1000	990
Bicarbonate	--		mg/L CaCO3	1100	1200	1200	260	500	570	1100	590	520	640	630	1000	990
Bromide	--		mg/L	--			--	--	--	--						
Carbonate	--		mg/L CaCO3	<5.0	<5.0	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Chloride	250	(3)	mg/L	140	170	210	**450**	**580**	77	**270**	67	70	210	240	140	160
Fluoride	1.6	(3)	mg/L	--	0.28	--	--	--	0.56	0.56	0.38	0.39	0.19	0.17	0.21	0.24
Nitrate (As N)+Nitrite (As N)			mg/L	--	--	--	--	--	--	--	--	<1.0	72	--	<1.0	<1.0
Nitrogen, Nitrate (As N)	10	(2)	mg/L	0.12	0.19	0.15	2.1	2.2	0.32	8.1	<1.0	--	--	**74**	--	--
Nitrogen, Nitrite (As N)	1	(2)	mg/L	<1.0	<2.0	<1.0	**2.2**	<5.0	<0.10	<1.0	<1.0	--	--	<2.0	--	--
Sulfate	600	(3)	mg/L	56	39	110	**1000**	**760**	4	19	65	110	**1600**	**1500**	**790**	**950**
Phosphorus, Orthophosphate (As P)	--		mg/L	--	<0.50	--	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Dissolved Solids	1000	(3)	mg/L	**2500**	**1720**	**1700**	--	--	740	**1700**	820	872	**3500**	**3710**	**2300**	**2420**
Diesel Range Organics (DRO)	1.34	(4)	mg/L	**9.4**	**5.7**	**65**	<1.0	<1.0	**5.7**	**5.2**	**550**	**59**	<1.0	<1.0	**14**	**11**
Gasoline Range Organics (GRO)	--		mg/L	84	54	190	<0.050	<0.050	42	16	24	30	0.055	0.077	42	43
Motor Oil Range Organics (MRO)	--		mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0
Ethanol	--		mg/L	--	--	--	--	--	--	--	--	--	--	--	<1.0	<1.0

-- No screening level or analytical result available
450 - bolded value exceeds screening level
(1) EPA - Regional Screening Levels (April 2009) - EPA Screening Levels.Tap Water
(2) EPA - Regional Screening Levels (April 2009) - MCL
(3) NMED WQCC standards - Title 20 Chapter 6, Part 2, - 20.6.2.3101 Standards for Ground Water of 10,000 mg/l TDS Concentration or less
(4) NMED TPH Screening Guidelines Oct. 2006 - #3 and #6 fuel oil
* = General Chemistry analytes not required by Work Plan.

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-1 (3.5-4.5')	SWMU 3-1 (7.5-8.5')	SWMU 3-3 (3.5-4.5')	SWMU 3-3 (7.5-8.5')	SWMU 3-3 (24-26')	SWMU 3-3 (26-27')	SWMU 3-4 (6-7')	SWMU 3-4 (10-11')	SWMU 3-4 (12-14')	SWMU 3-5 (4.5-5.5')	SWMU 3-5 (8.5-9.5')	SWMU 3-6 (6-7')	SWMU 3-6 (10-11')	SWMU 3-7 (0-2')	SWMU 3-7 (4.25-5.25')	SWMU 3-7 (8.25-9.25')	SWMU 3-8 (6-7')	SWMU 3-8 (10-11')	SWMU 3-8 (12-14')	SWMU 3-8 (14-16')	SWMU 3-9 (14-16')
							1201871-001 1/30/2012	1201871-002 1/30/2012	1201827-005 1/27/2012	1201827-006 1/27/2012	1201827-007 1/27/2012	1201827-008 1/27/2012	1201800-001 1/25/2012	1201800-002 1/25/2012	1201800-003 1/25/2012	1201871-010 1/30/2012	1201871-011 1/30/2012	1202199-005 2/6/2012	1202199-006 2/6/2012	1202147-007 2/2/2012	1202147-005 2/2/2012	1202147-006 2/2/2012	1202199-001 2/6/2012	1202199-002 2/6/2012	1202199-003 2/6/2012	1202199-004 2/6/2012	1202151-004 2/3/2012
Metals (mg/kg)																											
Antimony	3.13E+01	(1)	1.24E+02	(5)	7.44E+00	(8)	<5.0	<5.0	<5.0	<2.5	<2.5	<12	<2.5	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<2.5	<5.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Arsenic	3.90E+00	(1)	1.77E+01	(4)	1.48E-01	(8)	<5.0	<5.0	<5.0	<2.5	<2.5	17	<2.5	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<2.5	<5.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Barium	1.56E+04	(1)	4.35E+03	(5)	3.39E+03	(8)	150	150	210	160	44	170	150	160	170	140	87	74	61	130	37	33	71	14	24	23	10
Beryllium	1.56E+02	(1)	1.44E+02	(5)	6.49E+02	(8)	0.49	0.47	0.54	0.35	<0.15	<0.75	<0.15	<0.15	<0.15	0.41	<0.30	0.37	0.3	0.33	<0.30	<0.15	0.33	0.69	0.49	0.38	0.59
Cadmium	7.03E+01	(1)	2.77E+02	(5)	1.55E+01	(8)	<0.20	<0.20	<0.20	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium III	1.17E+05	(1)	4.65E+05	(5)	1.11E+09	(8)	7.5	7.4	8.5	5.3	1.8	3	2.7	6	3.7	6.3	4	5.4	4	4.7	3.3	2	3.6	3.9	3.8	2.4	3.3
Chromium VI	2.97E+00	(1)	6.31E+01	(4)	9.34E-02	(8)	7.5	7.4	8.5	5.3	1.8	3	2.7	6	3.7	6.3	4	5.4	4	4.7	3.3	2	3.6	3.9	3.8	2.4	3.3
Cobalt	2.30E+01	(2)	3.00E+02	(6)	5.51E+00	(9)	4.2	4	5.2	3.3	1.5	4.6	2.7	3	2.8	3.6	2.3	3	2.4	2.7	2	1.4	2.2	2.1	2.1	1.9	3.2
Cyanide	4.69E+01	(1)	1.86E+02	(5)	2.48E+00	(8)	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Lead	4.00E+02	(1)	8.00E+02	(4)	-	-	3.3	3.4	4.4	2.8	2.9	7.3	1	0.71	0.94	3.1	2	2.9	2.4	2.5	2	1.6	2.5	3	3.3	2.8	2.8
Mercury	1.56E+01	(1)	1.36E+01	(5)	3.68E-01	(8)	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Nickel	1.56E+03	(1)	6.19E+03	(5)	5.36E+02	(8)	6.6	5.8	7.8	4.7	1.4	2.8	1.7	2.2	1.4	5.3	3.6	4.9	3.7	3.9	2.8	1.8	2.8	2.8	2.6	2	3
Selenium	3.91E+02	(1)	1.55E+03	(5)	1.09E+01	(8)	<5.0	<5.0	<5.0	<2.5	<2.5	<12	<2.5	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<2.5	<5.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Silver	3.91E+02	(1)	1.55E+03	(5)	1.76E+01	(8)	<0.50	<0.50	<0.50	<0.25	<0.25	<1.2	<0.25	<0.25	<0.25	<0.50	<0.50	<0.25	<0.25	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Vanadium	3.91E+02	(1)	1.55E+03	(5)	2.05E+03	(8)	21	20	29	18	7	24	16	17	18	20	12	15	12	14	11	7.2	11	12	9.3	7.4	8.7
Zinc	2.35E+04	(1)	9.29E+04	(5)	7.67E+03	(8)	25	25	33	19	7.1	25	13	15	14	21	15	18	14	17	12	8.2	14	20	17	13	18
Volatile Organic Compounds - (EPA Method 8260) mg/kg																											
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,1,2,2-Tetrachloroethane	8.02E+00	(1)	4.35E+01	(4)	2.80E-05	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,1-Dichloropropene	-	-	-	-	-	-	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2,3-Trichlorobenzene	-	-	-	-	-	-	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	<0.001	<0.0009	0.077	0.058	1.4	1.8	<0.001	0.00658	0.14	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	0.00634	<0.005	<0.005	<0.001
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	<0.001	<0.0009	<0.050	<0.050	0.16	0.4	<0.001	0.00234	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	0.0056	<0.005	<0.005	<0.001
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1-Methylnaphthalene	2.20E+01	(3)	9.90E+02	(7)	1.69E-01	(9)	<0.004	<0.0039	<0.20	<0.20	2.2	1.2	<0.004	<0.004	<0.20	<0.004	<0.004	<0.025	<0.025	<0.004	<0.004	<0.004	<0.025	<0.025	<0.025	<0.025	<0.004
2,2-Dichloropropane	-	-	-	-	-	-	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	<0.001	<0.0009	<0.50	<0.50	<0.50	<0.48	<0.001	0.00297	<0.50	<0.001	<0.001	<0.025	<0.025	0.00135	<0.001	<0.001	<0.025	<0.025	<0.025	<0.025	<0.001
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
2-Hexanone	-	-	-	-	-	-	<0.001	<0.0009	<0.50	<0.50	<0.50	<0.48	<0.001	<0.001	<0.50	<0.001	<0.001	<0.025	<0.025	<0.001	<0.001	<0.001	<0.025	<0.025	<0.025	<0.025	<0.001
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.004	<0.0039	<0.20	<0.20	3.9	2.6	<0.004	<0.004	<0.20	<0.004	<0.004	<0.025	<0.025	<0.004	<0.004	<0.004	<0.025	<0.025	<0.025	<0.025	<0.004
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
4-Isopropyltoluene	-	-	-	-	-	-	<0.001	<0.0009	<0.050	<0.050	<0.050	0.052	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
4-Methyl-2-pentanone	-	-	-	-	-	-	<0.001	<0.0009	<0.50	<0.50	<0.50	<0.48	<0.001	<0.001	<0.50	<0.001	<0.001	<0.025	<0.025	<0.001	<0.001	<0.001	<0.025	<0.025	<0.025	<0.025	<0.001
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	<0.005	<0.0049	<0.75	<0.75	<0.75	<0.72	<0.005	0.0122	<0.75	<0.005	<0.005	<0.025	<0.025	0.0155	<0.005	<0.005	<0.025	<0.025	<0.025	<0.025	0.013
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	0.00351	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	<0.001	<0.0009	<0.40	<0.40	<0.40	<0.38	<0.001	<0.001	<0.40	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	<0.001	<0.0009	<0.50	<0.50	<0.50	<0.48	<0.001	<0.001	<0.50	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Chloroethane	-	-	-	-	-	-	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	<0.001	<0.0009	0.062	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	<0.001	<0.0009	<0.15	<0.15	<0.15	<0.14	<0.001	<0.001	<0.15	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
cis-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-1 (3.5-4.5')	SWMU 3-1 (7.5-8.5')	SWMU 3-3 (3.5-4.5')	SWMU 3-3 (7.5-8.5')	SWMU 3-3 (24-26')	SWMU 3-3 (26-27')	SWMU 3-4 (6-7')	SWMU 3-4 (10-11')	SWMU 3-4 (12-14')	SWMU 3-5 (4.5-5.5')	SWMU 3-5 (8.5-9.5')	SWMU 3-6 (6-7')	SWMU 3-6 (10-11')	SWMU 3-7 (0-2')	SWMU 3-7 (4.25-5.25')	SWMU 3-7 (8.25-9.25')	SWMU 3-8 (6-7')	SWMU 3-8 (10-11')	SWMU 3-8 (12-14')	SWMU 3-8 (14-16')	SWMU 3-9 (14-16')
							1201871-001 1/30/2012	1201871-002 1/30/2012	1201827-005 1/27/2012	1201827-006 1/27/2012	1201827-007 1/27/2012	1201827-008 1/27/2012	1201800-001 1/25/2012	1201800-002 1/25/2012	1201800-003 1/25/2012	1201871-010 1/30/2012	1201871-011 1/30/2012	1202199-005 2/6/2012	1202199-006 2/6/2012	1202147-007 2/2/2012	1202147-005 2/2/2012	1202147-006 2/2/2012	1202199-001 2/6/2012	1202199-002 2/6/2012	1202199-003 2/6/2012	1202199-004 2/6/2012	1202151-004 2/3/2012
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	<0.001	<0.0009	<0.050	<0.050	2.9	0.11	<0.001	0.00269	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	<0.001	<0.0009	<0.050	<0.050	0.65	0.071	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	0.0192	<0.005	<0.005	<0.001
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	<0.001	<0.0009	<0.15	<0.15	<0.15	<0.14	<0.001	<0.001	<0.15	<0.001	<0.001	<0.025	<0.025	<0.001	<0.001	<0.001	<0.025	<0.025	<0.025	<0.025	<0.001
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.002	<0.0019	<0.10	<0.10	2.5	1.3	<0.002	0.00231	<0.10	<0.002	<0.002	<0.005	<0.005	<0.002	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.001
n-Butylbenzene	-	-	-	-	-	-	<0.001	<0.0009	<0.050	<0.050	2.5	0.96	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
n-Propylbenzene	-	-	-	-	-	-	<0.001	<0.0009	<0.050	<0.050	3.2	0.57	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
sec-Butylbenzene	-	-	-	-	-	-	<0.001	<0.0009	<0.050	<0.050	0.73	0.21	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
tert-Butylbenzene	-	-	-	-	-	-	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	0.0296	0.00295	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
trans-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	<0.001	<0.0009	<0.10	<0.10	0.33	0.17	<0.001	0.0105	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	0.0055	<0.005	<0.001
Semi Volatile Organics - (EPA Method 8270) mg/kg																											
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	6.11E+03	(1)	2.38E+04	(5)	1.17E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
2,4,6-Trichlorophenol	6.11E+01	(1)	2.38E+02	(5)	1.17E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
2,4-Dichlorophenol	1.83E+02	(1)	7.15E+02	(5)	1.12E+00	(8)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40
2,4-Dimethylphenol	1.22E+03	(1)	4.76E+03	(5)	7.48E+00	(8)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.60	<0.30	<0.30	<0.30	<0.30
2,4-Dinitrophenol	1.22E+02	(1)	4.76E+02	(5)	7.10E-01	(8)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40
2,4-Dinitrotoluene	1.57E+01	(1)	6.18E+01	(4)	2.53E-02	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
2,6-Dinitrotoluene	6.11E+01	(1)	2.38E+02	(5)	4.33E-01	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
2-Chloronaphthalene	6.26E+03	(1)	2.48E+04	(5)	1.28E+02	(8)	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25
2-Chlorophenol	3.91E+02	(1)	1.55E+03	(5)	1.30E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.20	<0.20	<0.20	<0.20	4.1	2.4	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
2-Methylphenol	3.10E+03	(2)	3.10E+04	(6)	2.25E+01	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
2-Nitroaniline	1.80E+02	(2)	1.80E+03	(6)	3.71E-01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
2-Nitrophenol	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
3,3'-Dichlorobenzidine	1.08E+01	(1)	4.26E+01	(4)	8.33E-02	(8)	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25
3+4-Methylphenol	3.10E+02	(2)	3.10E+03	(6)	2.14E+00	(9)	<0.20	<0.20	<0.20	0.21	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
3-Nitroaniline	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
4-Bromophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
4-Chloro-3-methylphenol	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
4-Chloroaniline	2.40E+00	(3)	8.60E+01	(7)	1.35E-03	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
4-Nitroaniline	2.40E+01	(3)	8.60E+02	(7)	1.13E-02	(9)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40
4-Nitrophenol	-	-	-	-	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25
Acenaphthene	3.44E+03	(1)	1.86E+04	(5)	1.90E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Acenaphthylene	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Aniline	8.50E+01	(3)	3.00E+03	(7)	3.83E-02	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Anthracene	1.72E+04	(1)	6.68E+04	(5)	3.04E+03	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Azobenzene	4.90E+00	(3)	2.20E+02	(7)	5.74E-03	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Benz(a)anthracene	1.48E+00	(1)	2.34E+01	(4)	8.81E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	1.48E-01	(1)	2.34E+00	(4)	2.92E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Benzo(b)fluoranthene	1.48E+00	(1)	2.34E+01	(4)	2.98E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Benzo(k)fluoranthene	1.48E+01	(1)	2.34E+02	(4)	2.92E+01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Benzoic acid	2.40E+05	(2)	2.50E+06	(6)	3.71E+02	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
Benzyl alcohol	3.10E+04	(2)	3.10E+05	(6)	4.73E+01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethoxy)methane	1.80E+02	(2)	1.80E+03	(6)	2.59E-01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethyl)ether	2.68E+00	(1)	1.42E+01	(4)	2.96E-04	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	4.54E+02	(4)	2.62E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Bis(2-ethylhexyl)phthalate	3.47E+02	(1)	1.37E+03	(4)	9.70E+01	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
Butyl benzyl phthalate	2.60E+02	(3)	9.10E+03	(7)	7.54E+00	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-1 (3.5-4.5')	SWMU 3-1 (7.5-8.5')	SWMU 3-3 (3.5-4.5')	SWMU 3-3 (7.5-8.5')	SWMU 3-3 (24-26')	SWMU 3-3 (26-27')	SWMU 3-4 (6-7')	SWMU 3-4 (10-11')	SWMU 3-4 (12-14')	SWMU 3-5 (4.5-5.5')	SWMU 3-5 (8.5-9.5')	SWMU 3-6 (6-7')	SWMU 3-6 (10-11')	SWMU 3-7 (0-2')	SWMU 3-7 (4.25-5.25')	SWMU 3-7 (8.25-9.25')	SWMU 3-8 (6-7')	SWMU 3-8 (10-11')	SWMU 3-8 (12-14')	SWMU 3-8 (14-16')	SWMU 3-9 (14-16')
							1201871-001 1/30/2012	1201871-002 1/30/2012	1201827-005 1/27/2012	1201827-006 1/27/2012	1201827-007 1/27/2012	1201827-008 1/27/2012	1201800-001 1/25/2012	1201800-002 1/25/2012	1201800-003 1/25/2012	1201871-010 1/30/2012	1201871-011 1/30/2012	1202199-005 2/6/2012	1202199-006 2/6/2012	1202147-007 2/2/2012	1202147-005 2/2/2012	1202147-006 2/2/2012	1202199-001 2/6/2012	1202199-002 2/6/2012	1202199-003 2/6/2012	1202199-004 2/6/2012	1202151-004 2/3/2012
Carbazole	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Chrysene	1.48E+02	(1)	2.34E+03	(4)	8.99E+01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	1.48E-01	(1)	2.34E+00	(4)	9.52E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Dibenzofuran	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Diethyl phthalate	4.89E+04	(1)	1.91E+05	(5)	1.09E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Dimethyl phthalate	6.11E+05	(1)	2.38E+06	(5)	9.06E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Di-n-butyl phthalate	6.11E+03	(1)	2.38E+04	(5)	7.84E+01	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
Di-n-octyl phthalate	-	-	-	-	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25
Fluoranthene	2.29E+03	(1)	8.91E+03	(5)	1.37E+03	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Fluorene	2.29E+03	(1)	8.91E+03	(5)	2.29E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Hexachlorobenzene	3.04E+00	(1)	1.20E+01	(4)	4.48E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Hexachlorobutadiene	6.20E+00	(3)	2.20E+02	(7)	2.14E-02	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Hexachlorocyclopentadiene	3.67E+02	(1)	8.11E+02	(5)	5.92E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Hexachloroethane	4.28E+01	(1)	1.67E+02	(5)	9.20E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Indeno(1,2,3-cd)pyrene	1.48E+00	(1)	2.34E+01	(4)	9.71E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Isophorone	5.12E+03	(1)	4.75E+04	(5)	2.16E+00	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.20	<0.20	<0.20	<0.20	1.5	0.93	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Nitrobenzene	5.35E+01	(1)	3.00E+02	(4)	7.02E-03	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
N-Nitrosodi-n-propylamine	6.90E-02	(3)	2.50E+00	(7)	1.24E-04	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
N-Nitrosodiphenylamine	9.93E+02	(1)	3.91E+03	(4)	6.36E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Pentachlorophenol	8.94E+00	(1)	3.00E+01	(4)	1.44E-01	(8)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40
Phenanthrene	1.83E+03	(1)	7.15E+03	(5)	3.21E+02	(8)	<0.20	<0.20	<0.20	<0.20	0.25	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Phenol	1.83E+04	(1)	6.88E+04	(5)	5.59E+01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Pyrene	1.72E+03	(1)	6.68E+03	(5)	1.01E+03	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Pyridine	7.80E+01	(2)	1.00E+03	(6)	1.09E-01	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg																											
Diesel Range Organics (DRO)	1.00E+03	(11)	1.00E+03	(11)	1.00E+03	(11)	<9.9	30	<9.8	12	380	150	<10	<10	<10	<10	<9.9	<9.8	<9.7	<10	<9.8	<9.7	<10	<10	<9.9	<9.9	<10
Gasoline Range Organics (GRO)	--		--		--		<5.0	<5.0	<5.0	<5.0	100	28	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Motor Oil Range Organics (MRO)	3.00E+03	(12)	5.00E+03	(12)	3.00E+03	(12)	<49	51	<49	<49	<50	<48	<50	<50	<50	<50	<49	<49	<48	<51	<49	<49	<50	<51	<50	<50	<50

-- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)

EPA - Regional Screening Levels (April 2009)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels (April 2009)

(7) EPA Industrial - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(8) SoilGW NMED Dilution Attenuation Factor (DAF) = 11.25

(9) SoilGW Risk-based EPA DAF = 11.25

(10) SoilGW MCL-based EPA DAF = 11.25

(11) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "unknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

(12) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "Waste Oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Non-Residential Screening Level
yellow highlight represents value above Leachate (DAF) Screening Level
Bold with yellow highlight value exceeds Non-Residential Screening Level and DAF

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-9 (18-19')	SWMU 3-10 (2-4')	SWMU 3-10 (10-12')	SWMU 3-10 (13.5-14')	SWMU 3-11 (6.5-7.5')	SWMU 3-11 (10.5-11.5')	SWMU 3-12 (5-6')	SWMU 3-12 (9-10')	SWMU 3-13 (5.5-6.5')	SWMU 3-13 (9.5-10.5')	SWMU 3-14 (4.5-5.5')	SWMU 3-14 (8.5-9.5')	SWMU 3-15 (5.5-6.5')	SWMU 3-15 (9.5-10.5')	SWMU 3-16 (4.25-5.25')	SWMU 3-16 (8.25-9.25')	SWMU 3-17 (5-6')	SWMU 3-17 (9-10')	SWMU 3-18 (4.5-5.5')	SWMU 3-18 (8.5-9.5')	SWMU 3-19 (4.5-5.5')
							1202151-005 2/3/2012	1202151-001 2/3/2012	1202151-002 2/3/2012	1202151-003 2/3/2012	1202147-003 2/2/2012	1202147-004 2/2/2012	1201800-015 1/26/2012	1201800-016 1/26/2012	1201800-012 1/26/2012	1201800-014 1/26/2012	1202017-001 1/30/2012	1202017-002 1/30/2012	1201800-008 1/26/2012	1201800-009 1/26/2012	1202148-006 2/2/2012	1202148-008 2/2/2012	1201800-006 1/25/2012	1201800-007 1/25/2012	1201800-010 1/26/2012	1201800-011 1/26/2012	1201827-003 1/26/2012
Metals (mg/kg)																											
Antimony	3.13E+01	(1)	1.24E+02	(5)	7.44E+00	(8)	<2.5	<2.5	<2.5	<2.5	<2.5	<12	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<12	<12	<5.0	<2.5	<2.5	<2.5	<12
Arsenic	3.90E+00	(1)	1.77E+01	(4)	1.48E-01	(8)	<2.5	<2.5	<2.5	<2.5	<2.5	<12	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0	2.5	<2.5	<12	<12	<5.0	<2.5	<2.5	<2.5	<12
Barium	1.56E+04	(1)	4.35E+03	(5)	3.39E+03	(8)	23	83	260	230	590	640	140	77	160	120	150	73	160	76	180	140	170	120	150	170	300
Beryllium	1.56E+02	(1)	1.44E+02	(5)	6.49E+02	(8)	0.53	0.33	0.21	0.19	0.17	<0.75	0.33	0.27	0.35	0.33	0.49	0.42	0.43	0.37	<0.75	<0.75	0.52	0.36	0.4	0.33	<0.75
Cadmium	7.03E+01	(1)	2.77E+02	(5)	1.55E+01	(8)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.50	<0.50	<0.20	<0.10	<0.10	<0.10	<0.50
Chromium III	1.17E+05	(1)	4.65E+05	(5)	1.11E+09	(8)	3.7	5.4	3.9	28	83	11	5	4.1	5.3	4.9	7.6	6.1	6.6	5.5	12	8.7	8.5	4.9	6.2	5	10
Chromium VI	2.97E+00	(1)	6.31E+01	(4)	9.34E-02	(8)	3.7	5.4	3.9	28	83	11	5	4.1	5.3	4.9	7.6	6.1	6.6	5.5	12	8.7	8.5	4.9	6.2	5	10
Cobalt	2.30E+01	(2)	3.00E+02	(6)	5.51E+00	(9)	3.3	2.4	3.4	3.5	4.3	5.8	2.7	2.3	3.1	2.9	5	3.8	4.2	3.1	7.5	4.4	5.3	2.9	3.8	2.9	6
Cyanide	4.69E+01	(1)	1.86E+02	(5)	2.48E+00	(8)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30	<0.30	<0.3	<0.3	<0.3	<0.3	<0.3
Lead	4.00E+02	(1)	8.00E+02	(4)	-	-	2.7	2	1.2	1.1	1.2	1.5	2.5	2.2	2.7	2.5	3.9	3.1	3.2	2.8	6.7	4.3	4.6	2.9	3.1	2.5	5.1
Mercury	1.56E+01	(1)	1.36E+01	(5)	3.68E-01	(8)	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Nickel	1.56E+03	(1)	6.19E+03	(5)	5.36E+02	(8)	2.9	3.8	3	5.6	9.8	4.9	4.2	3.4	4.6	4.2	6.9	5.5	5.8	4.7	9.9	6.8	7.4	4.4	5.4	4.3	8.4
Selenium	3.91E+02	(1)	1.55E+03	(5)	1.09E+01	(8)	<2.5	<2.5	<2.5	<2.5	<2.5	<12	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<12	<12	<5.0	<2.5	<2.5	<2.5	<12
Silver	3.91E+02	(1)	1.55E+03	(5)	1.76E+01	(8)	<0.25	<0.25	<0.25	<0.25	<0.25	<1.2	<0.25	<0.25	<0.25	<0.25	<0.50	<0.50	<0.25	<0.25	<1.2	<1.2	<0.50	<0.25	<0.25	<0.25	<1.2
Vanadium	3.91E+02	(1)	1.55E+03	(5)	2.05E+03	(8)	8.4	12	18	19	24	35	16	13	17	15	25	18	22	16	40	23	27	15	21	15	31
Zinc	2.35E+04	(1)	9.29E+04	(5)	7.67E+03	(8)	14	15	17	17	18	29	16	14	18	16	31	23	23	19	46	29	35	18	22	17	39
Volatile Organic Compounds - (EPA Method 8260) mg/kg																											
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,1,2,2-Tetrachloroethane	8.02E+00	(1)	4.35E+01	(4)	2.80E-05	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,1-Dichloropropene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2,3-Trichlorobenzene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1-Methylnaphthalene	2.20E+01	(3)	9.90E+02	(7)	1.69E-01	(9)	<0.0220	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0036	<0.0036	<0.004	<0.0036	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0035
2,2-Dichloropropane	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	0.00672	0.0027	0.00127	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	0.00149	0.00202	<0.001	<0.001	<0.001	<0.001	<0.0008
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
2-Hexanone	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.0220	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0036	<0.0036	<0.004	<0.0036	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0035
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
4-Isopropyltoluene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
4-Methyl-2-pentanone	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	<0.0276	0.0137	0.00502	0.00518	<0.005	<0.005	<0.0046	<0.0046	<0.005	<0.0045	<0.005	<0.005	<0.005	<0.005	0.00825	0.00526	<0.005	<0.005	<0.005	<0.005	<0.0043
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Chloroethane	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
cis-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-9 (18-19')	SWMU 3-10 (2-4')	SWMU 3-10 (10-12')	SWMU 3-10 (13.5-14')	SWMU 3-11 (6.5-7.5')	SWMU 3-11 (10.5-11.5')	SWMU 3-12 (5-6')	SWMU 3-12 (9-10')	SWMU 3-13 (5.5-6.5')	SWMU 3-13 (9.5-10.5')	SWMU 3-14 (4.5-5.5')	SWMU 3-14 (8.5-9.5')	SWMU 3-15 (5.5-6.5')	SWMU 3-15 (9.5-10.5')	SWMU 3-16 (4.25-5.25')	SWMU 3-16 (8.25-9.25')	SWMU 3-17 (5-6')	SWMU 3-17 (9-10')	SWMU 3-18 (4.5-5.5')	SWMU 3-18 (8.5-9.5')	SWMU 3-19 (4.5-5.5')
							1202151-005	1202151-001	1202151-002	1202151-003	1202147-003	1202147-004	1201800-015	1201800-016	1201800-012	1201800-014	1202017-001	1202017-002	1201800-008	1201800-009	1202148-006	1202148-008	1201800-006	1201800-007	1201800-010	1201800-011	1201827-003
							2/3/2012	2/3/2012	2/3/2012	2/3/2012	2/2/2012	2/2/2012	1/26/2012	1/26/2012	1/26/2012	1/26/2012	1/30/2012	1/30/2012	1/26/2012	1/26/2012	2/2/2012	2/2/2012	1/25/2012	1/25/2012	1/26/2012	1/26/2012	1/26/2012
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.002	<0.002	<0.0018	<0.0018	<0.002	<0.0018	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.0017
n-Butylbenzene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
n-Propylbenzene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
sec-Butylbenzene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
tert-Butylbenzene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	<0.0055	0.00865	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
trans-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	<0.0110	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Semi Volatile Organics - (EPA Method 8270) mg/kg																											
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	6.11E+03	(1)	2.38E+04	(5)	1.17E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4,6-Trichlorophenol	6.11E+01	(1)	2.38E+02	(5)	1.17E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4-Dichlorophenol	1.83E+02	(1)	7.15E+02	(5)	1.12E+00	(8)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
2,4-Dimethylphenol	1.22E+03	(1)	4.76E+03	(5)	7.48E+00	(8)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2,4-Dinitrophenol	1.22E+02	(1)	4.76E+02	(5)	7.10E-01	(8)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
2,4-Dinitrotoluene	1.57E+01	(1)	6.18E+01	(4)	2.53E-02	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,6-Dinitrotoluene	6.11E+01	(1)	2.38E+02	(5)	4.33E-01	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2-Chloronaphthalene	6.26E+03	(1)	2.48E+04	(5)	1.28E+02	(8)	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Chlorophenol	3.91E+02	(1)	1.55E+03	(5)	1.30E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Methylphenol	3.10E+03	(2)	3.10E+04	(6)	2.25E+01	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2-Nitroaniline	1.80E+02	(2)	1.80E+03	(6)	3.71E-01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Nitrophenol	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3,3'-Dichlorobenzidine	1.08E+01	(1)	4.26E+01	(4)	8.33E-02	(8)	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
3+4-Methylphenol	3.10E+02	(2)	3.10E+03	(6)	2.14E+00	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3-Nitroaniline	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Bromophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4-Chloro-3-methylphenol	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chloroaniline	2.40E+00	(3)	8.60E+01	(7)	1.35E-03	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4-Nitroaniline	2.40E+01	(3)	8.60E+02	(7)	1.13E-02	(9)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
4-Nitrophenol	-	-	-	-	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Acenaphthene	3.44E+03	(1)	1.86E+04	(5)	1.90E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthylene	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Aniline	8.50E+01	(3)	3.00E+03	(7)	3.83E-02	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Anthracene	1.72E+04	(1)	6.68E+04	(5)	3.04E+03	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Azobenzene	4.90E+00	(3)	2.20E+02	(7)	5.74E-03	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benz(a)anthracene	1.48E+00	(1)	2.34E+01	(4)	8.81E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	1.48E-01	(1)	2.34E+00	(4)	2.92E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(b)fluoranthene	1.48E+00	(1)	2.34E+01	(4)	2.98E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(k)fluoranthene	1.48E+01	(1)	2.34E+02	(4)	2.92E+01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzoic acid	2.40E+05	(2)	2.50E+06	(6)	3.71E+02	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzyl alcohol	3.10E+04	(2)	3.10E+05	(6)	4.73E+01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethoxy)methane	1.80E+02	(2)	1.80E+03	(6)	2.59E-01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethyl)ether	2.68E+00	(1)	1.42E+01	(4)	2.96E-04	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	4.54E+02	(4)	2.62E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-ethylhexyl)phthalate	3.47E+02	(1)	1.37E+03	(4)	9.70E+01	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Butyl benzyl phthalate	2.60E+02	(3)	9.10E+03	(7)	7.54E+00	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-9 (18-19')	SWMU 3-10 (2-4')	SWMU 3-10 (10-12')	SWMU 3-10 (13.5-14')	SWMU 3-11 (6.5-7.5')	SWMU 3-11 (10.5-11.5')	SWMU 3-12 (5-6')	SWMU 3-12 (9-10')	SWMU 3-13 (5.5-6.5')	SWMU 3-13 (9.5-10.5')	SWMU 3-14 (4.5-5.5')	SWMU 3-14 (8.5-9.5')	SWMU 3-15 (5.5-6.5')	SWMU 3-15 (9.5-10.5')	SWMU 3-16 (4.25-5.25')	SWMU 3-16 (8.25-9.25')	SWMU 3-17 (5-6')	SWMU 3-17 (9-10')	SWMU 3-18 (4.5-5.5')	SWMU 3-18 (8.5-9.5')	SWMU 3-19 (4.5-5.5')
							1202151-005 2/3/2012	1202151-001 2/3/2012	1202151-002 2/3/2012	1202151-003 2/3/2012	1202147-003 2/2/2012	1202147-004 2/2/2012	1201800-015 1/26/2012	1201800-016 1/26/2012	1201800-012 1/26/2012	1201800-014 1/26/2012	1202017-001 1/30/2012	1202017-002 1/30/2012	1201800-008 1/26/2012	1201800-009 1/26/2012	1202148-006 2/2/2012	1202148-008 2/2/2012	1201800-006 1/25/2012	1201800-007 1/25/2012	1201800-010 1/26/2012	1201800-011 1/26/2012	1201827-003 1/26/2012
Carbazole	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chrysene	1.48E+02	(1)	2.34E+03	(4)	8.99E+01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	1.48E-01	(1)	2.34E+00	(4)	9.52E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenzofuran	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Diethyl phthalate	4.89E+04	(1)	1.91E+05	(5)	1.09E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dimethyl phthalate	6.11E+05	(1)	2.38E+06	(5)	9.06E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Di-n-butyl phthalate	6.11E+03	(1)	2.38E+04	(5)	7.84E+01	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Di-n-octyl phthalate	-	-	-	-	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Fluoranthene	2.29E+03	(1)	8.91E+03	(5)	1.37E+03	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Fluorene	2.29E+03	(1)	8.91E+03	(5)	2.29E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorobenzene	3.04E+00	(1)	1.20E+01	(4)	4.48E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorobutadiene	6.20E+00	(3)	2.20E+02	(7)	2.14E-02	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorocyclopentadiene	3.67E+02	(1)	8.11E+02	(5)	5.92E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachloroethane	4.28E+01	(1)	1.67E+02	(5)	9.20E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Indeno(1,2,3-cd)pyrene	1.48E+00	(1)	2.34E+01	(4)	9.71E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Isophorone	5.12E+03	(1)	4.75E+04	(5)	2.16E+00	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Nitrobenzene	5.35E+01	(1)	3.00E+02	(4)	7.02E-03	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
N-Nitrosodi-n-propylamine	6.90E-02	(3)	2.50E+00	(7)	1.24E-04	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
N-Nitrosodiphenylamine	9.93E+02	(1)	3.91E+03	(4)	6.36E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pentachlorophenol	8.94E+00	(1)	3.00E+01	(4)	1.44E-01	(8)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Phenanthrene	1.83E+03	(1)	7.15E+03	(5)	3.21E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Phenol	1.83E+04	(1)	6.88E+04	(5)	5.59E+01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pyrene	1.72E+03	(1)	6.68E+03	(5)	1.01E+03	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pyridine	7.80E+01	(2)	1.00E+03	(6)	1.09E-01	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg																											
Diesel Range Organics (DRO)	1.00E+03	(11)	1.00E+03	(11)	1.00E+03	(11)	<9.8	<10	<9.9	<9.8	<10	<9.7	<10	<9.7	<10	<9.6	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Gasoline Range Organics (GRO)	--		--		--		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Motor Oil Range Organics (MRO)	3.00E+03	(12)	5.00E+03	(12)	3.00E+03	(12)	<49	<50	<50	<49	<51	<49	<50	<48	<50	<48	<50	<50	<51	<50	<50	<50	<52	<50	<50	<51	<50

-- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)

EPA - Regional Screening Levels (April 2009)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels (April 2009)

(7) EPA Industrial - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(8) SoilGW NMED Dilution Attenuation Factor (DAF) = 11.25

(9) SoilGW Risk-based EPA DAF = 11.25

(10) SoilGW MCL-based EPA DAF = 11.25

(11) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "unknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

(12) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "Waste Oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Non-Residential Screening Level
yellow highlight represents value above Leachate (DAF) Screening Level
Bold with yellow highlight value exceeds Non-Residential Screening Level and DAF

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-19 (8.5-9.5') 1201827-004 1/26/2012	SWMU 3-20 (2-4') 1202148-003 2/2/2012	SWMU 3-20 (10.5-11.5') 1202148-004 2/2/2012	SWMU 3-20 (14.5-15.5') 1202148-005 2/2/2012	SWMU 3-21 (6.5-7.5') 1202148-001 2/2/2012	SWMU 3-21 (10.5-11.5') 1202148-002 2/2/2012	SWMU 3-22 (5-6') 1201827-001 1/26/2012	SWMU 3-22 (9-10') 1201827-002 1/26/2012	SWMU 3-23 (8-9') 1201800-017 1/26/2012	SWMU 3-23 (12-13') 1201800-018 1/26/2012	SWMU 3-24 (5.5-6.5) 1202147-001 2/2/2012	SWMU 3-24 (9.5-10.5') 1202147-002 2/2/2012	SWMU 3-25 (5-6') 1201800-004 1/25/2012	SWMU 3-25 (9-10') 1201800-005 1/25/2012	SWMU 3-26 (2.5-3.5') 1201871-003 1/30/2012	SWMU 3-26 (6.5-7.5') 1201871-004 1/30/2012	SWMU 3-27 (2.5-3.5') 1201871-005 1/30/2012	SWMU 3-27 (6.5-7.5') 1201871-007 1/30/2012	SWMU 3-28 (2.5-3.5') 1201871-008 1/30/2012	SWMU 3-28 (6.5-7.5') 1201871-009 1/30/2012
Metals (mg/kg)																										
Antimony	3.13E+01	(1)	1.24E+02	(5)	7.44E+00	(8)	<5.0	<12	<13	<5.0	<5.0	<12	<5.0	<5.0	<2.5	<2.5	<13	<5.0	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<5.0	<5.0
Arsenic	3.90E+00	(1)	1.77E+01	(4)	1.48E-01	(8)	<5.0	<12	<13	<5.0	<5.0	<12	<5.0	<5.0	<2.5	2.6	<13	<5.0	2.6	<2.5	<5.0	<5.0	<2.5	<2.5	<5.0	<5.0
Barium	1.56E+04	(1)	4.35E+03	(5)	3.39E+03	(8)	120	160	120	120	180	180	300	130	41	210	210	190	150	55	50	36	46	190	64	45
Beryllium	1.56E+02	(1)	1.44E+02	(5)	6.49E+02	(8)	0.42	<0.75	<0.75	<0.30	0.48	<0.75	0.49	0.47	0.18	0.36	<0.75	0.43	0.44	0.3	<0.30	<0.30	0.21	<0.15	<0.30	<0.30
Cadmium	7.03E+01	(1)	2.77E+02	(5)	1.55E+01	(8)	<0.20	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.20	<0.10	<0.10	<0.50	<0.20	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.20	<0.20
Chromium III	1.17E+05	(1)	4.65E+05	(5)	1.11E+09	(8)	6.7	11	3.8	3.9	7.5	7.7	7.6	6.9	2.6	5.6	8.9	6.2	6.8	4.5	3.4	2.8	2.8	1.7	3.3	2.8
Chromium VI	2.97E+00	(1)	6.31E+01	(4)	9.34E-02	(8)	**6.7**	**11**	**3.8**	**3.9**	**7.5**	**7.7**	**7.6**	**6.9**	**2.6**	**5.6**	**8.9**	**6.2**	**6.8**	**4.5**	**3.4**	**2.8**	**2.8**	**1.7**	**3.3**	**2.8**
Cobalt	2.30E+01	(2)	3.00E+02	(6)	5.51E+00	(9)	3.7	5	4.7	2.2	4.5	4.5	5.1	4.1	1.6	3.1	5.4	3.3	3.8	2.3	2.2	1.9	1.7	1.3	2	1.8
Cyanide	4.69E+01	(1)	1.86E+02	(5)	2.48E+00	(8)	<0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.3	<0.3	<0.3	<0.3	<0.30	<0.30	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Lead	4.00E+02	(1)	8.00E+02	(4)	-	-	3.3	3.6	2.2	2.1	4.1	3.8	4.3	4	1.8	2.8	4.5	3.4	3.2	2	2.1	2.2	1.9	1.5	1.9	1.9
Mercury	1.56E+01	(1)	1.36E+01	(5)	3.68E-01	(8)	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Nickel	1.56E+03	(1)	6.19E+03	(5)	5.36E+02	(8)	5.9	7.3	3.8	3.3	6.5	6.8	6.9	6.4	2.2	4.7	7.6	5.3	5.8	3.6	3	2.6	2.6	1.6	3.1	2.4
Selenium	3.91E+02	(1)	1.55E+03	(5)	1.09E+01	(8)	<5.0	<12	<13	<5.0	<5.0	<12	<5.0	<5.0	<2.5	<2.5	<13	<5.0	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<5.0	<5.0
Silver	3.91E+02	(1)	1.55E+03	(5)	1.76E+01	(8)	<0.50	<1.2	<1.2	<0.50	<0.50	<1.2	<0.50	<0.50	<0.25	<0.25	<1.3	<0.50	<0.25	<0.25	<0.50	<0.50	<0.25	<0.25	<0.50	<0.50
Vanadium	3.91E+02	(1)	1.55E+03	(5)	2.05E+03	(8)	19	27	13	13	23	20	27	20	8	16	27	18	20	14	10	9.4	10	6.4	11	8.5
Zinc	2.35E+04	(1)	9.29E+04	(5)	7.67E+03	(8)	22	35	15	14	26	29	30	25	9.4	19	33	20	22	15	13	12	11	7	13	11
Volatile Organic Compounds - (EPA Method 8260) mg/kg																										
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2,2-Tetrachloroethane	8.02E+00	(1)	4.35E+01	(4)	2.80E-05	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-Dichloropropene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,3-Trichlorobenzene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1-Methylnaphthalene	2.20E+01	(3)	9.90E+02	(7)	1.69E-01	(9)	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0035	<0.0035	<0.0038	<0.0036	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
2,2-Dichloropropane	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	<0.001	0.00683	0.00186	0.0017	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2-Hexanone	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0035	<0.0035	<0.0038	<0.0036	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
4-Isopropyltoluene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
4-Methyl-2-pentanone	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	<0.005	0.022	<0.005	0.00701	<0.005	<0.005	<0.0043	<0.0044	<0.0048	<0.0045	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroethane	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-19 (8.5-9.5')	SWMU 3-20 (2-4')	SWMU 3-20 (10.5-11.5')	SWMU 3-20 (14.5-15.5')	SWMU 3-21 (6.5-7.5')	SWMU 3-21 (10.5-11.5')	SWMU 3-22 (5-6')	SWMU 3-22 (9-10')	SWMU 3-23 (8-9')	SWMU 3-23 (12-13')	SWMU 3-24 (5.5-6.5)	SWMU 3-24 (9.5-10.5')	SWMU 3-25 (5-6')	SWMU 3-25 (9-10')	SWMU 3-26 (2.5-3.5')	SWMU 3-26 (6.5-7.5')	SWMU 3-27 (2.5-3.5')	SWMU 3-27 (6.5-7.5')	SWMU 3-28 (2.5-3.5')	SWMU 3-28 (6.5-7.5')
							1201827-004	1202148-003	1202148-004	1202148-005	1202148-001	1202148-002	1201827-001	1201827-002	1201800-017	1201800-018	1202147-001	1202147-002	1201800-004	1201800-005	1201871-003	1201871-004	1201871-005	1201871-007	1201871-008	1201871-009
							1/26/2012	2/2/2012	2/2/2012	2/2/2012	2/2/2012	2/2/2012	1/26/2012	1/26/2012	1/26/2012	1/26/2012	2/2/2012	2/2/2012	1/25/2012	1/25/2012	1/30/2012	1/30/2012	1/30/2012	1/30/2012	1/30/2012	1/30/2012
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.002	<0.001	<0.001	<0.001	<0.002	<0.002	<0.0017	<0.0017	<0.0019	<0.0018	<0.002	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
n-Butylbenzene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Propylbenzene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
sec-Butylbenzene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
tert-Butylbenzene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	<0.001	0.00126	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	0.00101	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00135	<0.001	<0.001
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
trans-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Semi Volatile Organics - (EPA Method 8270) mg/kg																										
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	6.11E+03	(1)	2.38E+04	(5)	1.17E+02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4,6-Trichlorophenol	6.11E+01	(1)	2.38E+02	(5)	1.17E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4-Dichlorophenol	1.83E+02	(1)	7.15E+02	(5)	1.12E+00	(8)	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
2,4-Dimethylphenol	1.22E+03	(1)	4.76E+03	(5)	7.48E+00	(8)	<0.30	<0.60	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2,4-Dinitrophenol	1.22E+02	(1)	4.76E+02	(5)	7.10E-01	(8)	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
2,4-Dinitrotoluene	1.57E+01	(1)	6.18E+01	(4)	2.53E-02	(8)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,6-Dinitrotoluene	6.11E+01	(1)	2.38E+02	(5)	4.33E-01	(8)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2-Chloronaphthalene	6.26E+03	(1)	2.48E+04	(5)	1.28E+02	(8)	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Chlorophenol	3.91E+02	(1)	1.55E+03	(5)	1.30E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Methylphenol	3.10E+03	(2)	3.10E+04	(6)	2.25E+01	(9)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2-Nitroaniline	1.80E+02	(2)	1.80E+03	(6)	3.71E-01	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Nitrophenol	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3,3'-Dichlorobenzidine	1.08E+01	(1)	4.26E+01	(4)	8.33E-02	(8)	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
3+4-Methylphenol	3.10E+02	(2)	3.10E+03	(6)	2.14E+00	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3-Nitroaniline	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Bromophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4-Chloro-3-methylphenol	-	-	-	-	-	-	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chloroaniline	2.40E+00	(3)	8.60E+01	(7)	1.35E-03	(9)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4-Nitroaniline	2.40E+01	(3)	8.60E+02	(7)	1.13E-02	(9)	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
4-Nitrophenol	-	-	-	-	-	-	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Acenaphthene	3.44E+03	(1)	1.86E+04	(5)	1.90E+02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthylene	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Aniline	8.50E+01	(3)	3.00E+03	(7)	3.83E-02	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Anthracene	1.72E+04	(1)	6.68E+04	(5)	3.04E+03	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Azobenzene	4.90E+00	(3)	2.20E+02	(7)	5.74E-03	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benz(a)anthracene	1.48E+00	(1)	2.34E+01	(4)	8.81E-01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	1.48E-01	(1)	2.34E+00	(4)	2.92E-01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(b)fluoranthene	1.48E+00	(1)	2.34E+01	(4)	2.98E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(k)fluoranthene	1.48E+01	(1)	2.34E+02	(4)	2.92E+01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzoic acid	2.40E+05	(2)	2.50E+06	(6)	3.71E+02	(9)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzyl alcohol	3.10E+04	(2)	3.10E+05	(6)	4.73E+01	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethoxy)methane	1.80E+02	(2)	1.80E+03	(6)	2.59E-01	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethyl)ether	2.68E+00	(1)	1.42E+01	(4)	2.96E-04	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	4.54E+02	(4)	2.62E-02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-ethylhexyl)phthalate	3.47E+02	(1)	1.37E+03	(4)	9.70E+01	(8)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Butyl benzyl phthalate	2.60E+02	(3)	9.10E+03	(7)	7.54E+00	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-19 (8.5-9.5')	SWMU 3-20 (2-4')	SWMU 3-20 (10.5-11.5')	SWMU 3-20 (14.5-15.5')	SWMU 3-21 (6.5-7.5')	SWMU 3-21 (10.5-11.5')	SWMU 3-22 (5-6')	SWMU 3-22 (9-10')	SWMU 3-23 (8-9')	SWMU 3-23 (12-13')	SWMU 3-24 (5.5-6.5)	SWMU 3-24 (9.5-10.5')	SWMU 3-25 (5-6')	SWMU 3-25 (9-10')	SWMU 3-26 (2.5-3.5')	SWMU 3-26 (6.5-7.5')	SWMU 3-27 (2.5-3.5')	SWMU 3-27 (6.5-7.5')	SWMU 3-28 (2.5-3.5')	SWMU 3-28 (6.5-7.5')
							1201827-004 1/26/2012	1202148-003 2/2/2012	1202148-004 2/2/2012	1202148-005 2/2/2012	1202148-001 2/2/2012	1202148-002 2/2/2012	1201827-001 1/26/2012	1201827-002 1/26/2012	1201800-017 1/26/2012	1201800-018 1/26/2012	1202147-001 2/2/2012	1202147-002 2/2/2012	1201800-004 1/25/2012	1201800-005 1/25/2012	1201871-003 1/30/2012	1201871-004 1/30/2012	1201871-005 1/30/2012	1201871-007 1/30/2012	1201871-008 1/30/2012	1201871-009 1/30/2012
Carbazole	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chrysene	1.48E+02	(1)	2.34E+03	(4)	8.99E+01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	1.48E-01	(1)	2.34E+00	(4)	9.52E-01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenzofuran	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Diethyl phthalate	4.89E+04	(1)	1.91E+05	(5)	1.09E+02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dimethyl phthalate	6.11E+05	(1)	2.38E+06	(5)	9.06E+02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Di-n-butyl phthalate	6.11E+03	(1)	2.38E+04	(5)	7.84E+01	(8)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Di-n-octyl phthalate	-	-	-	-	-	-	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Fluoranthene	2.29E+03	(1)	8.91E+03	(5)	1.37E+03	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Fluorene	2.29E+03	(1)	8.91E+03	(5)	2.29E+02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorobenzene	3.04E+00	(1)	1.20E+01	(4)	4.48E-02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorobutadiene	6.20E+00	(3)	2.20E+02	(7)	2.14E-02	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorocyclopentadiene	3.67E+02	(1)	8.11E+02	(5)	5.92E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachloroethane	4.28E+01	(1)	1.67E+02	(5)	9.20E-02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Indeno(1,2,3-cd)pyrene	1.48E+00	(1)	2.34E+01	(4)	9.71E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Isophorone	5.12E+03	(1)	4.75E+04	(5)	2.16E+00	(8)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Nitrobenzene	5.35E+01	(1)	3.00E+02	(4)	7.02E-03	(8)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
N-Nitrosodi-n-propylamine	6.90E-02	(3)	2.50E+00	(7)	1.24E-04	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
N-Nitrosodiphenylamine	9.93E+02	(1)	3.91E+03	(4)	6.36E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pentachlorophenol	8.94E+00	(1)	3.00E+01	(4)	1.44E-01	(8)	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Phenanthrene	1.83E+03	(1)	7.15E+03	(5)	3.21E+02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Phenol	1.83E+04	(1)	6.88E+04	(5)	5.59E+01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pyrene	1.72E+03	(1)	6.68E+03	(5)	1.01E+03	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pyridine	7.80E+01	(2)	1.00E+03	(6)	1.09E-01	(9)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg																										
Diesel Range Organics (DRO)	1.00E+03	(11)	1.00E+03	(11)	1.00E+03	(11)	<9.9	370	<10	<10	<9.9	<9.8	<9.9	<9.8	<9.8	<10	<9.9	<10	<9.8	<10	<9.8	<9.9	<9.7	<10	<10	<9.8
Gasoline Range Organics (GRO)	--		--		--		<5.0	5.4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Motor Oil Range Organics (MRO)	3.00E+03	(12)	5.00E+03	(12)	3.00E+03	(12)	<49	<510	<50	<51	<49	<49	<49	<49	<49	<51	<49	<50	<49	<52	<49	<49	<49	<50	<50	<49

-- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)

EPA - Regional Screening Levels (April 2009)
(1) NMED Residential Screening Level
(2) EPA Residential Screening Level
(3) EPA Residential - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic
(4) NMED Industrial Occupational Screening Level
(5) NMED Construction Worker Screening Level
(6) EPA Industrial - Screening Levels (April 2009)
(7) EPA Industrial - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic
(8) SoilGW NMED Dilution Attenuation Factor (DAF) = 11.25
(9) SoilGW Risk-based EPA DAF = 11.25
(10) SoilGW MCL-based EPA DAF = 11.25
(11) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "unknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels
(12) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "Waste Oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Non-Residential Screening Level
yellow highlight represents value above Leachate (DAF) Screening Level
Bold with yellow highlight value exceeds Non-Residential Screening Level and DAF

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 6-4 (5-6')	SWMU 6-4 (9-10')
							1201828-001 1/27/2012	1201828-002 1/27/2012
Metals (mg/kg)								
Antimony	3.13E+01	(1)	1.24E+02	(5)	7.44E+00	(8)	<2.5	<12
Arsenic	3.90E+00	(1)	1.77E+01	(4)	1.48E-01	(8)	<2.5	<12
Barium	1.56E+04	(1)	4.35E+03	(5)	3.39E+03	(8)	200	350
Beryllium	1.56E+02	(1)	1.44E+02	(5)	6.49E+02	(8)	0.35	<0.75
Cadmium	7.03E+01	(1)	2.77E+02	(5)	1.55E+01	(8)	<0.10	<0.50
Chromium III	1.17E+05	(1)	4.65E+05	(5)	1.11E+09	(8)	5.4	4.6
Chromium VI	2.97E+00	(1)	6.31E+01	(4)	9.34E-02	(8)	**5.4**	**4.6**
Cobalt	2.30E+01	(2)	3.00E+02	(6)	5.51E+00	(9)	2.9	3.6
Cyanide	4.69E+01	(1)	1.86E+02	(5)	2.48E+00	(8)	<0.3	<0.3
Lead	4.00E+02	(1)	8.00E+02	(4)	-	-	2.6	2.5
Mercury	1.56E+01	(1)	1.36E+01	(5)	3.68E-01	(8)	<0.033	<0.033
Nickel	1.56E+03	(1)	6.19E+03	(5)	5.36E+02	(8)	4.7	3.8
Selenium	3.91E+02	(1)	1.55E+03	(5)	1.09E+01	(8)	<2.5	<12
Silver	3.91E+02	(1)	1.55E+03	(5)	1.76E+01	(8)	<0.25	<1.2
Vanadium	3.91E+02	(1)	1.55E+03	(5)	2.05E+03	(8)	16	21
Zinc	2.35E+04	(1)	9.29E+04	(5)	7.67E+03	(8)	18	18
Volatile Organic Compounds - (EPA Method 8260) mg/kg								
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	<0.001	<0.001
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	<0.001	<0.001
1,1,2,2-Tetrachloroethane	8.02E+00	(1)	4.35E+01	(4)	2.80E-05	(8)	<0.001	<0.001
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	<0.001	<0.001
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	<0.001	<0.001
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	<0.001	<0.001
1,1-Dichloropropene	-	-	-	-	-	-	<0.001	<0.001
1,2,3-Trichlorobenzene	-	-	-	-	-	-	<0.001	<0.001
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	<0.001	<0.001
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.001	<0.001
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	<0.001	<0.001
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	<0.001	<0.001
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	<0.001	<0.001
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.001	<0.001
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	<0.001	<0.001
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	<0.001	<0.001
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	<0.001	<0.001
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.001	<0.001
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	<0.001	<0.001
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.001	<0.001
1-Methylnaphthalene	2.20E+01	(3)	9.90E+02	(7)	1.69E-01	(9)	<0.004	<0.004
2,2-Dichloropropane	-	-	-	-	-	-	<0.001	<0.001
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	<0.001	<0.001
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	<0.001	<0.001
2-Hexanone	-	-	-	-	-	-	<0.001	<0.001
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.004	<0.004
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	<0.001	<0.001
4-Isopropyltoluene	-	-	-	-	-	-	<0.001	<0.001
4-Methyl-2-pentanone	-	-	-	-	-	-	<0.001	<0.001
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	<0.005	<0.005
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	<0.001	<0.001
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	<0.001	<0.001
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	<0.001	<0.001
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	<0.001	<0.001
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	<0.001	<0.001
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	<0.001	<0.001
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	<0.001	<0.001
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	<0.001	<0.001
Chloroethane	-	-	-	-	-	-	<0.001	<0.001
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	<0.001	<0.001
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	<0.001	<0.001
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	<0.001	<0.001
cis-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.001	<0.001
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	<0.001	<0.001
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	<0.001	<0.001
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	<0.001	<0.001

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 6-4 (5-6')	SWMU 6-4 (9-10')
							1201828-001	1201828-002
							1/27/2012	1/27/2012
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	<0.001	<0.001
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	<0.001	<0.001
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	<0.001	<0.001
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	<0.001	<0.001
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	<0.001	<0.001
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.002	<0.002
n-Butylbenzene	-	-	-	-	-	-	<0.001	<0.001
n-Propylbenzene	-	-	-	-	-	-	<0.001	<0.001
sec-Butylbenzene	-	-	-	-	-	-	<0.001	<0.001
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	<0.001	<0.001
tert-Butylbenzene	-	-	-	-	-	-	<0.001	<0.001
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	<0.001	<0.001
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	<0.001	<0.001
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	<0.001	<0.001
trans-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.001	<0.001
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	<0.001	<0.001
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	<0.001	<0.001
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	<0.001	<0.001
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	<0.001	<0.001
Semi Volatile Organics - (EPA Method 8270) mg/kg								
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.20	<0.20
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.20	<0.20
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.20	<0.20
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.20	<0.20
2,4,5-Trichlorophenol	6.11E+03	(1)	2.38E+04	(5)	1.17E+02	(8)	<0.20	<0.20
2,4,6-Trichlorophenol	6.11E+01	(1)	2.38E+02	(5)	1.17E+00	(8)	<0.20	<0.20
2,4-Dichlorophenol	1.83E+02	(1)	7.15E+02	(5)	1.12E+00	(8)	<0.40	<0.40
2,4-Dimethylphenol	1.22E+03	(1)	4.76E+03	(5)	7.48E+00	(8)	<0.30	<0.30
2,4-Dinitrophenol	1.22E+02	(1)	4.76E+02	(5)	7.10E-01	(8)	<0.40	<0.40
2,4-Dinitrotoluene	1.57E+01	(1)	6.18E+01	(4)	2.53E-02	(8)	<0.50	<0.50
2,6-Dinitrotoluene	6.11E+01	(1)	2.38E+02	(5)	4.33E-01	(8)	<0.50	<0.50
2-Chloronaphthalene	6.26E+03	(1)	2.48E+04	(5)	1.28E+02	(8)	<0.25	<0.25
2-Chlorophenol	3.91E+02	(1)	1.55E+03	(5)	1.30E+00	(8)	<0.20	<0.20
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.20	<0.20
2-Methylphenol	3.10E+03	(2)	3.10E+04	(6)	2.25E+01	(9)	<0.50	<0.50
2-Nitroaniline	1.80E+02	(2)	1.80E+03	(6)	3.71E-01	(9)	<0.20	<0.20
2-Nitrophenol	-	-	-	-	-	-	<0.20	<0.20
3,3'-Dichlorobenzidine	1.08E+01	(1)	4.26E+01	(4)	8.33E-02	(8)	<0.25	<0.25
3+4-Methylphenol	3.10E+02	(2)	3.10E+03	(6)	2.14E+00	(9)	<0.20	<0.20
3-Nitroaniline	-	-	-	-	-	-	<0.20	<0.20
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	<0.50	<0.50
4-Bromophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20
4-Chloro-3-methylphenol	-	-	-	-	-	-	<0.50	<0.50
4-Chloroaniline	2.40E+00	(3)	8.60E+01	(7)	1.35E-03	(9)	<0.50	<0.50
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20
4-Nitroaniline	2.40E+01	(3)	8.60E+02	(7)	1.13E-02	(9)	<0.40	<0.40
4-Nitrophenol	-	-	-	-	-	-	<0.25	<0.25
Acenaphthene	3.44E+03	(1)	1.86E+04	(5)	1.90E+02	(8)	<0.20	<0.20
Acenaphthylene	-	-	-	-	-	-	<0.20	<0.20
Aniline	8.50E+01	(3)	3.00E+03	(7)	3.83E-02	(9)	<0.20	<0.20
Anthracene	1.72E+04	(1)	6.68E+04	(5)	3.04E+03	(8)	<0.20	<0.20
Azobenzene	4.90E+00	(3)	2.20E+02	(7)	5.74E-03	(9)	<0.20	<0.20
Benz(a)anthracene	1.48E+00	(1)	2.34E+01	(4)	8.81E-01	(8)	<0.20	<0.20
Benzo(a)pyrene	1.48E-01	(1)	2.34E+00	(4)	2.92E-01	(8)	<0.20	<0.20
Benzo(b)fluoranthene	1.48E+00	(1)	2.34E+01	(4)	2.98E+00	(8)	<0.20	<0.20
Benzo(g,h,i)perylene	-	-	-	-	-	-	<0.20	<0.20
Benzo(k)fluoranthene	1.48E+01	(1)	2.34E+02	(4)	2.92E+01	(8)	<0.20	<0.20
Benzoic acid	2.40E+05	(2)	2.50E+06	(6)	3.71E+02	(9)	<0.50	<0.50
Benzyl alcohol	3.10E+04	(2)	3.10E+05	(6)	4.73E+01	(9)	<0.20	<0.20
Bis(2-chloroethoxy)methane	1.80E+02	(2)	1.80E+03	(6)	2.59E-01	(9)	<0.20	<0.20
Bis(2-chloroethyl)ether	2.68E+00	(1)	1.42E+01	(4)	2.96E-04	(8)	<0.20	<0.20
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	4.54E+02	(4)	2.62E-02	(8)	<0.20	<0.20
Bis(2-ethylhexyl)phthalate	3.47E+02	(1)	1.37E+03	(4)	9.70E+01	(8)	<0.50	<0.50
Butyl benzyl phthalate	2.60E+02	(3)	9.10E+03	(7)	7.54E+00	(9)	<0.20	<0.20

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 6-4 (5-6')	SWMU 6-4 (9-10')
							1201828-001 1/27/2012	1201828-002 1/27/2012
Carbazole	-	-	-	-	-	-	<0.20	<0.20
Chrysene	1.48E+02	(1)	2.34E+03	(4)	8.99E+01	(8)	<0.20	<0.20
Dibenz(a,h)anthracene	1.48E-01	(1)	2.34E+00	(4)	9.52E-01	(8)	<0.20	<0.20
Dibenzofuran	-	-	-	-	-	-	<0.20	<0.20
Diethyl phthalate	4.89E+04	(1)	1.91E+05	(5)	1.09E+02	(8)	<0.20	<0.20
Dimethyl phthalate	6.11E+05	(1)	2.38E+06	(5)	9.06E+02	(8)	<0.20	<0.20
Di-n-butyl phthalate	6.11E+03	(1)	2.38E+04	(5)	7.84E+01	(8)	<0.50	<0.50
Di-n-octyl phthalate	-	-	-	-	-	-	<0.25	<0.25
Fluoranthene	2.29E+03	(1)	8.91E+03	(5)	1.37E+03	(8)	<0.20	<0.20
Fluorene	2.29E+03	(1)	8.91E+03	(5)	2.29E+02	(8)	<0.20	<0.20
Hexachlorobenzene	3.04E+00	(1)	1.20E+01	(4)	4.48E-02	(8)	<0.20	<0.20
Hexachlorobutadiene	6.20E+00	(3)	2.20E+02	(7)	2.14E-02	(9)	<0.20	<0.20
Hexachlorocyclopentadiene	3.67E+02	(1)	8.11E+02	(5)	5.92E+00	(8)	<0.20	<0.20
Hexachloroethane	4.28E+01	(1)	1.67E+02	(5)	9.20E-02	(8)	<0.20	<0.20
Indeno(1,2,3-cd)pyrene	1.48E+00	(1)	2.34E+01	(4)	9.71E+00	(8)	<0.20	<0.20
Isophorone	5.12E+03	(1)	4.75E+04	(5)	2.16E+00	(8)	<0.50	<0.50
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.20	<0.20
Nitrobenzene	5.35E+01	(1)	3.00E+02	(4)	7.02E-03	(8)	<0.50	<0.50
N-Nitrosodi-n-propylamine	6.90E-02	(3)	2.50E+00	(7)	1.24E-04	(9)	<0.20	<0.20
N-Nitrosodiphenylamine	9.93E+02	(1)	3.91E+03	(4)	6.36E+00	(8)	<0.20	<0.20
Pentachlorophenol	8.94E+00	(1)	3.00E+01	(4)	1.44E-01	(8)	<0.40	<0.40
Phenanthrene	1.83E+03	(1)	7.15E+03	(5)	3.21E+02	(8)	<0.20	<0.20
Phenol	1.83E+04	(1)	6.88E+04	(5)	5.59E+01	(8)	<0.20	<0.20
Pyrene	1.72E+03	(1)	6.68E+03	(5)	1.01E+03	(8)	<0.20	<0.20
Pyridine	7.80E+01	(2)	1.00E+03	(6)	1.09E-01	(9)	<0.50	<0.50
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg								
Diesel Range Organics (DRO)	1.00E+03	(11)	1.00E+03	(11)	1.00E+03	(11)	<9.9	<10
Gasoline Range Organics (GRO)	--		--		--		<5.0	<5.0
Motor Oil Range Organics (MRO)	3.00E+03	(12)	5.00E+03	(12)	3.00E+03	(12)	<49	<52

-- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)

EPA - Regional Screening Levels (April 2009)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels (April 2009)

(7) EPA Industrial - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(8) SoilGW NMED Dilution Attenuation Factor (DAF) = 11.25

(9) SoilGW Risk-based EPA DAF = 11.25

(10) SoilGW MCL-based EPA DAF = 11.25

(11) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "unknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

(12) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "Waste Oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Non-Residential Screening Level
yellow highlight represents value above Leachate (DAF) Screening Level
Bold with yellow highlight value exceeds Non-Residential Screening Level and DAF

Western Refining
LOGISTICS

WNR LISTED NYSE

June 28, 2012

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

UPS Mail #: 1Z 881 839 01 5450 4228 (Addressed to NMED)
Certified Mail #: 7009 2250 0002 3833 5285 (Addressed to OCD)

Re: Group 8 Investigation Report
Western Refining Southwest, Inc., Bloomfield Refinery
EPA ID# NMD089416416

Dear Mr. Kieling:

Western Refining Southwest, Inc., Bloomfield Refinery submits the referenced Investigation Report pursuant to Section IV.B.7 of the July 2007 HWB Order. This Investigation Report summarizes the site environmental investigation activities completed for SWMU No. 3 Underground Piping Currently in Use and SWMU No. 6 Abandoned Underground Piping, which has been designated as Group 8.

If you have any questions or would like to discuss the Investigation Report, please contact me at (505) 632-4171

Sincerely,

James R. Schmaltz
Health, Safety, Environmental, and Regulatory Director
Western Refining Southwest, Inc.
Bloomfield Refinery

cc: Dave Cobrain – NMED HWB
Leona Tsinnajinnie – NMED HWB
Carl Chavez - NMOCD
Allen Hains – Western Refining El Paso
Scott Crouch – RPS Austin

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RPS

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INVESTIGATION REPORT
GROUP 8

(SWMU No. 3 Underground Piping Currently in Use and SWMU No. 6 Abandoned Underground Piping)

Bloomfield Refinery
Western Refining Southwest, Inc.
#50 Rd 4990
Bloomfield, New Mexico 87413

June 2012

James R. Schmaltz
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List of Acronyms

American Petroleum Institute (API)
areas of concern (AOCs)
below ground level (bgl)
benzene, toluene, ethylbenzene, and xylene (BTEX)
Code of Federal Regulations (CFR)
diesel oil range organics (DRO)
dilution/attenuation factor (DAF)
Environmental Protection Agency (EPA)
hazard index (HI)
hollow-stem auger (HSA)
investigation derived waste (IDW)
liquefied petroleum gas (LPG)
Massachusetts Department of Environmental Protection (MADEP)
maximum contaminant level (MCL)
monitoring well (MW)
motor oil range organics (MRO)
New Mexico Administrative Code (NMAC)
New Mexico Environment Department (NMED)
New Mexico Statues Annotated (NMSA)
overburden drilling/excentric drilling (ODEX)
photoionization detector (PID)
polyvinyl chloride (PVC)
RCRA Facility Investigation (RFI)
Resource Conservation and Recovery Act (RCRA)
separate phase hydrocarbon (SPH)
Solid Waste Management Units (SWMUs)
total petroleum hydrocarbon (TPH)
toxicity characteristic leaching procedure (TCLP)
unified soil classification system (USCS)
volatile organic constituent (VOC)

Executive Summary

The Bloomfield Refinery, which is located in the Four Corners Area of New Mexico, has been in operation since the late 1950s. Past inspections by State and federal environmental inspectors have identified locations where releases to the environment may have occurred. These locations are generally referred to as Solid Waste Management Units (SWMUs) or Areas of Concern (AOCs).

Pursuant to the terms and conditions of an Order issued on July 27, 2007 by the New Mexico Environment Department (NMED) to San Juan Refining Company, as owner, and Giant Industries Arizona, Inc., as operator, for the Bloomfield Refinery, this environmental site investigation was completed for the SWMUs designated as Group 8. Group 8 includes SWMU No. 3 (Underground Piping Currently in Use) and SWMU No. 6 (Abandoned Underground Piping). A Class I modification to the facility's Resource Conservation and Recovery Act (RCRA) permit was approved on June 10, 2008 to reflect the name change of the operator of the refinery to Western Refining Southwest, Inc. The operator is now Western Refining Southwest, Inc. – Bloomfield Refinery. The name of the owner of the refinery remained the same – San Juan Refining Company.

The Order requires that San Juan Refining Company and Giant Industries Arizona, Inc. determine and evaluate the presence, nature, and extent of historical releases of contaminants at the aforementioned SWMUs. The investigation activities included collection and analysis of soil samples for potential site-related constituents beginning on January 25, 2012 and continuing through February 6, 2012. The samples were collected from 28 soil borings, which were completed using hollow-stem augers. At active underground pipelines, soil borings were drilled laterally within 5 feet of the pipeline and at inactive underground pipelines the soil borings were completed within 3 feet of the pipeline. A total of 64 soil samples (excluding additional quality assurance samples) were collected for analysis of potential site-related constituents (e.g., volatile and semi-volatile organics, total petroleum hydrocarbons, and metals).

Three metals (arsenic, chromium, and cobalt) and seven organic constituents (1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, chloroform, ethylbenzene, 1-methylnaphthalene, naphthalene, and benzo(a)pyrene) were detected at concentrations above their respective screening levels. While the metals were detected at various depths, the vast majority of the soil samples with organic constituents at concentrations above the screening levels were found at

depths well below the pipeline and near the depth of saturation. Only one of the 59 soil samples that were collected within six feet vertically of an underground pipeline detected an organic constituent (chloroform) at a concentration above the screening level.

A separate study is being conducted to evaluate background concentrations of potentially naturally occurring constituents at the refinery and after site-specific background concentrations have been established for metals in soils, the reported metals results should be reevaluated to determine if any of the detected results are representative of background conditions. Additional sampling and analysis may be required after the background evaluation is completed to speciate the chromium detected in soil samples to determine if it is present as chromium III or VI.

Based on a review of the field screening data and the analytical results, there were no obvious releases identified from the active or abandoned underground pipelines. The organic constituents that were detected in the soil samples are most likely associated with previously identified releases to groundwater from other sources or other previously investigated SWMUs (e.g., the Raw Water Ponds), which are located in the same area as some of the underground pipelines.

Section 1
Introduction

The Bloomfield Refinery is located immediately south of Bloomfield, New Mexico in San Juan County (Figure 1). The physical address is #50 County Road 4990, Bloomfield, New Mexico 87413. The Bloomfield Refinery is located on approximately 263 acres. Bordering the facility is a combination of federal and private properties. Public property managed by the Bureau of Land Management lies to the south. The majority of undeveloped land in the vicinity of the facility is used extensively for oil and gas production and, in some instances, grazing. U.S. Highway 550 is located approximately one-half mile west of the facility. The topography of the main portion of the site is generally flat with steep bluffs to the north where the San Juan River intersects Tertiary terrace deposits.

The Bloomfield Refinery is currently owned by San Juan Refining Company, a New Mexico corporation, and operated by Western Refining Southwest, Inc. formerly known as Giant Industries Arizona, Inc., an Arizona corporation. The Bloomfield Refinery has an approximate refining capacity of 18,000 barrels per day. Various process units operated at the facility, included crude distillation, reforming, fluidized catalytic cracking, sulfur recovery, merox treater, catalytic polymerization, and diesel hydrotreating. Products produced at the refinery included gasoline, diesel fuels, jet fuels, kerosene, propane, butane, naphtha, residual fuel, fuel oils, and liquefied petroleum gas (LPG).

On July 27, 2007, the New Mexico Environment Department (NMED) issued an Order to San Juan Refining Company and Giant Industries Arizona, Inc. ("Western") requiring investigation and corrective action at the Bloomfield Refinery. This Investigation Report has been prepared for the Solid Waste Management Units (SWMUs) designated as Group 8 in the Order, which includes SWMU No. 3 (Underground Piping Currently in Use) and SWMU No. 6 (Abandoned Underground Piping). There are some additional limited runs of underground piping in and near the Process Units (SWMU No. 13) and the Wastewater Collection System (SWMU No. 27). These pipelines will be investigated under Group 9. The location of SWMUs No. 3 and No. 6 is shown on Figure 2. Photographs are included for these two SWMUs in Appendix A. As SWMUs No. 3 and No. 6 consist of underground piping, there is limited opportunity for photographs.

The purpose of the site investigation is to determine and evaluate the presence, nature, and extent of releases of contaminants in accordance with 20.4.1.500 New Mexico Administrative Code (NMAC) incorporating 40 Code of Federal Regulations (CFR) Section 264.101. The investigation activities were conducted in accordance with Section IV of the Order and focused on soil as groundwater has been previously investigated in the same areas under other SWMU/AOC groups. The investigation was completed pursuant to the Investigation Work Plan dated December 2010, which was approved with modifications by the NMED on June 7, 2011.

The samples of soil were analyzed for volatile and semi-volatile organic constituents, petroleum hydrocarbons, and metals. The results of these analyses are compared to applicable State or federal cleanup and screening levels as specified in Section VII of the Order and as directed by NMED.

Section 2
Background

This section presents background information for Group 8, including a review of historical waste management activities for each location to identity the following:

- Type and characteristics of waste and contaminants handled in the subject AOCs;
- Known and possible sources of impacts;
- History of releases; and
- Known extent of impacts prior to the current investigation.

SWMU No. 3 Underground Piping Currently in Use

The majority of the underground piping at the refinery is considered to still be in use even though petroleum refining operations have recently been suspended and the property is currently used as a petroleum terminal. The terminal operations still include most of the same or similar transfer and storage operations of refined products and crude oil that took place during active refining operations. Crude oil is delivered to the refinery at the truck unloading rack and crosses beneath County Road 4990 to storage tanks within the Refinery Tank Farm. Crude oil now leaves the facility via pipeline. Refined product is currently delivered to the facility via a pipeline operated by a third party and trucks, and is transferred to on-site storage tanks through aboveground lines with the exception of the lines that run beneath County Road 4990 to the tank farm. Product is moved from the storage tanks to the product loading rack via mostly aboveground pipelines with the exception of lines that run beneath County Road 4990 in open culverts and beneath the actual loading rack.

Figure 2 shows the underground lines that are included in SWMUs No. 3 and No. 6. A list of the underground pipelines that are considered to be SWMU No. 3 (i.e., underground piping currently in use) is included in Table 1. It should be noted that in Figure 2 there are very short segments of pipelines shown as underground pipelines in the Tank Farm but in actuality, these are only very short portions of the above ground lines that cross through tank dike walls. All of the active underground lines are subject to a routine inspection program to test for potential leaks and as indicated in the Table 1, all of the lines with inspection dates back to November 2007 have passed the integrity tests. There are no documented historical releases from the active underground pipelines. The type of materials (e.g., product type, crude oil, wastewater, etc.) transported through a particular pipeline are identified in Table 1. The broad spectrum chemical analyses (e.g., SW-846 methods 8260, 8270, and 8015) are capable of detecting the presence

of any of the petroleum hydrocarbons handled at the refinery and thus the identification of a particular material in any specific pipeline is not critical to the investigation.

SWMU No. 6 Abandoned Underground Piping

The abandoned underground piping is shown on Figure 2 and is limited to two pipelines. One line ran from the discharge at the aeration lagoons to the former South Evaporation Pond. This line carried wastewater to the evaporation pond. During the field investigation, the underground lines were first located using hydro-excavation. During this activity, the wastewater line, which ran from the aeration lagoons to the former South Evaporation Pond, could not be identified where it was originally thought to be located. Subsequent review of company records and interview of Western personnel indicates that this line was probably located further to the south and ran along the gravel road south of Tanks 11 through 14. See Section 3.1 for additional information on the location of this pipeline. The second line ran a short distance along the north side of Tanks 35 and 18 and was used to move product within the Tank Farm. There are no documented historical releases from these pipelines.

Previous Investigations in the Area of SWMUs No. 3 and No. 6

Previous investigations have identified and delineated impacts to groundwater from historical site operations. Figure 3 shows the distribution of separate phase hydrocarbon (SPH) in the subsurface based on the apparent thickness of SPH measured in monitoring wells. Most of the areas with underground piping are not present over locations with measureable SPH. There is a thin accumulation of SPH in MW-25, which is near the isomerate/naphtha pipeline that runs from near bullet tank B-12 to Tank 25. Dissolved-phase impacts are depicted on Figure 4.

Recent investigations conducted under the Order for RCRA Facility Investigation (RFI) Groups 2, 3, 4, and 5 have included both soil borings and monitoring wells along the SWMU No. 3 underground lines as shown on Figure 2. The analytical results from analyses of these samples are presented in Tables 2 and 3 and are included in this report to supplement analyses conduct pursuant to the approved Group 8 Investigation Work Plan. These supplemental sample locations include the following:

- Tank Farm - one soil boring (SWMU 15-3) near active underground hydrocarbon lines;
- Product Loading Rack – soil borings SWMU 22-15/MW-61 and AOC 26-8/MW-65;
- Fire Training Area – soil borings SWMU 10-1 and 10-2;

- Former South Evaporation Pond – soil boring SWMU 7-1; and
- Inactive Landfill – soil borings SWMU 8-6, 8-8, and 8-10, and monitoring well SWMU 8-6A/MW-52.

Soil samples have also recently been collected pursuant to the Order along the SWMU No. 6 underground lines, with the sample locations shown on Figure 2. The analytical results from analyses of these samples are presented in Tables 2 and 3, and are used to supplement analyses conduct pursuant to the approved Group 8 Investigation Work Plan. The existing sample location was soil boring SWMU 15-3, which is located in the Tank Farm.

Section 3
Scope of Activities

3.1 Soil Boring Installation and Sample Collection

Pursuant to Section IV of the Order and the approved Group 8 Investigation Work Plan, an investigation of soils was conducted to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil borings were installed at SWMUs 3 and 6 (Figure 2). No groundwater samples were collected under this scope of work, as groundwater samples are routinely collected and analyzed on a semiannual basis as part of the Facility-Wide Groundwater Monitoring Plan from much of this area. As outlined in the work plan, there is the potential for constituents to have been released to soils at known locations at SWMUs 3 and 6, and therefore a judgmental sampling design was implemented. Examples of these areas include pipe connections (e.g., fittings and valves). Western routinely tests underground pipelines for leaks. All recent tests have passed and therefore no additional potential target investigation locations were determined from integrity test results.

Fifteen soil borings were proposed along the SWMU No. 3 active wastewater pipelines and thirteen soil borings were proposed along the active hydrocarbon pipelines. Four soil borings were proposed along the SWMU No. 6 abandoned pipelines. Prior to installing the soil borings, the actual location and depth of the pipelines were identified in the field and based on these observations, NMED was contacted on February 2, 1012 to request changes to the proposed scope of work. The changes affected four separate areas and each are explained below.

SWMU 3-2

The piping from Tank 37 to the API separator is an underground PVC pipeline that conveys recovered water from Tank 37 (located north of the Hammond Ditch) to the API separator. The jog in the piping as reflected by proposed soil boring location identified as 3-2 on Figure 2 was found to be physically located under the concrete slab of one of the process units. In this same vicinity there exists an active high voltage power line that is known to be in PVC conduit and not protected by concrete, and there also exists a high-pressure fire water system manifold used to supply fire water to the adjacent process units.

Western requested that the drilling at location 3-2 be deferred until such time that either the high-voltage electrical line could be de-activated and/or the process unit equipment could be moved. NMED approved this request via email on February 2, 2012 (Appendix B).

SWMU 3-5

Western hydro-excavated at the location near proposed boring 3-5 as identified on Figure 2. Hydro-excavation activities did not locate the current active sour water line. Additional interviews recently conducted with current and prior Western personnel gave reason to believe that the sour water line does not run along the south side of the raw water ponds, but rather runs along the roadway towards the far eastern portion of the refinery property (refer to the revised piping route shown on Figure 2). Hydro-excavation activities along the fence just southeast of the former south evaporation pond indentified a 45 degree angle in the piping, thus confirming the information recently provided by Western personnel.

Western requested to relocate the original soil boring indicated as 3-5 to the revised location indicated on Figure 2. NMED accepted this change on February 2, 2012.

SWMU 3-13

This boring, while not specifically listed in the email correspondence, was moved a short distance to the east because the underground line was located in the field to the east of where it was originally thought to be located.

SWMU 3-24

Additional Western personnel interviews and hydro-excavation activities confirm that the underground piping from the Tank 41 and Tank 43 area was incorrectly indicated on the original underground piping base map provided in the investigation work plan. Figure 2 shows the actual route of the underground piping for this area.

Western requested to relocate the original soil boring location indicated as 3-24 to the revised location indicated on Figure 2 on February 2, 2012 and this was accepted by NMED on the same date. Our email of February 2, 2012 incorrectly referred to this as the 3-28 location.

SWMU 6-1, 6-2 and 6-3

SWMU No. 6 includes an abandoned pipeline once used to transfer used water from the aeration lagoons to the former South Evaporation Pond. Hydro-excavation activities were not

successful in locating this abandoned line. A 10-foot deep hydro-excavated trench extending north approximately 20 feet from the piping manifold south of Tank 13 feet did not reveal any underground piping in the area. Additional interviews with both on-site and former Western personnel gave reason to believe that this abandoned pipe was originally located in the same trench as the fire water line, which runs west-east along the Tank Farm roadway south of Tanks 11 through 14. Western personnel also indicated that this line has since been removed. The line has not been in-service since the 1980's. Recent hydro-excavation along the current fire-water line did not find the pipeline, confirming the pipeline has been removed.

Western requested permission to not collect soil samples from the proposed soil boring locations indicated as 6-1, 6-2, and 6-3 on Figure 2 since the pipeline cannot be located in the field. NMED responded to Western's request and asked about the possibility of collecting samples along the fire water line where the former wastewater line was previously located. Western elected not to collect samples during this mobilization to allow further investigation of the actual location of this former line to ensure samples are collected in the correct location. Because the original depth could not be verified, it was not possible to select sample depths pursuant to the work plan.

The soil borings were proposed to be drilled to a minimum depth of six feet below the bottom depth of the adjacent pipeline. If there was screening evidence of impacted soils (e.g., petroleum odor, staining, or elevated photo-ionization detector or a combustible gas indicator readings) at six feet below the pipeline, then the boring was extended deeper until there was either no evidence of impact or groundwater was encountered.

In accordance with the work plan, the following soil borings were installed to a minimum depth of six feet below the bottom depth of the adjacent pipeline using hollow-stem augering (HSA) drilling and sampling methodology:

- SWMU 3-1 – This boring is located adjacent to an active hydrocarbon pipeline. The pipeline in this area makes a 90° turn. The pipeline was hydroexcavated and the bottom of the pipeline was found to be 2.5 feet below ground level (bgl). The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 3.5 – 4.5 feet and 7.5 – 8.5 feet.

- SWMU 3-5 – This boring is located adjacent to an active wastewater pipeline. The pipeline was hydroexcavated and the bottom was found to be 3.5 feet bgl. The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 4.5 – 5.5 feet and 8.5 – 9.5 feet.

- SWMU 3-6 – This boring is located adjacent to an active wastewater pipeline. The pipeline was hydroexcavated and the bottom was found to be 5 feet bgl. The boring was advanced to a depth of 12 feet bgl. Two soil samples were collected from 6 – 7 feet and 10 – 11 feet.

- SWMU 3-7 – This boring is located adjacent to an active wastewater pipeline. The pipeline was hydroexcavated and the bottom was found to be 3.25 feet bgl. The boring was advanced to a depth of 10 feet bgl. Three soil samples were collected from the following intervals; 0 – 2 feet (with duplicate), 4.25 – 5.25 feet, and 8.25 – 9.25 feet. The soil sample collected from 0 – 2 feet bgl corresponds to an elevated organic vapor reading in the 0 – 2 feet interval.

- SWMU 3-8 – This boring is located adjacent to active wastewater pipelines. The pipelines were hydroexcavated and were found to have been installed at various depths. The boring was advanced to a depth of 16.25 feet bgl. Four soil samples were collected from the following intervals; 6 – 7 feet, 10 – 11 feet, 12 – 14 feet, and 14 – 16 feet.

- SWMU 3-9 – This boring is located adjacent to an active wastewater pipeline. The pipeline was hydroexcavated and the bottom was found to be 13 feet bgl. The boring was advanced to a depth of 20 feet bgl. Two soil samples were collected from 14 – 16 feet bgl and 18 – 19 feet bgl.

- SWMU 3-11 – This boring is located adjacent to active wastewater pipelines. The pipelines were hydroexcavated and the bottom was found to be 5.5 feet bgl. The boring was advanced to a depth of 12 feet bgl. Two soil samples were collected from 6.5 – 7.5 feet bgl and 10.5 – 11.5 feet bgl.

- SWMU 3-12 – This boring is located adjacent to active wastewater pipelines. The pipelines were hydroexcavated and the bottom was found to be 4 feet bgl. The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 5 – 6 feet bgl and 9 – 10 feet bgl.

- SWMU 3-13 – This boring is located adjacent to active wastewater pipelines. The pipelines in this area make a 90° turn. The pipelines were hydroexcavated and the bottom was found to be 4.5 feet bgl. The boring was advanced to a depth of 12 feet bgl. Two soil samples were collected from 5.5 – 6.5 feet bgl (with duplicate) and 9.5 – 10.5 feet bgl.

- SWMU 3-14 – This boring is located adjacent to active wastewater pipelines. The pipelines in this area make a 45° turn. The pipelines were hydroexcavated and the bottom was found to be 3.5 feet bgl. The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 4.5 – 5.5 feet bgl and 8.5 – 9.5 feet bgl.

- SWMU 3-15 – This boring is located adjacent to active wastewater pipelines. The pipelines were hydroexcavated and the bottom was found to be 4.5 feet bgl. The boring was advanced to a depth of 12 feet bgl. Two soil samples were collected from 5.5 – 6.5 feet bgl and 9.5 – 10.5 feet bgl.

- SWMU 3-16 – This boring is located adjacent to an active hydrocarbon pipeline. The bottom of the line is at 3.25 feet bgl. The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 4.25 – 5.25 feet bgl (with duplicate) and 8.25 – 9.25 feet bgl.

- SWMU 3-17 – This boring is located adjacent to an active hydrocarbon pipeline. The bottom of the line is at 4 feet bgl. The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 5 – 6 feet bgl and 9 – 10 feet bgl.

- SWMU 3-18 – This boring is located adjacent to an active hydrocarbon pipeline. The pipeline was hydroexcavated and the bottom of the line was found to be 3.5 feet bgl. The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 4.5 – 5.5 feet bgl and 8.5 – 9.5 feet bgl.

- SWMU 3-19 – This boring is located adjacent to active hydrocarbon pipelines. The pipelines were hydroexcavated and the bottom was found to be 3.5 feet bgl. The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 4.5 – 5.5 feet bgl and 8.5 – 9.5 feet bgl.

- SWMU 3-20 – This boring is located adjacent to active hydrocarbon pipelines. The pipeline was hydroexcavated and the bottom was found to be 9.5 feet bgl. The boring was advanced to a depth of 16 feet bgl. Three soil samples were collected the following intervals; 2 – 4 feet, 10.5 – 11.5 feet, and 14.5 – 15.5 feet. The soil sample collected from 2 – 4 feet bgl corresponds to an elevated organic vapor reading in the 2 – 4 feet interval.

- SWMU 3-21 – This boring is located adjacent to active hydrocarbon pipelines. The pipelines were observed in a below grade vault and the bottom was found to be 5.5 feet bgl. The boring was advanced to a depth of 12 feet bgl. Two soil samples were collected from 6.5 – 7.5 feet bgl and 10.5 – 11.5 feet bgl.

- SWMU 3-22 – This boring is located adjacent to active hydrocarbon pipelines. The pipelines were hydroexcavated and the bottom was found to be 4 feet bgl. The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 5 – 6 feet bgl and 9 – 10 feet bgl.

- SWMU 3-23 – This boring is located adjacent to active hydrocarbon pipelines. The pipelines were hydroexcavated and the bottom was found to be 7 feet bgl. The boring was advanced to a depth of 14 feet bgl. Two soil samples were collected from 8 – 9 feet bgl and 12 – 13 feet bgl.

- SWMU 3-24 – This boring is located adjacent to active hydrocarbon pipelines. The pipelines were hydroexcavated and the bottom was found to be 4.5 feet bgl. The boring was advanced to a depth of 12 feet bgl. Two soil samples were collected from 5.5 – 6.5 feet bgl and 9.5 – 10.5 feet bgl.

- SWMU 3-25 – This boring is located adjacent to active hydrocarbon pipelines. The pipelines were hydroexcavated and the bottom was found to be 4 feet bgl. The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 5 – 6 feet bgl and 9 – 10 feet bgl.

- SWMU 3-26 – This boring is located adjacent to an inactive hydrocarbon pipeline. The pipeline was hydroexcavated and the bottom was found to be 1.5 feet bgl. The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 2.5 – 3.5 feet bgl and 6.5 – 7.5 feet bgl.

- SWMU 3-27 – This boring is located adjacent to an inactive hydrocarbon pipeline. The pipeline was hydroexcavated and the bottom was found to be 1.5 feet bgl. The boring was advanced to a depth of 8 feet bgl. Two soil samples were collected from 2.5 – 3.5 feet bgl (with duplicate) and 6.5 – 7.5 feet bgl.

- SWMU 3-28 – This boring is located adjacent to an inactive hydrocarbon pipeline. The pipeline was hydroexcavated and the bottom was found to be 1.5 feet bgl. The boring was advanced to a depth of 8 feet bgl. Two soil samples were collected from 2.5 – 3.5 feet bgl and 6.5 – 7.5 feet bgl.

- SWMU 6-4 – This boring is located adjacent to an inactive hydrocarbon pipeline. The pipeline was hydroexcavated and the bottom was found to be 4 feet bgl. The boring was advanced to a depth of 10 feet bgl. Two soil samples were collected from 5 – 6 feet bgl and 9 - 10 feet bgl.

The following soil boring was not installed to a minimum depth of six feet below the bottom depth of the adjacent pipeline due to refusal being encountered while using HSA drilling and sampling methodology:

- SWMU 3-10 – This boring is located adjacent to an active wastewater pipeline. The pipeline was hydroexcavated and the bottom was found to be 11 feet bgl. The boring was advanced to a depth of 14 feet bgl. Three soil samples were collected from the following intervals; 2 – 4 feet, 10 – 12 feet, and 13.5 – 14 feet. The soil sample collected from 2 – 4 feet bgl corresponds to a slightly elevated organic vapor reading in the 2 - 4 feet interval.

Because of field evidence (e.g., elevated organic vapor readings and hydrocarbon odors) indicating potential impacts, the following soil borings were installed at depths greater than six feet below the bottom depth of the adjacent pipeline using HSA drilling and sampling methodology:

- SWMU 3-3 – This boring is located adjacent to an active hydrocarbon pipeline. The pipeline was hydroexcavated. The bottom of the pipeline was found to be 2.5 feet bgl. The boring was advanced to a depth of 30 feet bgl. Four soil samples were collected from the following intervals; 3.5 – 4.5 feet, 7.5 – 8.5 feet, 24 – 26 feet, and 26 – 27 feet.

- SWMU 3-4 - This boring is located adjacent to an active hydrocarbon pipeline. The pipeline was hydroexcavated and the bottom was found to be 5 feet bgl. The boring was advanced to a depth of 16 feet bgl. Three soil samples were collected from the following intervals; 6 – 7 feet, 10 – 11 feet, and 12 – 14 feet.

3.2 Background Information Research

Documents containing the results of previous investigations and subsequent routine groundwater monitoring data from monitoring wells were reviewed to facilitate development of the Group 8 Investigation Work Plan (Groundwater Technology, Inc. 1994, Western Refining Southwest, Inc, 2010, and Western Refining Southwest, Inc, 2011). The previously collected data provide detailed information on the overall subsurface conditions, including hydrogeology

and contaminant distribution within groundwater on a site-wide basis. The data collected under this scope of services supplements the existing soil information and provide specific information regarding contaminant occurrence and distribution within soils near the underground pipelines.

3.3 Collection and Management of Investigation Derived Waste

Soil cuttings (i.e., excess sample material) were contained and characterized using methods based on the type of contaminants suspected or encountered. Discrete soil samples were collected for waste characterization using a decontaminated stainless-steel spoon. Additional discussion on management of investigation derived waste (IDW) is presented in Appendix C. The soil samples were analyzed for leachable RCRA 8 Metals [(Environmental Protection Agency (EPA) method 6010B] using the toxicity characteristic leaching procedure (TCLP) and benzene, toluene, ethylbenzene, xylenes (BTEX) by EPA method 8021B. The analyses are included at the back of Appendix G. The soil cuttings are currently stored on-site pending approval from the New Mexico Oil Conservation Division for off-site disposal.

All decontamination water (approximately 40 gallons total) was disposed at the end of each day in the refinery wastewater treatment system upstream of the American Petroleum Institute (API) Separator.

3.4 Surveys

A hand held GPS receiver was used to record the coordinates of each soil boring location and each location was measured to within one foot of permanent site features. These coordinates were recorded on the field boring logs. The soil boring locations were subsequently surveyed by a registered surveyor.

The horizontal coordinates and elevation of each soil boring and the locations of all other pertinent structures was determined by a registered New Mexico professional land surveyor in accordance with the State Plane Coordinate System (NMSA 1978 47-1-49-56 (Repl. Pamp. 1993)). The surveys were conducted 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. Horizontal positions were measured to the nearest 0.1-ft, and vertical elevations were measured to the nearest 0.01-ft. The survey data is included in Appendix D.

Section 4
Field Investigation Results

This section provides a summary of the surface and subsurface conditions at the refinery, including SWMUs No. 3 and 6. A discussion is included on the installation of soil borings, field screening of soils, and collection of soil samples for analysis. Groundwater and surface water conditions are described in the last two subsections.

4.1 Surface Conditions

Regionally, the surface topography slopes toward the floodplain of the San Juan River, which runs along the northern boundary of the refinery complex. To the south of the refinery, the drainage is to the northwest. North of the refinery, across the San Juan River, surface water flows in a southeasterly direction toward the San Juan River. The active portion of the refinery property, where the process units, storage tanks, and SWMUs No. 3 and 6 are located, is generally of low relief with an overall northwest gradient of approximately 0.02 ft/ft. The refinery sits on an alluvial floodplain terrace deposit and there is a steep bluff (approx. drop of 90 feet) at the northern boundary of the refinery where the San Juan River intersects the floodplain terrace, which marks the southern boundary of the floodplain.

There are two locally significant arroyos, one immediately east and another immediately west of the refinery. These arroyos collect most of the surface water flows in the area, thus significantly reducing surface water flows across the refinery and SWMUs No. 3 and 6. A minor drainage feature is located on the eastern portion of the refinery, where the former Landfill Pond (SWMU No. 9) was located. There are several steep arroyos located to the west along the northern refinery boundary on the steep bluff face that capture local surface water flows and minor groundwater discharges.

The refinery complex is bisected by County Road #4990 (Sullivan Road), which runs east-west. The process units, storage tanks (crude oil and liquid products), wastewater treatment systems, and SWMU No. 6 are located north of the county road. The crude oil and product loading racks, LPG storage tanks and loading racks, maintenance buildings/90-day storage area, pipeline offices, transportation truck shop, and the Class I injection well are located south of the county road. SWMU No. 3 is present on both sides of the county road. There is very little vegetation throughout these areas with most surfaces composed of concrete, asphalt, or gravel. The area

between the refinery and the San Juan River does have limited vegetation on steep slopes that do not support dense vegetation.

4.2 Subsurface Conditions

Numerous soil borings and monitoring wells have been completed across the refinery property during previous site investigations and installation of the slurry wall, which runs along the northern and western refinery boundary. Based on the available site-specific and regional subsurface information, the site is underlain by the Quaternary Jackson Lake terrace deposits, which unconformably overlie the Tertiary Nacimiento Formation. The Jackson Lake deposits consist of fine grained sand, silt and clay that grades to coarse sand, gravel and cobble size material closer to the contact with the Nacimiento Formation. The Jackson Lake Formation is over 50 feet thick near the southeast portion of the site and generally thins to the northwest toward the San Juan River. The Nacimiento Formation is primarily composed of fine grained materials (e.g., carbonaceous mudstone/claystone with interbedded sandstones) with a reported local thickness of approximately 570 feet (Groundwater Technology Inc., 1994).

Figures 5, 6 and 7 present cross-sections of the shallow subsurface based on borings logs from on-site monitoring well completions. As shown in Cross-Section A-A' (Figure 5), the top of the Nacimiento Formation occurs at approximately 5495 feet MSL. The uppermost aquifer is under water table conditions and occurs within the sand and gravel deposits of the Jackson Lake Formation. The Nacimiento Formation functions as an aquitard at the site that prevents constituents from migrating to deeper aquifers. The potentiometric surface as measured in April 2012 is presented as Figure 8 and shows the groundwater generally flowing to the northwest.

Previous investigations have identified and delineated impacts to groundwater from historical site operations. Figure 3 shows the distribution of SPH in the subsurface based on the apparent thickness of SPH measured in monitoring wells. Dissolved-phase impacts are depicted on Figure 4.

4.3 Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment

This subsection provides a description of subsurface investigations to locate potential impacts to soils and also the potential for deeper soil impacts to have migrated vertically to the underlying groundwater. This includes soil field screening results, soil sampling intervals and methods for detection of subsurface impacts in soils along the pipelines identified as SWMU No. 3 and 6.

The soil borings were drilled using the hollow-stem auguring (HSA) method, which utilizes split-spoons for sample collection, and a general description of the exploratory drilling activities is as follows. The drilling equipment was decontaminated between each borehole, as described in Appendix C. Twenty five soil borings were drilled to the minimum depth of six feet below the bottom of the adjacent pipeline. One soil boring, SWMU 3-10, was not installed to a minimum depth of six feet below the bottom depth of the adjacent pipeline due to refusal being encountered while using HSA drilling and sampling methodology. Because of field evidence (e.g., elevated organic vapor readings and hydrocarbon odors) indicating potential impacts, soil borings SWMU 3-3 and SWMU 3-4 were installed at depths greater than six feet below the bottom depth of the adjacent pipeline using HSA drilling and sampling methodology. Saturation was encountered in soil borings SWMU 3-3 and SWMU 3-4.

Discrete soil samples were collected for laboratory analyses at the following intervals:

- 1-2' below the bottom depth of the adjacent pipeline (all soil borings);
- 5-6' below the bottom depth of the adjacent pipeline or the lowermost one foot interval on soil boring penetration deeper than six feet below the pipeline (all soil borings except SWMU 3-10);
- From the interval in each soil boring with the greatest apparent degree of contamination based on field screening (only soil borings with observed potential impacts – SWMU 3-3, 3-4, 3-7, 3-10, and 3-20);
- From the 6" interval at the top of saturation (applicable only to borings that reach saturation – SWMU 3-3 and 3-4); and
- Any additional intervals as determined based on field screening results.

The installation of soil borings and collection of soil samples is discussed below in numerical order. A description of the field screening and soil sampling procedures are presented in Appendix C. Copies of the boring logs are provided in Appendix E. In addition to being included on the soil boring logs, the soil vapor (i.e., headspace) screening results are summarized in Table 4. The locations of the soil borings appear on Figure 2.

SWMU 3-1

On January 30, 2012 the drilling rig was set up on location SWMU 3-1. Sample collection was accomplished using the HSA drilling method and split spoon samplers. Two soil samples were collected from 3.5 – 4.5 feet and 7.5 – 8.5 feet. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the

surface to a depth of 10 feet bgl. The lithology encountered consisted of surficial silt from 0 – 2 feet bgl. A firm, low plastic clay was encountered from 2 – 10 feet bgl. The sampling terminated at 10 feet bgl. The borehole was plugged with bentonite chips the same day.

SWMU 3-3

On January 27, 2012 the drilling rig was set up on location SWMU 3-3 and drilled to a depth of 30' bgl. Two soil samples were collected from 3.5 – 4.5 feet and 7.5 – 8.5 feet. These two samples satisfied the minimum sampling requirements outlined in the work plan. Due to field indications of potential impacts [e.g., odor and elevated photoionization detector (PID) readings] the soil boring was advanced to saturation. The odor and elevated PID readings were observed from 2 to 27 feet bgl. A soil sample was collected from 24 – 26 feet which corresponded to the interval with the highest PID reading (1379 ppm). An additional sample was collected from 26 – 27 feet which corresponded to the interval immediately above saturation. The saturated interval exhibited strong odor and was black. The lithology included a surficial clayey silt from 0 – 2 feet bgl then silty clay (2 – 6 feet bgl), silty sand (6 – 10 feet bgl), clayey silt (10 – 14 feet bgl), silty sand (14 – 18 feet bgl), and gravelly sand (18 – 30 feet bgl). The boring was plugged with a cement /grout mixture the same day.

SWMU 3-4

On January 25, 2012 the drilling rig was set up on location SWMU 3-4 and drilled to a depth of 16' bgl. Two soil samples were collected from 6 – 7 feet and 10 – 11 feet. These two samples satisfied the minimum sampling requirements outlined in the work plan. Due to the occurrence of elevated PID readings starting at 8 feet bgl the soil boring was advanced to saturation. An additional soil sample was collected from 12 – 14 feet satisfying the requirement of collecting a sample from the interval with the highest PID reading (238 ppm) and collecting the interval immediately above saturation (14 feet bgl). The saturated interval exhibited strong odor and was black. The lithology consisted primarily of sand ranging from silty sand (0 – 2 feet bgl) to clayey sand (2 – 5.5 feet bgl) and then gravelly sand (5.5 – 14 feet bgl). Saturation was encountered in gravelly sand/sandy gravel (14 – 16 feet bgl). The boring was plugged with a cement/grout mixture on January 25, 2012.

SWMU 3-5

On January 30, 2012 the drilling rig was set up on location SWMU 3-5 and drilled to a depth of 10' bgl. A soil sample was collected from 4.5 – 5.5 feet bgl and another from 8.5 – 9.5 feet bgl.

No odors were observed and PID readings were 0.0 ppm. Over the 10 foot interval, the lithology ranged from a surficial silty clay (0 – 2 feet bgl) to clayey silt (2 – 6 feet bgl) to sandy silt (6 – 10 feet bgl). Groundwater was not encountered and the boring was plugged with bentonite chips the same day.

SWMU 3-6

On February 6, 2012 the drilling rig was set up on location SWMU 3-6 and drilled to a depth of 12' bgl. No odors were observed and PID readings ranged from 4.9 ppm (0 – 2 feet bgl) to 0.0 ppm (2 – 12 feet bgl). The lithology consisted of silt from 0 – 6 feet bgl, clayey silt (6 -10 feet bgl), and sandy silt (10 – 12 feet bgl). Soil samples were collected from 6 – 7 feet bgl and 10 – 11 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips on February 6, 2012.

SWMU 3-7

On February 2, 2012 the drilling rig was set up on location SWMU 3-7 and drilled to a depth of 10' bgl. The soil did not exhibit an odor however, the PID reading for the 0 – 2 feet bgl interval was recorded as 126.7 ppm. The readings dropped significantly to 6.9 ppm (2 – 4 feet bgl); 7 ppm (4 – 6 feet bgl) and 0.2 ppm (6 – 8 feet bgl). A soil sample (with duplicate) was collected from 0 - 2 feet bgl to satisfy the work plan's requirement of collecting a sample from the interval with the highest PID reading. Soil samples were collected from 4.25 – 5.25 feet bgl and 8.25 – 9.25 feet bgl. The lithology encountered was fill material consisting of silty clay (0 – 4 feet bgl) and silty sand (4 – 10 feet bgl). Groundwater was not encountered and the boring was plugged with bentonite chips the same day.

SWMU 3-8

On February 6, 2012 the drilling rig was set up on location SWMU 3-8 and drilled to a depth of 16.25 feet bgl. No odors were observed and PID readings were 0.0 ppm. Since the pipelines were found to have been installed at various depths four soil samples were collected from the following intervals; 6 – 7 feet, 10 – 11 feet, 12 – 14 feet, and 14 – 16 feet. Fill material consisting of silt and clayey sand was encountered from 0 – 10 feet bgl. A sand/sandstone was encountered from 10 – 16.25 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips the same day.

SWMU 3-9

On February 3, 2012 the drilling rig was set up on location SWMU 3-9 and drilled to a depth of 20' bgl. No odor was observed and PID readings were 0.0 ppm. The lithology consisted of fill material (0 – 12 feet bgl), clay/silty clay (12 – 14 feet bgl), sand/clayey sand (14 – 16 feet bgl), and clayey sand (16 – 20 feet bgl). Two soil samples were collected from 14 – 16 feet bgl and 18 – 19 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips on February 3, 2012.

SWMU 3-10

On February 3, 2012 the drilling rig was set up on location SWMU 3-10 and drilled to a depth of 14 feet bgl. No odor was observed and PID readings ranged from 0.0 to 21.7 ppm. The lithology consisted of fill material (gravel/sand/clay) from 0 – 10 feet bgl. Sandy gravel was encountered from 10 – 14 feet bgl. One soil sample was collected from 2 – 4 feet bgl from the interval that was observed to exhibit a PID reading of 21.7 ppm. Two samples were collected from 10 – 12 feet bgl and 13.5 – 14 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips the same day.

SWMU 3-11

On February 2, 2012 the drilling rig was set up on location SWMU 3-11 and drilled to a depth of 12' bgl. No odor was observed and PID readings were 0.0 ppm. Fill material (gravel/sand) was encountered from 0 – 6 feet bgl. Sandy gravel was encountered from 6 – 12 feet bgl. Two samples were collected from 6.5 – 7.5 feet bgl and 10.5 – 11.5 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips the same day.

SWMU 3-12

On January 26, 2012 the drilling rig was set up on location SWMU 3-12 and drilled to a depth of 10' bgl. No odor was observed. A PID reading of 19.6 was observed from the sample collected from 0 – 2 feet bgl. The remainder of the PID readings were 0.0 ppm. A low plastic silt was encountered from 0 – 10 feet bgl. Two samples were collected from 5 – 6 feet bgl and 9 – 10 feet bgl for analysis. Groundwater was not encountered and the boring was plugged with bentonite chips on January 26, 2012.

SWMU 3-13

On January 26, 2012 the drilling rig was set up on location SWMU 3-13 and drilled to a depth of 12 feet bgl. No odor was observed and the PID readings were 0.0 ppm. Low plastic silt was encountered from 0 – 12 feet bgl. Two samples were collected from 5.5 – 6.5 feet bgl (with duplicate) and 9.5 – 10.5 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips the same day.

SWMU 3-14

On January 30, 2012 the drilling rig was set up on location SWMU 3-14 and drilled to a depth of 10 feet bgl. No odor was observed. The PID readings ranged from 0.0 to 9.7 ppm. Surficial silty clay was encountered from 0 – 2 feet bgl. Clayey silt was encountered from 2 – 10 feet bgl. Two samples were collected from 4.5 – 5.5 feet bgl and 8.5 – 9.5 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips the same day.

SWMU 3-15

On January 26, 2012 the drilling rig was set up on location SWMU 3-15 and drilled to a depth of 12 feet bgl. No odor was observed and PID readings were 0.0 ppm. The lithology consisted of clayey silt/silt/silty sand. Two samples were collected from 5.5 – 6.5 feet bgl and 9.5 – 10.5 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips on January 26, 2012.

SWMU 3-16

On February 2, 2012 the drilling rig was set up on location SWMU 3-16 and drilled to a depth of 10 feet bgl. No odor was observed and PID readings ranged from 0.0 to 1.7 ppm. The lithology encountered was silty clay fill (0 - 4 feet), clayey silt (4 – 8 feet), and silty sand (8 – 10 feet). Two samples were collected from 4.25 – 5.25 feet bgl (with duplicate) and 8.25 – 9.25 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips on February 2, 2012.

SWMU 3-17

On January 25, 2012 the drilling rig was set up on location SWMU 3-17 and drilled to a depth of 10 feet bgl. No odor was observed and PID readings were 0.0 ppm. The lithology consisted of gravelly clay (0 – 4 feet), silty sand (4 – 6 feet), and clayey silt/sand (6 – 10 feet). Two samples

were collected from 5 – 6 feet bgl and 9 – 10 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips the same day.

SWMU 3-18

On January 26, 2012 the drilling rig was set up on location SWMU 3-18 and drilled to a depth of 10 feet bgl. No odor was observed and PID readings ranged from 0.0 ppm to 7.8 ppm. Clayey silt was encountered from 0 – 6 feet bgl. Silty sand was encountered from 6 – 10 feet bgl. Saturation was not encountered. Two soil samples were collected from 4.5 – 5.5 feet bgl and 8.5 – 9.5 feet bgl. The borehole was plugged with bentonite chips on January 26, 2012.

SWMU 3-19

On January 26, 2012 the drilling rig was set up on location SWMU 3-19 and drilled to a depth of 10 feet bgl. No odor was observed and PID readings were 0.0 ppm. The lithology consisted of clay fill (0 – 2 feet), silty clay (2 – 6 feet), and clayey silt (6 – 10 feet). Two samples were collected from 4.5 – 5.5 feet bgl and 8.5 – 9.5 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips the same day.

SWMU 3-20

On February 2, 2012 the drilling rig was set up on location SWMU 3-20 and drilled to a depth of 16 feet bgl. A faint odor was observed in the sample collect from the 4 – 6 feet interval. The PID readings ranged from 1.4 ppm (14.5 – 15.5 feet bgl) to 56 ppm (2 – 4 feet bgl). A soil sample was collected from the 2 – 4 feet bgl interval. Two soil samples were collected from 10.5 – 11.5 feet bgl and 14.5 – 15.5 feet bgl. The lithology consisted of fill (clay/silt/sand/gravel) from 0 – 10 feet, clayey silt (10 – 14 feet), and silty sand (14 – 16 feet). Saturation was not encountered in the boring. The borehole was plugged with bentonite chips the same day.

SWMU 3-21

On February 2, 2012 the drilling rig was set up on location SWMU 3-21 and drilled to a depth of 12 feet bgl. No odor was observed and PID readings ranged from 0.0 ppm to 1.1 ppm. Fill material was encountered from 0 – 6 feet bgl. Clayey silt was encountered from 6 – 12 feet bgl. Saturation was not encountered. Two soil samples were collected from 6.5 – 7.5 feet bgl and 10.5 – 11.5 feet bgl. The borehole was plugged with bentonite chips on February 2, 2012.

SWMU 3-22

On January 26, 2012 the drilling rig was set up on location SWMU 3-22 and drilled to a depth of 10 feet bgl. No odor was observed and PID readings were 0.0 ppm. The lithology consisted of clay/gravel fill (0 – 2 feet) and clayey silt (2 – 10 feet). Two samples were collected from 5 – 6 feet bgl and 9 – 10 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips the same day.

SWMU 3-23

On January 26, 2012 the drilling rig was set up on location SWMU 3-23 and drilled to a depth of 14 feet bgl. No odor was observed. The PID readings ranged from 0.0 ppm to 6.3 ppm. Two soil samples were collected from 8 – 9 feet bgl and 12 – 13 feet bgl. The lithology consisted of fill from 0 – 2 feet, clayey silt (2 – 7 feet), silty sand (7 – 10 feet), silty clayey sand (10 – 12 feet), and clayey sand (12 -14 feet). Saturation was not encountered in the boring. The borehole was plugged with bentonite chips the same day .

SWMU 3-24

On February 2, 2012 the drilling rig was set up on location SWMU 3-24 and drilled to a depth of 12 feet bgl. No odor was observed and PID readings were 0.0 ppm. The lithology consisted of silty sand/gravel fill (0 – 6 feet) and silty sand (6 – 12 feet). Two samples were collected from 5.5 – 6.5 feet bgl and 9.5 – 10.5 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips on February 2, 2012.

SWMU 3-25

On January 25, 2012 the drilling rig was set up on location SWMU 3-25 and drilled to a depth of 10 feet bgl. No odor was observed and PID readings were 0.0 ppm. The lithology consisted of clayey sand (0 – 6 feet) and sandy clay (6 – 10 feet). Two samples were collected from 5 – 6 feet bgl and 9 – 10 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips the same day.

SWMU 3-26

On January 30, 2012 the drilling rig was set up on location SWMU 3-26 and drilled to a depth of 10 feet bgl. No odor was observed and the PID readings were 0.0 ppm. Low plastic silt was encountered from 0 – 10 feet bgl. Two samples were collected from 2.5 – 3.5 feet bgl and 6.5 –

7.5 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips the same day .

SWMU 3-27

On January 30, 2012 the drilling rig was set up on location SWMU 3-27 and drilled to a depth of 8 feet bgl. No odor was observed and PID readings ranged from 0.0 ppm to 0.1 ppm. The lithology consisted of silt (0 – 4 feet) and silty sand (4 – 8 feet). Two samples were collected from 2.5 – 3.5 feet bgl (with duplicate) and 6.5 – 7.5 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips on January 30, 2012.

SWMU 3-28

On January 30, 2012 the drilling rig was set up on location SWMU 3-28 and drilled to a depth of 8 feet bgl. No odor was observed and the PID readings were 0.0 ppm. Low plastic silt was encountered from 0 – 8 feet bgl. Two samples were collected from 2.5 – 3.5 feet bgl and 6.5 – 7.5 feet bgl. Groundwater was not encountered and the boring was plugged with bentonite chips the same day .

SWMU 6-4

On January 27, 2012 the drilling rig was set up on location SWMU 6-4 and drilled to a depth of 10 feet bgl. No odor was observed. The PID readings ranged from 0.0 ppm to 0.1 ppm. Two soil samples were collected from 5 – 6 feet bgl and 9 - 10 feet bgl. The lithology consisted of silty clay from 0 – 2 feet, clayey silt (2 – 6 feet), silty sand (6 – 9 feet), and gravelly sand (9 – 10 feet). Saturation was not encountered in the boring. The borehole was plugged with bentonite chips on January 27, 2012.

4.4 Groundwater Conditions

The uppermost aquifer is under water table conditions and occurs within the sand and gravel deposits of the Jackson Lake Formation. The Nacimiento Formation functions as an aquitard at the site and prevents site related contaminants from migrating to deeper aquifers. The potentiometric surface as measured in April 2012 is presented in Figure 8 and shows the groundwater generally flowing to the northwest. The potentiometric surface at the site is consistent with the regional gradient in that movement is toward to the San Juan River, which is a location of regional groundwater discharge. The installation of the North Boundary Barrier Wall (i.e., slurry wall) and collection wells/French drain along the western and northern

boundary of the refinery controls the flow of groundwater in this area and has basically eliminated the discharge of groundwater from the refinery along this area.

The slurry wall was designed and installed as a permanent control measure to prevent further potential discharges of groundwater to surface water and the generation of seeps along the bluff. Subsequent to the installation of the slurry wall in 2005 and with the continued recovery of groundwater from the Hammond Ditch French drain, the discharge from the seeps was significantly reduced. No SPH has been observed in the discharge from the seeps since installation of the slurry wall. The areas with the greatest saturated thickness are generally found near and along the Hammond Ditch and on-site surface impoundments (i.e., the current and former raw water ponds). The predominant source of recharge to the shallow aquifer beneath the refinery is recharge from man-made features (e.g., the Hammond Ditch and on-site surface impoundments). The saturated thickness beneath the refinery varies from zero feet in the southern portion of the site to a maximum of approximately eight feet along the northern portion of the refinery, on the up-gradient side of the slurry wall.

4.5 Surface Water Conditions

The only local surface water body, excluding on-site surface impounds and the Hammond Irrigation Ditch, is the San Juan River, which flows along the northern most property boundary. There were no accumulations of surface water observed during the site investigation in the areas of SWMUs No. 3 and 6.

Regionally, the surface topography slopes toward the floodplain of the San Juan River, and across most of the refinery and to the south of the refinery, the drainage is to the northwest. There is a steep bluff (approximate drop of 90 feet) at the northern boundary of the refinery where the San Juan River intersects the floodplain terrace, which marks the southern boundary of the floodplain.

There are two locally significant arroyos, one immediately east and another immediately west of the refinery, which collect most of the surface water flows in the area, thus significantly reducing surface water flows across the refinery and SWMUs No. 3 and 6. A minor drainage feature is located on the eastern portion of the refinery, where the Landfill Pond (SWMU No. 9) was located and there are several steep arroyos along the northern refinery boundary that primarily capture only local surface water flows. There are smaller arroyos located on the bluff face and the seeps are generally near the headwall of the arroyos or along the arroyos.

The average annual rainfall is only approximately 8.6 inches, thus the threat of surface water transport of contaminants as suspended load or dissolved phase is low. The refinery implements a Stormwater Pollution Prevention Plan to ensure that surface waters of the State are not impacted by refinery operations.

Section 5
Regulatory Criteria

The applicable screening and cleanup levels are specified in Section VII of the Order issued by NMED on July 2, 2007. The soil cleanup levels are based on a target excess cancer risk of 10^{-5} for carcinogenic contaminants and a target hazard index of 1.0 for noncarcinogenic contaminants. The Order specifies a hierarchy of screening levels, with the screening levels based on NMED guidance taking precedence over EPA's Region VI Human Health Medium Specific Screening Levels with one exception for groundwater. If both a New Mexico Water Quality Control Commission standard and federal Maximum Contaminant Level (MCL) are available for an individual constituent, then the lower of the two levels is used as the screening level. Based on direction received from NMED subsequent to issuance of the Order, EPA's Region VI Human Health Medium Specific Screening Levels have been replaced with EPA Regional Screening Levels dated April 2009. The NMED guidance document used to establish cleanup levels is the *Risk Assessment Guidance for Site Investigations and Remediation* (February 2012), which supersedes the *Technical Background Document for Development of Soil Screening Levels* (Revision 5.0 dated August 2009) and *Total Petroleum Hydrocarbon (TPH) Screening Guidelines* (dated October 2006).

For non-residential properties (e.g., the Bloomfield Refinery), the soil screening levels must be protective of commercial/industrial workers throughout the upper two feet of surface soils and construction workers throughout the upper ten feet based on NMED criteria. NMED residential soil screening levels are applied to the upper ten feet and soil screening levels for protection of groundwater apply throughout the vadose zone. EPA soil screening levels for direct contact exposure apply to the upper two feet of the vadose zone. To achieve closure as "corrective action complete without controls", the affected media must meet residential screening levels, which are presented in Table 5. Table 6 provides a list of the available NMED and EPA soil screening levels for non-residential properties. While Tables 5 and 6 indicate the various depths to which the individual soil screening levels are applicable, Table 7 discussed below does not include this level of detail.

The aforementioned Tables 5 and 6 have soil screening levels for the soil-to-groundwater pathway that are based on a dilution/attenuation factor (DAF) of 1.0 and 11.25 A review of site conditions indicates that a DAF of 1.0 is overly conservative, thus a site-specific DAF value was calculated. A review of the site-specific conditions at each of the SWMUs and AOCs recently

investigated indicates that the conditions at SWMU No. 2 Drum Storage Area North Bone Yard could present a greater potential for constituents to leach from soils to the underlying groundwater because SWMU No. 2 has the shallowest depth to groundwater and although it may be overly conservative for the SWMUs investigated under Group 8, the same DAF value of 11.25 is applied at all locations presented in this Investigation Report. The documentation of the calculation of the site-specific DAF value is provided in Appendix F.

The screening levels that are compared to individual soil sample results for SWMUs No. 3 and 6 are presented in Table 7. The screening levels in Table 7 include residential land use, non-residential land use, and screening levels to evaluate the potential for constituents to migrate to groundwater using the site-specific DAF of 11.25. The screening levels in Table 7 have not been segregated based on depth of the soil sample as discussed above for Tables 5 and 6. It should also be noted that the screening levels for chromium are conservatively based on the presence of chromium VI; speciation has not been conducted to determine if the chromium detected in soil samples collected at SWMU No. 3 and 6 is chromium III or chromium VI.

A review of the NMED TPH Screening Guidelines (dated 2012) indicates that the TPH screening levels were developed based on screening levels and compositional assumptions developed by the Massachusetts Department of Environmental Protection (MADEP). The screening levels were developed to be protective of both direct contact exposures and leachate generation. The analytical results, as presented in Table 7, are reported for gasoline range organics (C6- C10), diesel range organics (>C10-C28), and motor oil range organics (>C28-C35). The applicable TPH screening levels used for comparison to the individual samples are selected from Table 6-2 of the NMED guidance. Because the specific type of products (e.g., diesel fuel or jet fuel) that were potentially released from the various underground pipelines is not always known, "unknown oil" was selected from Table 6-2 for comparison to the diesel range analytical results. There are no screening levels for comparison to results reported in the gasoline range, but rather individual constituents (e.g., BTEX) are evaluated.

The analyses for motor oil range organics only report results for >C28 to C35. Since the motor oil range analytical results only include hydrocarbons greater than C28, it is not appropriate to compare the results against screening levels for product types that have lower hydrocarbon ranges (e.g., diesel fuel – 60% C11-C22 aromatics and 40% C9-C18 aliphatics). The only product type in the NMED guidance that contains the >C28-C35 carbon range is "waste oil",

which includes C19-C36. Therefore, the motor oil range soil analytical results are compared to the "waste oil" soil screening levels in NMED's Table 6-2.

The DAF screening levels for diesel and motor range organics in Table 7 are conservatively based on residential land use. The DAF screening levels have not been adjusted for the site-specific DAF value of 11.25 because the default screening levels that NMED based on the MADEP screening levels already incorporate a minor adjustment for the DAF component.

Some of the individual constituents reported by the laboratory do not have screening levels but all were non-detect except n-butylbenzene, n-propylbenzene, and sec-butylbenzene. These constituents were detected at low concentrations at only one location (SWMU 3-3) and were only detected in deep intervals (24-27 feet), which could be associated with known impacts to groundwater near this location.

Section 6
Site Impacts

This section discusses the chemical analyses performed and presents the analytical results that were obtained through the analysis of soil samples, which were collected at the Group 8 SWMUs. The analytical results for soils are presented and compared to applicable screening levels, as described in Section 5.0.

6.1 Soil Sampling Chemical Analytical Results

Soil samples were analyzed by Hall Environmental Analysis Laboratory in Albuquerque, New Mexico using the following methods for organic constituents:

- SW-846 Method 8260 volatile organic compounds;
- SW-846 Method 8270 semi-volatile organic compounds; and
- SW-846 Method 8015B gasoline, diesel, and motor oil range petroleum hydrocarbons.

Soil samples were analyzed for the following metals using the indicated analytical methods.

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

The analytical results for SWMUs No. 3 and 6 are summarized in Table 7. The individual results that exceed the applicable screening levels are indicated using a bold font and/or are highlighted, as explained in the table footnotes. Maps showing the distribution of constituents detected in soils above screening levels are included as Figures 9 – 19. The concentrations

shown on Figures 9 – 19 that exceed the screening levels in Table 7 are underlined on the figures (i.e., concentrations above residential and/or DAF (11.25) screening levels). The laboratory analytical reports are included in Appendix G and the data validation of the results, which includes the analytical results for the associated QA/QC samples, is included in Appendix H. The constituents that have concentrations in soils above screening levels are discussed below.

SWMU No. 3 Underground Piping Current in Use

Arsenic was detected in four samples collected under the Group 8 Investigation Work Plan [SWMU 3-3 (26-27'), SWMU 3-15 (5.5-6.5'), SWMU 3-23 (12-13'), and SWMU 3-25 (5-6')] at concentrations above the DAF screening level (0.147 mg/kg) and all of these samples except SWMU 3-3 (26-27') have concentrations below the residential screening level (3.9 mg/kg). The detected concentrations range from 2.5 mg/kg to 17 mg/kg (Table 7). A review of the previous analyses for soil samples collected near the underground pipelines, indicates six samples [SWMU 7-1 (5-7'), SWMU 8-6 (1.5-2'), SWMU 8-10 (0-0.5'), SWMU 10-2 (0-0.5'), SWMU 10-2 (1.5-2'), and SWMU 15-3 (0.5-2')] have concentrations above the DAF screening level with only one of these samples [SWMU 15-3 (0.5-2')] having a concentration (5.5 mg/kg) above the residential screening level (Table 2). The arsenic analytical results are shown on Figure 9.

Chromium (reported as total chromium) was detected in every soil sample analyzed at concentrations above the chromium VI DAF screening level of 0.0929 mg/kg and most also exceed the residential screening level of 2.97 mg/kg. Speciation of the detected chromium results was not performed to determine if the chromium is present as chromium III or chromium VI. The lowest chromium III screening level is a value of 117,000 mg/kg for residential exposure. The detected concentrations ranged from 1.8 mg/kg to 83 mg/kg for the soil samples collected under the Group 8 Investigation Work Plan, with a maximum of 100 mg/kg detected in two samples collected earlier near the pipeline at SWMU 8 [8-6 (1.5-2') and 8-8 (1.5-2')]. The chromium analytical results are shown on Figure 10.

Cobalt was detected in three soil samples [(SWMU 3-11 (10.5-11.5'), SWMU 3-16 (4.25–5.25'), and SWMU 3-19 (4.5–5.5')] at concentrations above the DAF screening level (5.51 mg/kg) but none exceed the residential soil screening level of 23 mg/kg. The detected concentrations range from 1.3 mg/kg to 7.5 mg/kg. The cobalt analytical results are shown on Figure 11.

1,2,4-Trimethylbenzene was found in two soil samples [SWMU 3-3 (24-26') and SWMU 3-3 (26-27')], which were collected under the Group 8 Investigation Work Plan, at concentrations above the DAF screening level of 0.27 mg/kg. The reported concentrations were 1.4 and 1.8 mg/kg, which are less than the residential screening level of 67.0 mg/kg. A review of the samples collected earlier near underground piping, which are summarized in Table 2, indicates one additional sample [AOC 22-15 (34-36')] with a concentration above the DAF screening level at 0.69 mg/kg. The reported values for 1,2,4-trimethylbenzene are presented in Figure 12.

1,3,5-Trimethylbenzene was found in one soil sample [SWMU 3-3 (26-27')], which was collected under the Group 8 Investigation Work Plan, at a concentration above the DAF screening level of 0.225 mg/kg. The reported concentration was 0.4 mg/kg and the residential screening level is 47 mg/kg. A review of the samples collected earlier, which are summarized in Table 2, indicates one additional sample [AOC 22-15 (34-36')] with concentrations above the DAF screening level at 0.26 mg/kg. The reported values for 1,2,4-trimethylbenzene are presented in Figure 13.

Chloroform was detected in a single soil sample [SWMU 3-3 (3.5-4.5')]. The reported concentration of 0.062 mg/kg exceeds the DAF screening level of 0.00725 mg/kg but is less than the residential screening level of 5.86 mg/kg.

Three soil samples indicated the presence of ethylbenzene above quantitation limits but only one sample [SWMU 3-3 (24-26')] had a concentration (2.9 mg/kg) above the DAF screening level of 1.53 mg/kg. The reported values ranged from 0.00269 to 2.9 mg/kg, with none exceeding the residential DAF value of 68.4 mg/kg. Figure 14 shows the analytical results for ethylbenzene.

1-Methylnaphthalene was detected in two samples [(SWMU 3-3 (24-26') and SWMU 3-3 (26-27')] at concentrations of 2.2 and 1.2 mg/kg, respectively, which exceed the DAF screening level of 0.169 mg/kg. All other samples were non-detect and no samples had results above the residential screening level of 22 mg/kg. The analytical results are shown in Figure 15.

Naphthalene was found in two soil samples [SWMU 3-3 (24-26') and SWMU 3-3 (26-27')], which were collected under the Group 8 Investigation Work Plan, at concentrations above the DAF screening level of 0.00401 mg/kg. The reported concentrations for these two samples were 2.5 and 1.3 mg/kg. The reported values for naphthalene are presented in Figure 16 and none exceed the residential screening level of 43 mg/kg.

Benzo(a)pyrene was detected in a single soil sample [SWMU 7-1 (4-5')]. The reported concentration of 1.3 mg/kg exceeds the DAF screening level of 0.292 mg/kg and the residential screening level of 0.148 mg/kg. The sample was collected as part of the Group 4 effort conducted earlier and no samples collected under the Group 8 Investigation Work Plan had reported detections of benzo(a)pyrene. The analytical results are shown in Figure 17.

Diesel range organics (DRO) were detected in five samples collected under the Group 8 Investigation Work Plan, but all at concentrations less than the screening levels. The DRO analytical results are presented in Figure 18.

Motor oil range organics (MRO) were detected in one sample collected under the Group 8 Investigation Work Plan, but at a concentration less than the screening levels. The MRO analytical results are presented in Figure 19.

SWMU No. 6 Abandoned Underground Piping.

There were two soil samples collected at boring SWMU 6-4 from depths of 5-6' and 9-10'. Chromium was detected in each sample at concentrations (5.4 and 4.6 mg/kg) above the chromium VI DAF screening level (0.0929 mg/kg) and the chromium VI residential soil screening level of 2.97 mg/kg. The concentrations of both samples are less than the chromium III screening levels, as indicated in Table 7. The chromium analytical results are shown on Figure 10.

Soil boring SWMU 15-3 is located along an active underground hydrocarbon pipeline but is also near the end of an abandoned underground hydrocarbon pipeline. Arsenic and chromium were the only constituents detected at concentrations above the screening levels from this location in a sample collected from 0.5 to 2'. The arsenic and chromium results are discussed above under SWMU No. 3.

Section 7
Conclusions and Recommendations

This section summarizes and provides an evaluation of the potential impacts as shown in field screening data and analytical data. An investigation of soils was conducted at Group 8 (SWMUs 3 and 6) to assess and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil samples were collected and analyzed for potential site-related constituents.

7.1 Conclusions

SWMU No. 3 – Underground Piping Currently in Use

Three metals (arsenic, chromium and cobalt) were detected in soil samples at concentrations exceeding their respective screening levels. Arsenic was detected in 10 samples at concentrations above the DAF screening level, with two of these samples having concentrations above the residential screening level. One of the two samples with arsenic concentrations above the residential screening level was collected at a depth of 26 feet and thus does not pose a threat via the direct contact pathways. The second sample with arsenic above the residential screening level was collected above the pipeline at a depth of 0.5-2' in one of the SWMU-15 samples (SWMU 15-3) and is best addressed as part of SWMU 15. Chromium was detected in every soil sample at concentrations above the chromium VI DAF screening level and most also exceeded the chromium VI residential screening level. All chromium results are well below the chromium III screening levels. The chromium concentrations are reported as total chromium; and therefore cannot be speciated between chromium III and VI. Cobalt was detected in generally low concentrations with three samples having concentrations slightly over the DAF screening level; however, none of the cobalt detections were above the residential screening levels. Arsenic, chromium, and cobalt are naturally occurring constituents in many soils and it is possible that these constituents are naturally occurring in soils at the Bloomfield Refinery. It may be overly conservative to compare the total chromium results to the chromium VI screening levels, but additional analyses will be required to speciate the chromium.

Seven organic constituents (1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, chloroform, ethylbenzene, 1-methylnaphthalene, naphthalene, and benzo(a)pyrene) were detected at concentrations above their respective screening levels. 1,2,4-Trimethylbenzene was detected in three samples [SWMU 3-3 (24-26'), SWMU 3-3 (26-27'), and AOC 22-15 (34-36')] at

concentrations above the DAF screening level, but all three were collected from depths that may reflect impacts from lateral transport of impacted groundwater and not a soil source at the location of the soil boring. 1,3,5-Trimethylbenzene was detected in two samples [SWMU 3-3 (26-27') and AOC 22-15 (34-36')] at concentrations above the DAF screening level and samples were collected from depths that may also reflect impacts from lateral transport of impacted groundwater and not a soil source at the location of the soil boring. At soil boring SWMU 3-3 saturation was recorded at a depth of 28 feet and in soil boring AOC 22-15 saturation was noted at a depth of 36 feet.

Chloroform was detected in only one soil sample [SWMU 3-3 (3.5-4.5')] and the reported value is low at 0.062 mg/kg, but exceeds the DAF screening level; however, it is less than the residential screening level. No other constituents were detected above the screening levels in this soil sample.

Ethylbenzene was detected above the DAF screening level in only one soil sample [SWMU 3-3 (26-27')] that was collected from a very deep interval that most likely is detecting impacts from groundwater and not an overlying soil source. Evidence for this conclusion includes the fact that ethylbenzene was not detected in shallower samples [(SWMU 3-3 (3.5-4.5') and SWMU 3-3 (7.5-8.5')] collected from depths near the pipeline and was only detected in deeper samples. This same pattern of non-detect results in shallower intervals near the pipeline vs. exceedences of the screening levels at depth occurs for other organic constituents also (e.g., 1,3,5-trimethylbenzene, 1-methylnaphthalene, and naphthalene).

1-Methylnaphthalene was detected in two deep samples [(SWMU 3-3 (24-26') and SWMU 3-3 (26-27')] at concentrations above the DAF screening level, but all other samples were non-detect. The fact that it was only detected in such deep samples indicates these samples are most likely impacted from lateral transport of impacted groundwater and not a soil source at the location of the soil boring.

Naphthalene was detected in only two deep samples [(SWMU 3-3 (24-26') and SWMU 3-3 (26-27')] at concentrations above the DAF screening level. The fact that it was only detected above the screening level in such deep samples and not in the shallower samples collected near the pipeline indicates these samples are most likely impacted from lateral transport of impacted groundwater and not a soil source at the location of the soil boring.

Benzo(a)pyrene was detected in a single soil sample [SWMU 7-1 (4-5')] at a concentration exceeding the DAF screening level and the residential screening level. The sample was collected as part of the Group 4 effort conducted earlier and no samples collected under the Group 8 Investigation Work Plan reported detections of benzo(a)pyrene. This single detection of benzo(a)pyrene appears to be more likely associated with SWMU No. 7 (Raw Water Ponds) than the Group 8 SWMUs and is best managed as part of Group 4.

SWMU No. 6 Abandoned Underground Piping.

The abandoned pipeline thought to be located near Tanks 11, 12, 13, and 14, and proposed soil borings 6-1, 6-2, and 6-3 could not be located in this area. After additional discussions with refinery personnel it is believed this pipeline was located approximately 200 feet further south, but was previously removed. Because the pipeline was previously removed, its previous location and depth cannot be confirmed and thus it is not possible to identify sample locations that meet the requirement to be within three feet of the line in the horizontal plane and specified depths below the pipeline.

Chromium was detected above the chromium VI DAF and residential screenings levels at boring SWMU 6-4 from depths of 5-6' and 9-10'. However, the detections are less than the chromium III screening level. Chromium was the only constituent detected above a screening level and no organics were detected in either sample. It does not appear that the soils have been impacted by a release from the pipeline, since no organic constituents have been detected. The chromium detections will require further evaluation.

Cumulative Risk Evaluation

A cumulative risk evaluation for soils is presented in Table 8. This was conducted by taking the maximum reported concentration of each detected constituent from both SWMUs and dividing by the residential screening level and non-residential screening levels as shown in the equations below. These calculations are separated for carcinogenic and non-carcinogenic constituents. The cumulative carcinogenic risk is 3.25×10^{-4} assuming residential land use and 2.3×10^{-5} for non-residential land use. The hazard index for residential land use is 0.96 and for non-residential land use is 0.615.

$$Site\ Risk = \left(\frac{conc_x}{SSL_x} + \frac{conc_y}{SSL_y} + \frac{conc_z}{SSL_z} + \cdots + \frac{conc_i}{SSL_i}\right) \times 10^{-5}$$

$$Site\ Hazard\ Index\ (HI) = \left(\frac{conc_x}{SSL_x} + \frac{conc_y}{SSL_y} + \frac{conc_z}{SSL_z} + \cdots + \frac{conc_i}{SSL_i}\right) \times 1$$

7.2 Recommendations

Western has recently conducted an investigation of background locations and will attempt to establish site-specific background values for various naturally occurring constituents (e.g., arsenic, chromium and cobalt in soils). After background values have been established, the site data for arsenic, chromium, and cobalt should be reassessed to determine if some analytical results are actually representative of background conditions and not site-related impacts. If some of the highest chromium values exceed background concentrations, then these locations may need to be reassessed to determine if chromium in soils is present as chromium III or VI.

The organic constituents detected in soils above screening levels all appear to be at depths that associate the impacts with impacted groundwater and not a soil source that has resulted from leaks in the underground piping with the single exception of sample SWMU 3-3 (3.5-4.5'). The elevated concentrations of organics deep within the subsurface are best addressed through groundwater remediation efforts conducted as part of the various SWMUs and AOCs with which the groundwater contamination is associated. Chloroform was detected in only one soil sample [SWMU 3-3 (3.5-4.5)] above the DAF screening level (0.062 vs. 0.00725 mg/kg) and no other constituents that would be more likely to be associated with a release of petroleum hydrocarbons (e.g., BTEX) are detected at concentrations above the screening levels in this sample. The detection of chloroform in soil sample SWMU 3-3 (3.5-4.5') does not appear to indicate a release from the adjacent underground pipeline.

The sampling data does not indicate any releases from the underground pipelines investigated as part of Group 8. Western recommends that SWMUs 3 and 6 be approved for Corrective Action Complete Without Controls once a demonstration is made that chromium does not pose an unacceptable threat.

Section 8
References

Groundwater Technology Inc., 1994, RCRA Facility Investigation/Corrective Measures Study Report Bloomfield Refining Company #50 County Road 4990 Bloomfield, New Mexico, p.51.

Western Refining Southwest, Inc., 2010, Groundwater Remediation and Monitoring Annual Report, Bloomfield Refinery Bloomfield New Mexico, p.37.

Western Refining Southwest, Inc. 2011, Investigation Report Group 5 (SWMU No. 15 Tank Farm Area, p. 42.

Tables

Table 1
Description and Inspection Schedule of Underground Pipelines
SWMU Group 8 Investigation Report
Western Refining Southwest - Bloomfield Refinery

Line Number	Description (Service)	Line Size (inch)	Line Length (feet)	Starting Location	End Location	Drawing Reference	Construction Material	Inspection Scheduled	Inspection Date	Inspection Results Pass/Fail	Test/ Inspection Method	Repairs/Maint Needed	Repairs-Maint Completion date
1	Effluent Wtr. Transfer Line	6	3000	Effilent Pond Outlet Pump P-616	North Evaporation Pond	D-500-800-031	PVC	2010	Jul-10	Pass	Hydrtest	None	N/A
2	Effluent Wtr. Trans. Pump	6	908	North Evaporation Pond Outlet	Effilent Transfer Pump P-671	D-500-800-031	PVC	2012					
3	Effluent Wtr. Transfer Line	6	2,797	Effilent Trans. Pump Disch.	Injection Well Building	D-500-800-031	PVC	2012	Oct-09	Pass	Hydrostatic	None	N/A
4	Injection Well Recir. Line	6	910	Injection Well Building	North Evaporation Pond	D-500-800-031	PVC	2012					
5	River Terrace Transfer Line	2	911	River Terrace Processing Skid	River Pump Building Water Basin	D-500-800-043	PVC	2012					
6	Crude Transfer Line	12	912	Pipe Rack East Of LPG Stg Tks.	Pipe Rack Southwest of Tk. # 31	N/A	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
7	Steam Header at Terminals	6	913	Pipe Rack Southwest of Tk. # 31	Pipe Rack East Of LPG Stg. Tks.	N/A	Carbon steel	2011					
8	Condensate Return Header	4	914	Pipe Rack East Of LPG Stg Tks.	Pipe Rack Southwest of Tk. # 31	N/A	Carbon steel	2011					
9	C-4 To Blend	4	218	Pipe Rack East Of LPG Bullets	Pipe Rack Southwest of Tk. # 31	N/A	Carbon steel	*Temporarily Out of Service					
10	ULSD Sales Line	12	916	Pipe Rack Southwest of Tk. # 31	Filter Pad Area North Of Loading Pad	N/A	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
11	Unleaded Gasoline Sales	12	917	Pipe Rack Southwest of Tk. # 31	Filter Pad Area North Of Loading Pad	N/A	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
12	Naphtha Sales from Tk #35	12	980	Pipe Rack Southwest of Tk. # 31	Filter Pad Area North Of Loading Pad	N/A	Carbon steel	out of service					
13	Lite Straight Run Product	4	218	Pipe Rack Southwest of Tk. # 31	Rack Area North Of B-23	N/A	Carbon steel	2011					
14	Poly Material To Storage	3	275	Pipe Rack Southwest of Tk. # 31	Area Northeast of B-21	N/A	Carbon steel	*Temporarily Out of Service					
15	Poly Unit Feed Line	3	275	Area Northeast of B-21	Pipe Rack Southwest of Tk. # 31	N/A	Carbon steel	*Temporarily Out of Service					
16	LPG Rerun Line	2	275	Area Northeast of B-21	Pipe Rack Southwest of Tk. # 31	N/A	Carbon steel	*Temporarily Out of Service					
17	Saturate To Storage	2	275	Pipe Rack Southwest of Tk. # 31	Area Northeast of B-21	N/A	Carbon steel	*Temporarily Out of Service					
18	C-4 To Storage	2	275	Pipe Rack Southwest of Tk. # 31	Area Northeast of B-21	N/A	Carbon steel	*Temporarily Out of Service					
19	C-3 To Storage	2	275	Pipe Rack Southwest of Tk. # 31	Area Northeast of B-21	N/A	Carbon steel	*Temporarily Out of Service					
20	JP-8 Sales Line	8	388	Pipe Rack Southwest of Tk. # 31	Out Of Service	N/A	Carbon steel	out of service					
21	Off Road Diesel Sales From Tk.18	6	389	Pipe Rack Southwest of Tk. # 31	Filter Pad Area North Of Loading Pad	N/A	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
22	Slop Line ToTk. # 22	4	390	Area Northeast of B-21	Out of Service	N/A	Carbon steel	out of service					
23	Isomerate/Naptha Line	6	699	Low Rack West Of Tk.# 25	Area West of B-12	D-000-900-023	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
24	Sub Grade Gasoine (Tk #32)	8	392	Pipe Rack West Of Tk.# 36	Filter Pad Area North Of Loading Pad	N/A	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A

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25	Premium Sales from Tk.s # 3 & 4	6	393	Pipe Rack West Of Tk.# 36	Filter Pad Area North Of Loading Pad	N/A	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
26	Naptha to VRU	4	313	Crude Line East of B-21	Manifold @ VRU Unit	NewTech 595-M-601	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
27	Naphta Feed To VRU Unit	4	223	Transfer Pump @ Tk. # 44	Manifold @ VRU Unit	NewTech 595-M-601	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
28	Naptha Fill/Rerun To Tk. #44	4	223	Manifold @ VRU Unit	Naptha Fill Line To Tk. # 44	NewTech 595-M-601	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
29	Off-Road Diesel To Bays #1 & 2	8	397	From F-706 Filter Piping	To Meter Spools @ Bays # 1&2	D-700-500-118	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
30	(Old Kerosene) To Bay # 3	6	398	From F-706 Filter Piping	To Meter Spools @ Bays # 3	D-700-500-118	Carbon steel	2011					
31	Premiun Sales Line	10	399	From F-705 Filter Piping	To Meter Spools @ Bays # 1,2 & 3	D-700-500-118	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
32	Unleaded GasolineSales Line	10	400	From F-704 Filter Piping	To Meter Spools @ Bays # 1,2 & 3	D-700-500-118	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
33	ULSD To Bay # 4	8	401	From F-703 Filter Piping	To Meter Spool @ Bay # 4	D-700-500-123	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
34	Ethanol Pump Suction Line	8	330	From Tk. # 45 Outlet Nozzel	To P-707 & P-707A Pump Suction	D-700-500-140	Carbon steel	2011					
35	Ethanol Unloading Line	4	330	From P-706 Pump Discharge	To Tk. # 45 Inlet Nozzel	D-700-500-140	Carbon steel	2011					
36	Naphtha Unloading Line	6	420	Suction Manifold @ P-607A	Unloading line @ Tk. #18 and 19	B-600-500-296	Carbon steel	2007	Sep-07	Pass		None	N/A
37	Naptha Rundown To Tk.# 35	3	99	Line From North Pipe Rack Area	To Tk. # 35 Fill Nozzle	B-600-500-232	Carbon steel	*Temporarily Out of Service					
38	Naptha Feed Line to Unit	4	99	From P-607A Pump Discharge	To North Pipe Rack Feed To Units	B-600-500-236	Carbon steel	*Temporarily Out of Service					
81	Crude Transfer Line	12	99	Pipe Rack East Of LPG Stg Tks.	Pipe Rack South of Crude Unloading Bays	D-000-900-023	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
82	Crude Transfer Line	12	194	Pipe Rack South of Crude Unloading Bays	Berm South of Tank #43	D-000-900-023	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
83	Groundwater Recovery Transfer Line	4	822	Discharge at Tk #37	Valve box at corner Northeast of DHT	AMEC 6/7	Carbon Steel/PVC	2010	Jul-10	Pass	Hydrtest	None	N/A
84	Premium Sales Line from Tk #3 & 4	8	300	Area West of API Separator	DHT Option City		Carbon Steel	2007	Nov-07	Pass	Praxair	None	N/A
85	Diesel Reciepts	6	25	Roadway SW of Tk #17	Piperack btwn Tk #34 and Tk #25	D-800-600-104	Carbon Steel	2010	Jun-10	Pass	Hydrotest	None	N/A
86	Premium/Uneaded Reciepts	6	25	Roadway SW of Tk #17	Piperack btwn Tk #34 and Tk #25	D-800-600-099 D-600-800-113	Carbon Steel	2010	Jun-10	Pass	Hydrotest	None	N/A
87	Groundwater Recovery Transfer Line	3	970	Tk #38	Slop Line NE of Tk #31	D-600-800-121	Carbon Steel	2010	Aug-10	Pass	Hydrotest	None	N/A

*All lines that are temporarily out of service due to suspension of refining operations were steamed out and are hydrocarbon free

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	AOC 22-15 (1.0-1.5')	AOC 22-15 (1.5-2.0')	AOC 22-15 (30-32')	AOC 22-15 (34-36')	AOC 26-8 (0-1.0')	AOC 26-8 (1.5-2.0')	AOC 26-8 (32-36')	SWMU 7-1 (0-0.5')	SWMU 7-1 (10-12')	SWMU 7-1 (4-5')	SWMU 7-1 (5-7')	SWMU 8-6 (0-0.5')	SWMU 8-6 (1.5-2.0')	SWMU 8-6a (33-34)	SWMU 8-8 (0-0.5')	SWMU 8-8 (1.5-2.0')	SWMU 8-10 (0-0.5')	SWMU 8-10 (1.5-2.0')	SWMU 10-1 (0-0.5')	SWMU 10-1 (1.5-2.0')	SWMU 10-2 (0-0.5')
							4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/16/2009	4/16/2009	4/16/2009	8/17/2010	8/17/2010	8/17/2010	8/17/2010	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	8/17/2010	8/17/2010	8/17/2010
Metals (mg/kg)																											
Antimony	3.13E+01	(1)	1.24E+02	(5)	7.44E+00	(8)	<2.5	<2.5	<2.5	<2.5	<13	<2.5	<2.5	<5.0	<5.0	<5.0	<2.5	<2.6	<2.7	<2.9	<2.6	<2.6	<2.6	<2.6	<2.5	<2.5	<2.5
Arsenic	3.90E+00	(1)	1.77E+01	(4)	1.48E-01	(8)	<13	<2.5	<2.5	<2.5	<13	<2.5	<2.5	<5.0	<5.0	<5.0	3.1	<2.6	3	<2.9	<2.6	<2.6	3	<2.6	<2.5	<2.5	2.7
Barium	1.56E+04	(1)	4.35E+03	(5)	3.39E+03	(8)	160	160	190	230	380	280	230	120	200	150	110	210	200	130	190	180	440	350	75	59	61
Beryllium	1.56E+02	(1)	1.44E+02	(5)	6.49E+02	(8)	0.26	0.39	0.18	<0.15	<0.75	0.29	<0.15	0.37	0.42	0.42	0.29	0.43	0.44	<0.18	0.42	0.43	0.5	0.47	0.29	0.17	0.22
Cadmium	7.03E+01	(1)	2.77E+02	(5)	1.55E+01	(8)	<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	<0.20	<0.20	<0.20	<0.10	<0.11	<0.11	<0.12	<0.11	<0.11	<0.11	<0.10	<0.10	<0.10	<0.10
Chromium III	1.17E+05	(1)	4.65E+05	(5)	1.11E+09	(8)	4.4	4.8	4.7	2.2	2.4	4.2	2.5	6.3	6.6	14	4.2	85	100	7.7	83	100	6.1	6.4	4.2	2.7	3.1
Chromium VI	2.97E+00	(1)	6.31E+01	(4)	9.34E-02	(8)	**4.4**	**4.8**	**4.7**	2.2	2.4	**4.2**	2.5	**6.3**	**6.6**	**14**	**4.2**	**85**	**100**	**7.7**	**83**	**100**	**6.1**	**6.4**	**4.2**	2.7	**3.1**
Cobalt	2.30E+01	(2)	3.00E+02	(6)	5.51E+00	(9)	3.5	3.8	2.9	2.2	3.1	3.5	2.3	3.2	3.9	3.5	1.8	4.2	4.5	2.2	4.1	4	4.8	5.4	2.2	1.5	1.9
Cyanide	4.69E+01	(1)	1.86E+02	(5)	2.48E+00	(8)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50	<0.50
Lead	4.00E+02	(1)	8.00E+02	(4)	-	-	5.3	4.3	3.9	2.1	2.8	3.2	3.1	4.7	4	5	1.4	6.1	5.6	3.8	5.8	5.7	5.1	4.8	2.6	2.3	2.3
Mercury	1.56E+01	(1)	1.36E+01	(5)	3.68E-01	(8)	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.17	<0.033	0.64	<0.033	0.046	0.045	<0.039	0.044	0.053	<0.035	<0.035	<0.033	<0.033	<0.033
Nickel	1.56E+03	(1)	6.19E+03	(5)	5.36E+02	(8)	5	5.7	3.8	1.7	3	4.8	1.8	4.7	5.1	6.1	3	8.5	7.8	2.2	7.4	7	7.2	7.1	3.5	2.9	2.8
Selenium	3.91E+02	(1)	1.55E+03	(5)	1.09E+01	(8)	<13	<13	<2.5	<2.5	<13	<12	<12	<5.0	<5.0	<5.0	<2.5	<26	<27	<2.9	<26	<26	<26	<26	<2.5	<2.5	<2.5
Silver	3.91E+02	(1)	1.55E+03	(5)	1.76E+01	(8)	<0.25	<0.25	<0.25	<0.25	<1.3	<0.25	<0.25	<0.50	<0.50	<0.50	<0.25	<0.26	<0.27	<0.29	<0.26	<0.26	<0.26	<0.26	<0.25	<0.25	<0.25
Vanadium	3.91E+02	(1)	1.55E+03	(5)	2.05E+03	(8)	12	15	15	11	<13	13	10	17	24	18	12	18	18	12	17	16	20	22	13	8.5	9.3
Zinc	2.35E+04	(1)	9.29E+04	(5)	7.67E+03	(8)	18	24	21	12	22	24	14	28	24	69	13	89	88	14	84	84	32	32	16	11	12
Volatile Organic Compounds - (EPA Method 8260) mg/kg																											
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,1,2,2-Tetrachloroethane	8.02E+00	(1)	4.35E+01	(4)	2.80E-05	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,1-Dichloropropene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2,3-Trichlorobenzene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	--	--	--	0.69	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	--	--	--	0.26	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,3-Dichlorobenzene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	--	--	<0.20	--	--	--	--	--	--	--
1-Methylnaphthalene	2.20E+01	(3)	9.90E+02	(7)	1.69E-01	(9)	--	--	--	--	--	--	--	--	--	<0.20	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
2,2-Dichloropropane	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	--	--	--	--	--	--	--	--	--	<0.50	--	<0.00467	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446	--	--	--
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
2-Hexanone	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.50	--	<0.00467	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446	--	--	--
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	--	--	--	--	--	--	--	--	--	<0.20	--	--	--	<0.20	--	--	--	--	--	--	--
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
4-Isopropyltoluene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
4-Methyl-2-pentanone	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.50	--	<0.00467	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446	--	--	--
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	--	--	--	--	--	--	--	--	--	<0.75	--	0.0669	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446	--	--	--
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	--	--	--	--	--	--	--	--	--	<0.50	--	<0.00467	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446	--	--	--
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Chloroethane	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
cis-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+03	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	AOC 22-15 (1.0-1.5')	AOC 22-15 (1.5-2.0')	AOC 22-15 (30-32')	AOC 22-15 (34-36')	AOC 26-8 (0-1.0')	AOC 26-8 (1.5-2.0')	AOC 26-8 (32-36')	SWMU 7-1 (0-0.5')	SWMU 7-1 (10-12')	SWMU 7-1 (4-5')	SWMU 7-1 (5-7')	SWMU 8-6 (0-0.5')	SWMU 8-6 (1.5-2.0')	SWMU 8-6a (33-34)	SWMU 8-8 (0-0.5')	SWMU 8-8 (1.5-2.0')	SWMU 8-10 (0-0.5')	SWMU 8-10 (1.5-2.0')	SWMU 10-1 (0-0.5')	SWMU 10-1 (1.5-2.0')	SWMU 10-2 (0-0.5')
							4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/16/2009	4/16/2009	4/16/2009	8/17/2010	8/17/2010	8/17/2010	8/17/2010	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	8/17/2010	8/17/2010	8/17/2010
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	--	--	--	--	--	--	--	--	--	<0.15	--	<0.00234	<0.00225	<0.00249	<0.00224	<0.00232	<0.00238	<0.00223	--	--	--
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
n-Butylbenzene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
n-Propylbenzene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
sec-Butylbenzene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
tert-Butylbenzene	-	-	-	-	-	-	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
trans-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	0.00214	<0.00112	<0.00124	<0.00112	0.00417	<0.00119	<0.00112	--	--	--
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	--	--	--	--	--	--	--	--	--	<0.050	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	--	--	--	--	--	--	--	--	--	<0.10	--	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112	--	--	--
Volatile Organic Compounds - (EPA Method 8260) mg/kg																											
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,1,2,2-Tetrachloroethane	-	(1)	2.90E+00	(6)	2.80E-05	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloropropene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	<0.000924	<0.001	<0.000976	--	0.00433	<0.00109	0.0032	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	<0.000924	<0.001	<0.000976	--	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
2,2-Dichloropropane	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	<0.0037	<0.00401	<0.0039	<0.00403	<0.00371	<0.00436	0.00958	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	-	-	-	-	-	-	<0.0037	<0.00401	<0.0039	<0.00403	<0.00371	<0.00436	<0.00365	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Isopropyltoluene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	--	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	-	-	-	-	-	-	<0.0037	<0.00401	<0.0039	<0.00403	<0.00371	<0.00436	<0.00365	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	0.00984	0.00614	0.015	0.205	<0.00371	<0.00436	0.0424	0.00342	0.0115	--	<0.00173	--	--	--	--	--	--	--	--	<0.00188	0.00567	<0.00208
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000966	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	<0.0037	<0.00401	<0.0039	<0.00403	<0.00371	<0.00436	<0.00365	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Chloroethane	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
cis-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	--	<0.000865	--	--	--	--	--	--	--	--	<0.000942	<0.000931	<0.00104

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	AOC 22-15 (1.0-1.5')	AOC 22-15 (1.5-2.0')	AOC 22-15 (30-32')	AOC 22-15 (34-36')	AOC 26-8 (0-1.0')	AOC 26-8 (1.5-2.0')	AOC 26-8 (32-36')	SWMU 7-1 (0-0.5')	SWMU 7-1 (10-12')	SWMU 7-1 (4-5')	SWMU 7-1 (5-7')	SWMU 8-6 (0-0.5')	SWMU 8-6 (1.5-2.0')	SWMU 8-6a (33-34)	SWMU 8-8 (0-0.5')	SWMU 8-8 (1.5-2.0')	SWMU 8-10 (0-0.5')	SWMU 8-10 (1.5-2.0')	SWMU 10-1 (0-0.5')	SWMU 10-1 (1.5-2.0')	SWMU 10-2 (0-0.5')
							4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/16/2009	4/16/2009	4/16/2009	8/17/2010	8/17/2010	8/17/2010	8/17/2010	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	8/17/2010	8/17/2010	8/17/2010
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	<0.000924	<0.001	<0.000976	<0.00005	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	<0.000924	<0.001	<0.000976	<0.00005	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	<0.000924	<0.001	0.0281	0.00707	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	0.0163	0.011	0.0121	0.0156	0.00824	0.00976	0.00838	0.0266	0.0303	–	0.0294	–	–	–	–	–	–	–	–	0.0037	0.00687	0.00338
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.000924	<0.001	<0.000976	0.0001	0.00182	<0.00109	0.00234	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
n-Butylbenzene	-	-	-	-	-	-	*<0.000924*	*<0.001*	*<0.000976*	*0.00015*	*<0.000928*	*<0.00109*	*<0.000912*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
n-Propylbenzene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	0.000084	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
sec-Butylbenzene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00005	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
tert-Butylbenzene	-	-	-	-	-	-	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	<0.000924	<0.001	<0.000976	0.00159	0.00392	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	–	<0.000942	<0.000931	0.00115
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
trans-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	<0.000924	<0.001	<0.000976	<0.00101	<0.000928	<0.00109	<0.000912	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	<0.000924	<0.001	<0.000976	0.00022	<0.000928	<0.00109	0.00254	<0.000923	<0.00104	–	<0.000865	–	–	–	–	–	–	–	–	<0.000942	<0.000931	<0.00104
Semi Volatile Organics - (EPA Method 8270) mg/kg																												
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
1,3-Dichlorobenzene	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	6.11E+03	(1)	2.38E+04	(5)	1.17E+02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
2,4,6-Trichlorophenol	6.11E+01	(1)	2.38E+02	(5)	1.17E+00	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
2,4-Dichlorophenol	1.83E+02	(1)	7.15E+02	(5)	1.12E+00	(8)	<2.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<2.0	<0.40	<2.1	<2.1	<0.47	<2.1	<2.1	<0.42	<0.42	<0.40	<0.40	<0.40
2,4-Dimethylphenol	1.22E+03	(1)	4.76E+03	(5)	7.48E+00	(8)	<1.5	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<1.5	<0.30	<1.6	<1.6	<0.35	<1.6	<1.6	<0.32	<0.31	<0.30	<0.30	<0.30
2,4-Dinitrophenol	1.22E+02	(1)	4.76E+02	(5)	7.10E-01	(8)	<2.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<2.0	<0.40	<2.1	<2.1	<0.47	<2.1	<2.1	<0.42	<0.42	<0.40	<0.40	<0.40
2,4-Dinitrotoluene	1.57E+01	(1)	6.18E+01	(4)	2.53E-02	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
2,6-Dinitrotoluene	6.11E+01	(1)	2.38E+02	(5)	4.33E-01	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
2-Chloronaphthalene	-	(1)	8.20E+04	(6)	2.03E+02	(9)	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	–	–	–	–	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26	<0.25	<0.25	<0.25
2-Chlorophenol	3.91E+02	(1)	1.55E+03	(5)	1.30E+00	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<1.3	<0.25	<0.25	0.63	<0.25	<0.25	<0.25	–	–	–	–	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26	<0.20	<0.20	<0.20
2-Methylphenol	3.10E+03	(2)	3.10E+04	(6)	2.25E+01	(9)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
2-Nitroaniline	1.80E+02	(2)	1.80E+03	(6)	3.71E-01	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
2-Nitrophenol	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
3,3'-Dichlorobenzidine	1.08E+01	(1)	4.26E+01	(4)	8.33E-02	(8)	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	–	–	–	–	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26	<0.25	<0.25	<0.25
3+4-Methylphenol	3.10E+02	(2)	3.10E+03	(6)	2.14E+00	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
3-Nitroaniline	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
4-Bromophenyl phenyl ether	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
4-Chloro-3-methylphenol	-	-	-	-	-	-	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
4-Chloroaniline	2.40E+00	(3)	8.60E+01	(7)	1.35E-03	(9)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
4-Nitroaniline	2.40E+01	(3)	8.60E+02	(7)	1.13E-02	(9)	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	–	–	–	–	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26	<0.25	<0.25	<0.25
4-Nitrophenol	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Acenaphthene	3.44E+03	(1)	1.86E+04	(5)	1.90E+02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Acenaphthylene	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Aniline	8.50E+01	(3)	3.00E+03	(7)	3.83E-02	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Anthracene	1.72E+04	(1)	6.68E+04	(5)	3.04E+03	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Azobenzene	4.90E+00	(3)	2.20E+02	(7)	5.74E-03	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Benz(a)anthracene	1.48E+00	(1)	2.34E+01	(4)	8.81E-01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Benzo(a)pyrene	1.48E-01	(1)	2.34E+00	(4)	2.92E-01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	**1.3**	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Benzo(b)fluoranthene	1.48E+00	(1)	2.34E+01	(4)	2.98E+00	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	-	-	-	-	-	-	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
Benzo(k)fluoranthene	1.48E+01	(1)	2.34E+02	(4)	2.92E+01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Benzoic acid	2.40E+05	(2)	2.50E+06	(6)	3.71E+02	(9)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
Benzyl alcohol	3.10E+04	(2)	3.10E+05	(6)	4.73E+01	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Bis(2-chloroethoxy)methane	1.80E+02	(2)	1.80E+03	(6)	2.59E-01	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Bis(2-chloroethyl)ether	2.68E+00	(1)	1.42E+01	(4)	2.96E-04	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	4.54E+02	(4)	2.62E-02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Bis(2-ethylhexyl)phthalate	3.47E+02	(1)	1.37E+03	(4)	9.70E+01	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
Butyl benzyl phthalate	2.60E+02	(3)	9.10E+03	(7)	7.54E+00	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	AOC 22-15 (1.0-1.5')	AOC 22-15 (1.5-2.0')	AOC 22-15 (30-32')	AOC 22-15 (34-36')	AOC 26-8 (0-1.0')	AOC 26-8 (1.5-2.0')	AOC 26-8 (32-36')	SWMU 7-1 (0-0.5')	SWMU 7-1 (10-12')	SWMU 7-1 (4-5')	SWMU 7-1 (5-7')	SWMU 8-6 (0-0.5')	SWMU 8-6 (1.5-2.0')	SWMU 8-6a (33-34)	SWMU 8-8 (0-0.5')	SWMU 8-8 (1.5-2.0')	SWMU 8-10 (0-0.5')	SWMU 8-10 (1.5-2.0')	SWMU 10-1 (0-0.5')	SWMU 10-1 (1.5-2.0')	SWMU 10-2 (0-0.5')
							4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/16/2009	4/16/2009	4/16/2009	8/17/2010	8/17/2010	8/17/2010	8/17/2010	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	8/17/2010	8/17/2010	8/17/2010
Carbazole	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Chrysene	1.48E+02	(1)	2.34E+03	(4)	8.99E+01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	1.7	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	1.48E-01	(1)	2.34E+00	(4)	9.52E-01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Dibenzofuran	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Diethyl phthalate	4.89E+04	(1)	1.91E+05	(5)	1.09E+02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Dimethyl phthalate	6.11E+05	(1)	2.38E+06	(5)	9.06E+02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Di-n-butyl phthalate	6.11E+03	(1)	2.38E+04	(5)	7.84E+01	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	–	–	–	–	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
Di-n-octyl phthalate	-	-	-	-	-	-	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.25	<0.25	<0.25
Fluoranthene	2.29E+03	(1)	8.91E+03	(5)	1.37E+03	(8)	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.20	<0.20	<1.0	<0.20	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26	<0.20	<0.20	<0.20
Fluorene	2.29E+03	(1)	8.91E+03	(5)	2.29E+02	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.20	<0.20	<1.0	<0.20	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.20	<0.20	<0.20
Hexachlorobenzene	3.04E+00	(1)	1.20E+01	(4)	4.48E-02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Hexachlorobutadiene	6.20E+00	(3)	2.20E+02	(7)	2.14E-02	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Hexachlorocyclopentadiene	3.67E+02	(1)	8.11E+02	(5)	5.92E+00	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Hexachloroethane	4.28E+01	(1)	1.67E+02	(5)	9.20E-02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Indeno(1,2,3-cd)pyrene	1.48E+00	(1)	2.34E+01	(4)	9.71E+00	(8)	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.20	<0.20	<1.0	<0.20	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26	<0.20	<0.20	<0.20
Isophorone	5.12E+03	(1)	4.75E+04	(5)	2.16E+00	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Nitrobenzene	5.35E+01	(1)	3.00E+02	(4)	7.02E-03	(8)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
N-Nitrosodi-n-propylamine	6.90E-02	(3)	2.50E+00	(7)	1.24E-04	(9)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
N-Nitrosodiphenylamine	9.93E+02	(1)	3.91E+03	(4)	6.36E+00	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Pentachlorophenol	8.94E+00	(1)	3.00E+01	(4)	1.44E-01	(8)	<2.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<2.0	<0.40	<2.1	<2.1	<0.47	<2.1	<2.1	<0.42	<0.42	<0.40	<0.40	<0.40
Phenanthrene	1.83E+03	(1)	7.15E+03	(5)	3.21E+02	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	–	–	–	–	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Phenol	1.83E+04	(1)	6.88E+04	(5)	5.59E+01	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Pyrene	1.72E+03	(1)	6.68E+03	(5)	1.01E+03	(8)	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	1.9	<0.20	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21	<0.20	<0.20	<0.20
Pyridine	7.80E+01	(2)	1.00E+03	(6)	1.09E-01	(9)	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52	<0.50	<0.50	<0.50
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg																											
Diesel Range Organics (DRO)	1.00E+03	(11)	1.00E+03	(11)	1.00E+03	(11)	19	<10	<10	100	11	<10	<10	18	<10	470	<10	93	150	21	61	92	<11	<10	<10	19	280
Gasoline Range Organics (GRO)	–		–		–		<5.0	<5.0	<5.0	15	<5.0	<5.0	<5.0	81	<50	530	<50	<5.0	<5.0	<5.9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Motor Oil Range Organics (MRO)	3.00E+03	(12)	5.00E+03	(12)	3.00E+03	(12)	71	<50	<50	<50	160	64	<50	<5.0	<5.0	<5.0	<5.0	300	500	<59	200	270	<53	<52	<50	<50	<50
Ethanol							–	–	–	–	<1.0	<1.0	<1.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–

– No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)

EPA - Regional Screening Levels (April 2009)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels (April 2009)

(7) EPA Industrial - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(8) SoilGW NMED Dilution Attenuation Factor (DAF) = 11.25

(9) SoilGW Risk-based EPA DAF = 11.25

(10) SoilGW MCL-based EPA DAF = 11.25

(11) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "uknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

(12) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "Waste Oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Non-Residential Screening Level

yellow highlight represents value above Leachate (DAF) Screening Level

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 10-2 (1.5-2.0')	SWMU 15-3 (0.5-2.0')	SWMU 15-3 (2-4')
							8/17/2010	8/19/2010	8/24/2010
Metals (mg/kg)									
Antimony	3.13E+01	(1)	1.24E+02	(5)	7.44E+00	(8)	<2.5	<5.0	--
Arsenic	3.90E+00	(1)	1.77E+01	(4)	1.48E-01	(8)	2.6	**5.5**	--
Barium	1.56E+04	(1)	4.35E+03	(5)	3.39E+03	(8)	60	220	--
Beryllium	1.56E+02	(1)	1.44E+02	(5)	6.49E+02	(8)	0.22	0.56	--
Cadmium	7.03E+01	(1)	2.77E+02	(5)	1.55E+01	(8)	<0.10	<0.20	--
Chromium III	1.17E+05	(1)	4.65E+05	(5)	1.11E+09	(8)	3	8.6	--
Chromium VI	2.97E+00	(1)	6.31E+01	(4)	9.34E-02	(8)	**3**	**8.6**	--
Cobalt	2.30E+01	(2)	3.00E+02	(6)	5.51E+00	(9)	1.8	4.9	--
Cyanide	4.69E+01	(1)	1.86E+02	(5)	2.48E+00	(8)	<0.50	<0.50	--
Lead	4.00E+02	(1)	8.00E+02	(4)	-	-	2.1	5.3	--
Mercury	1.56E+01	(1)	1.36E+01	(5)	3.68E-01	(8)	<0.033	<0.033	--
Nickel	1.56E+03	(1)	6.19E+03	(5)	5.36E+02	(8)	2.7	7.5	--
Selenium	3.91E+02	(1)	1.55E+03	(5)	1.09E+01	(8)	<2.5	<5.0	--
Silver	3.91E+02	(1)	1.55E+03	(5)	1.76E+01	(8)	<0.25	<0.50	--
Vanadium	3.91E+02	(1)	1.55E+03	(5)	2.05E+03	(8)	9.2	26	--
Zinc	2.35E+04	(1)	9.29E+04	(5)	7.67E+03	(8)	11	38	--
Volatile Organic Compounds - (EPA Method 8260) mg/kg									
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	--	--	--
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	--	--	--
1,1,2,2-Tetrachloroethane	8.02E+00	(1)	4.35E+01	(4)	2.80E-05	(8)	--	--	--
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	--	--	--
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	--	--	--
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	--	--	--
1,1-Dichloropropene	-	-	-	-	-	-	--	--	--
1,2,3-Trichlorobenzene	-	-	-	-	-	-	--	--	--
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	--	--	--
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	--	--	--
	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	--	--	--
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	--	--	--
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	--	--	--
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	--	--	--
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	--	--	--
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	--	--	--
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	--	--	--
1,3-Dichlorobenzene	-	-	-	-	-	-	--	--	--
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	--	--	--
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	--	--	--
1-Methylnaphthalene	2.20E+01	(3)	9.90E+02	(7)	1.69E-01	(9)	--	--	--
2,2-Dichloropropane	-	-	-	-	-	-	--	--	--
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	--	--	--
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	--	--	--
2-Hexanone	-	-	-	-	-	-	--	--	--
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	--	--	--
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	--	--	--
4-Isopropyltoluene	-	-	-	-	-	-	--	--	--
4-Methyl-2-pentanone	-	-	-	-	-	-	--	--	--
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	--	--	--
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	--	--	--
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	--	--	--
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	--	--	--
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	--	--	--
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	--	--	--
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	--	--	--
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	--	--	--
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	--	--	--
Chloroethane	-	-	-	-	-	-	--	--	--
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	--	--	--
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	--	--	--
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	--	--	--
cis-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	--	--	--
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	--	--	--
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	--	--	--
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	--	--	--

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 10-2 (1.5-2.0')	SWMU 15-3 (0.5-2.0')	SWMU 15-3 (2-4')
							8/17/2010	8/19/2010	8/24/2010
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	--	--	--
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	--	--	--
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	--	--	--
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	--	--	--
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	--	--	--
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	--	--	--
n-Butylbenzene	-	-	-	-	-	-	--	--	--
n-Propylbenzene	-	-	-	-	-	-	--	--	--
sec-Butylbenzene	-	-	-	-	-	-	--	--	--
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	--	--	--
tert-Butylbenzene	-	-	-	-	-	-	--	--	--
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	--	--	--
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	--	--	--
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	--	--	--
trans-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	--	--	--
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	--	--	--
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	--	--	--
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	--	--	--
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	--	--	--
Volatile Organic Compounds - (EPA Method 8260) mg/kg									
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	<0.0011	<0.000924	--
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	<0.0011	<0.000924	--
1,1,2,2-Tetrachloroethane	-	(1)	2.90E+00	(6)	2.80E-05	(8)	<0.0011	<0.000924	--
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	<0.0011	<0.000924	--
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	<0.0011	<0.000924	--
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	--	--	--
1,1-Dichloropropene	-	-	-	-	-	-	--	--	--
1,2,3-Trichlorobenzene	-	-	-	-	-	-	--	--	--
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	<0.0011	<0.000924	--
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.0011	<0.000924	--
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	--	--	--
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	<0.0011	<0.000924	--
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	--	--	--
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.0011	<0.000924	--
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	--	--	--
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	<0.0011	<0.000924	--
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	<0.0011	<0.000924	--
1,3-Dichlorobenzene	-	-	-	-	-	-	--	--	--
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	--	--	--
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.0011	<0.000924	--
2,2-Dichloropropane	-	-	-	-	-	-	--	--	--
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	<0.0011	<0.000924	--
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	--	--	--
2-Hexanone	-	-	-	-	-	-	--	--	--
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	--	--	--
4-Isopropyltoluene	-	-	-	-	-	-	--	--	--
4-Methyl-2-pentanone	-	-	-	-	-	-	--	--	--
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	<0.0022	<0.00185	--
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	<0.0011	<0.000924	--
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	<0.0011	<0.000924	--
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	<0.0011	<0.000924	--
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	--	--	--
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	<0.0011	<0.000924	--
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	<0.0011	<0.000924	--
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	<0.0011	<0.000924	--
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	<0.0011	<0.000924	--
Chloroethane	-	-	-	-	-	-	--	--	--
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	<0.0011	<0.000924	--
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	<0.0011	<0.000924	--
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	<0.0011	<0.000924	--
cis-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	--	--	--
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	<0.0011	<0.000924	--
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	--	--	--
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	<0.0011	<0.000924	--

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 10-2 (1.5-2.0')	SWMU 15-3 (0.5-2.0')	SWMU 15-3 (2-4')
							8/17/2010	8/19/2010	8/24/2010
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	<0.0011	<0.000924	--
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	--	--	--
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	--	--	--
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	--	--	--
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	0.00494	<0.000924	--
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.0011	<0.000924	--
n-Butylbenzene	-	-	-	-	-	-	--	--	--
n-Propylbenzene	-	-	-	-	-	-	--	--	--
sec-Butylbenzene	-	-	-	-	-	-	--	--	--
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	<0.0011	<0.000924	--
tert-Butylbenzene	-	-	-	-	-	-	--	--	--
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	--	--	--
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	<0.0011	<0.000924	--
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	<0.0011	<0.000924	--
trans-1,3-Dichloropropene	-	(1)	8.40E+00	(6)	1.80E-03	(9)	--	--	--
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	<0.0011	<0.000924	--
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	<0.0011	<0.000924	--
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	<0.0011	<0.000924	--
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	<0.0011	<0.000924	--
Semi Volatile Organics - (EPA Method 8270) mg/kg									
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.20	<0.20	--
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.20	<0.20	--
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.20	<0.20	--
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.20	<0.20	--
2,4,5-Trichlorophenol	6.11E+03	(1)	2.38E+04	(5)	1.17E+02	(8)	<0.20	<0.20	--
2,4,6-Trichlorophenol	6.11E+01	(1)	2.38E+02	(5)	1.17E+00	(8)	<0.20	<0.20	--
2,4-Dichlorophenol	1.83E+02	(1)	7.15E+02	(5)	1.12E+00	(8)	<0.40	<0.40	--
2,4-Dimethylphenol	1.22E+03	(1)	4.76E+03	(5)	7.48E+00	(8)	<0.30	<0.30	--
2,4-Dinitrophenol	1.22E+02	(1)	4.76E+02	(5)	7.10E-01	(8)	<0.40	<0.40	--
2,4-Dinitrotoluene	1.57E+01	(1)	6.18E+01	(4)	2.53E-02	(8)	<0.50	<0.50	--
2,6-Dinitrotoluene	6.11E+01	(1)	2.38E+02	(5)	4.33E-01	(8)	<0.50	<0.50	--
2-Chloronaphthalene	-	(1)	8.20E+04	(6)	2.03E+02	(9)	<0.25	<0.25	--
2-Chlorophenol	3.91E+02	(1)	1.55E+03	(5)	1.30E+00	(8)	<0.20	<0.20	--
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.20	<0.20	--
2-Methylphenol	3.10E+03	(2)	3.10E+04	(6)	2.25E+01	(9)	<0.50	<0.50	--
2-Nitroaniline	1.80E+02	(2)	1.80E+03	(6)	3.71E-01	(9)	<0.20	<0.20	--
2-Nitrophenol	-	-	-	-	-	-	<0.20	<0.20	--
3,3'-Dichlorobenzidine	1.08E+01	(1)	4.26E+01	(4)	8.33E-02	(8)	<0.25	<0.25	--
3+4-Methylphenol	3.10E+02	(2)	3.10E+03	(6)	2.14E+00	(9)	<0.20	<0.20	--
3-Nitroaniline	-	-	-	-	-	-	<0.20	<0.20	--
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	<0.50	<0.50	--
4-Bromophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20	--
4-Chloro-3-methylphenol	-	-	-	-	-	-	<0.50	<0.50	--
4-Chloroaniline	2.40E+00	(3)	8.60E+01	(7)	1.35E-03	(9)	<0.50	<0.50	--
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20	--
4-Nitroaniline	2.40E+01	(3)	8.60E+02	(7)	1.13E-02	(9)	<0.25	<0.25	--
4-Nitrophenol	-	-	-	-	-	-	<0.20	<0.20	--
Acenaphthene	3.44E+03	(1)	1.86E+04	(5)	1.90E+02	(8)	<0.20	<0.20	--
Acenaphthylene	-	-	-	-	-	-	<0.20	<0.20	--
Aniline	8.50E+01	(3)	3.00E+03	(7)	3.83E-02	(9)	<0.20	<0.20	--
Anthracene	1.72E+04	(1)	6.68E+04	(5)	3.04E+03	(8)	<0.20	<0.20	--
Azobenzene	4.90E+00	(3)	2.20E+02	(7)	5.74E-03	(9)	<0.20	<0.20	--
Benz(a)anthracene	1.48E+00	(1)	2.34E+01	(4)	8.81E-01	(8)	<0.20	<0.20	--
Benzo(a)pyrene	1.48E-01	(1)	2.34E+00	(4)	2.92E-01	(8)	<0.20	<0.20	--
Benzo(b)fluoranthene	1.48E+00	(1)	2.34E+01	(4)	2.98E+00	(8)	<0.20	<0.20	--
Benzo(g,h,i)perylene	-	-	-	-	-	-	<0.20	<0.20	--
Benzo(k)fluoranthene	1.48E+01	(1)	2.34E+02	(4)	2.92E+01	(8)	<0.20	<0.20	--
Benzoic acid	2.40E+05	(2)	2.50E+06	(6)	3.71E+02	(9)	<0.50	<0.50	--
Benzyl alcohol	3.10E+04	(2)	3.10E+05	(6)	4.73E+01	(9)	<0.20	<0.20	--
Bis(2-chloroethoxy)methane	1.80E+02	(2)	1.80E+03	(6)	2.59E-01	(9)	<0.20	<0.20	--
Bis(2-chloroethyl)ether	2.68E+00	(1)	1.42E+01	(4)	2.96E-04	(8)	<0.20	<0.20	--
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	4.54E+02	(4)	2.62E-02	(8)	<0.20	<0.20	--
Bis(2-ethylhexyl)phthalate	3.47E+02	(1)	1.37E+03	(4)	9.70E+01	(8)	<0.50	<0.50	--
Butyl benzyl phthalate	2.60E+02	(3)	9.10E+03	(7)	7.54E+00	(9)	<0.20	<0.20	--

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 10-2 (1.5-2.0')	SWMU 15-3 (0.5-2.0')	SWMU 15-3 (2-4')
							8/17/2010	8/19/2010	8/24/2010
Carbazole	-	-	-	-	-	-	<0.20	<0.20	--
Chrysene	1.48E+02	(1)	2.34E+03	(4)	8.99E+01	(8)	<0.20	<0.20	--
Dibenz(a,h)anthracene	1.48E-01	(1)	2.34E+00	(4)	9.52E-01	(8)	<0.20	<0.20	--
Dibenzofuran	-	-	-	-	-	-	<0.20	<0.20	--
Diethyl phthalate	4.89E+04	(1)	1.91E+05	(5)	1.09E+02	(8)	<0.20	<0.20	--
Dimethyl phthalate	6.11E+05	(1)	2.38E+06	(5)	9.06E+02	(8)	<0.20	<0.20	--
Di-n-butyl phthalate	6.11E+03	(1)	2.38E+04	(5)	7.84E+01	(8)	<0.50	<0.50	--
Di-n-octyl phthalate	-	-	-	-	-	-	<0.25	<0.25	--
Fluoranthene	2.29E+03	(1)	8.91E+03	(5)	1.37E+03	(8)	<0.20	<0.20	--
Fluorene	2.29E+03	(1)	8.91E+03	(5)	2.29E+02	(8)	<0.20	<0.20	--
Hexachlorobenzene	3.04E+00	(1)	1.20E+01	(4)	4.48E-02	(8)	<0.20	<0.20	--
Hexachlorobutadiene	6.20E+00	(3)	2.20E+02	(7)	2.14E-02	(9)	<0.20	<0.20	--
Hexachlorocyclopentadiene	3.67E+02	(1)	8.11E+02	(5)	5.92E+00	(8)	<0.20	<0.20	--
Hexachloroethane	4.28E+01	(1)	1.67E+02	(5)	9.20E-02	(8)	<0.20	<0.20	--
Indeno(1,2,3-cd)pyrene	1.48E+00	(1)	2.34E+01	(4)	9.71E+00	(8)	<0.20	<0.20	--
Isophorone	5.12E+03	(1)	4.75E+04	(5)	2.16E+00	(8)	<0.50	<0.50	--
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.20	<0.20	--
Nitrobenzene	5.35E+01	(1)	3.00E+02	(4)	7.02E-03	(8)	<0.50	<0.50	--
N-Nitrosodi-n-propylamine	6.90E-02	(3)	2.50E+00	(7)	1.24E-04	(9)	<0.20	<0.20	--
N-Nitrosodiphenylamine	9.93E+02	(1)	3.91E+03	(4)	6.36E+00	(8)	<0.20	<0.20	--
Pentachlorophenol	8.94E+00	(1)	3.00E+01	(4)	1.44E-01	(8)	<0.40	<0.40	--
Phenanthrene	1.83E+03	(1)	7.15E+03	(5)	3.21E+02	(8)	<0.20	<0.20	--
Phenol	1.83E+04	(1)	6.88E+04	(5)	5.59E+01	(8)	<0.20	<0.20	--
Pyrene	1.72E+03	(1)	6.68E+03	(5)	1.01E+03	(8)	<0.20	<0.20	--
Pyridine	7.80E+01	(2)	1.00E+03	(6)	1.09E-01	(9)	<0.50	<0.50	--
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg									
Diesel Range Organics (DRO)	1.00E+03	(11)	1.00E+03	(11)	1.00E+03	(11)	46	<10	<10
Gasoline Range Organics (GRO)	--		--		--		<5.0	<5.0	<5.0
Motor Oil Range Organics (MRO)	3.00E+03	(12)	5.00E+03	(12)	3.00E+03	(12)	<50	<50	<50
Ethanol							--	--	--

-- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)

EPA - Regional Screening Levels (April 2009)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels (April 2009)

(7) EPA Industrial - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(8) SoilGW NMED Dilution Attenuation Factor (DAF) = 11.25

(9) SoilGW Risk-based EPA DAF = 11.25

(10) SoilGW MCL-based EPA DAF = 11.25

(11) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "uknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

(12) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "Waste Oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Non-Residential Screening Level

yellow highlight represents value above Leachate (DAF) Screening Level

Table 3
Ground Water Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	AOC 22-12 (GW)	AOC 22-12/TW-01	AOC 22-13 (GW)	MW-52	MW-52	MW-55	MW-56	MW-61	MW-61	MW-63	MW-63	MW-65	MW-65
Sample Date				4/14/2009	7/29/2009	4/9/2009	10/28/2008	1/8/2009	5/5/2009	5/5/2009	5/13/2009	7/16/2009	5/13/2009	7/15/2009	5/12/2009	7/16/2009
Metals																
Antimony	0.006	(2)	mg/L	<0.001	<0.005	<0.001	<0.001	<0.0010	--	--	0.002	<0.005	<0.001	<0.001	0.001	<0.005
Arsenic	0.01	(2)	mg/L	**0.013**	**0.031**	**0.017**	**0.043**	**0.075**	<0.020	<0.020	**0.041**	**0.024**	0.007	0.005	**0.021**	**0.024**
Barium	1	(3)	mg/L	0.88	0.44	0.73	**1.1**	0.099	0.6	**1.2**	0.29	0.28	0.15	0.027	0.15	0.074
Beryllium	0.004	(2)	mg/L	<0.0030	<0.0030	<0.0030	0.002	<0.0030	--	--	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Cadmium	0.005	(2)	mg/L	<0.0020	<0.0020	<0.0020	<0.001	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Calcium *	-		mg/L	--	210	--	258	220	36	130	--	120	--	420	--	240
Calcium, Dissolved	-		mg/L	140	150	180	--	--	35	130	110	120	390	410	230	260
Chromium	0.05	(3)	mg/L	<0.0060	<0.0060	0.013	0.03	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.0063	<0.0060	<0.0060	<0.0060
Cobalt	0.05	(3)	mg/L	0.0083	0.0084	0.024	0.05	0.028	--	--	<0.0060	<0.0060	0.013	<0.0060	<0.0060	<0.0060
Cyanide, Total	0.2	(3)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.0050	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron, Dissolved	1	(3)	mg/L	**2.2**	**5.9**	**24**	0.54	**4.7**	0.88	0.26	0.14	**1.6**	0.35	0.028	0.98	**4**
Iron, Total	-	(3)	mg/L	10	17	61		41	3.3	2.9	1.2	2.8	21	1.5	3.5	5.3
Lead	0.015	(2)	mg/L	<0.0050	**0.018**	**0.038**	**0.02**	<0.0050	0.0098	<0.0050	**0.025**	**0.042**	0.0097	<0.0050	<0.0050	<0.0050
Magnesium	-		mg/L	--	78	--	69	56	12	42	--	44	--	130	--	82
Magnesium, Dissolved	-		mg/L	61	70	81	--	--	11	36	37	45	110	120	79	84
Manganese	0.2	(3)	mg/L	--	**5.4**	--	4.86	6.1	1.6	3.6	3.2	4.3	--	**4.6**	**2.7**	**3.8**
Manganese, Dissolved	-	(3)	mg/L	3.4	3.7	3.9	--	--	--	--	--	4.4	3	4.4	--	3.9
Mercury	0.002	(3)	mg/L	<0.00020	<0.00020	0.00045	<0.001	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Nickel	0.2	(3)	mg/L	0.011	0.013	0.034	0.12	0.074	--	--	<0.010	<0.010	0.021	0.012	<0.010	<0.010
Potassium *	-		mg/L	--	3.6	--	--	--	6	3.5	--	1.9	--	4.6	--	3.4
Potassium, Dissolved	-		mg/L	3.8	5.1	3.7	6	4.2	6	3.1	1.7	2.1	4.7	4.1	3.8	3.9
Selenium	0.05	(3)	mg/L	<0.050	<0.005	<0.050	0.038	0.0095	<0.050	<0.050	<0.25	<0.001	<0.25	0.026	<0.050	<0.001
Silver	0.05	(3)	mg/L	<0.0050	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium *	-		mg/L	--	410	--	--	--	220	420	--	110	--	540	--	520
Sodium, Dissolved	-		mg/L	380	400	360	577	490	220	430	130	110	510	510	480	520
Vanadium	0.26	(1)	mg/L	<0.050	<0.050	<0.050	<0.1	<0.050	--	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Zinc	10	(3)	mg/L	0.027	0.054	0.051	0.18	<0.020	--	--	<0.020	<0.020	0.074	<0.020	<0.020	<0.020
Volatile Organic Compounds - (EPA Method 8260W)																
1,1,1,2-Tetrachloroethane	0.52	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,1,1-Trichloroethane	60	(3)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,1,2,2-Tetrachloroethane	10	(3)	µg/L	<100	<200	<200	<2.0	<2.0	<40	<10	<40	<20	<2.0	<2.0	<40	<20
1,1,2-Trichloroethane	5	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,1-Dichloroethane	25	(3)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,1-Dichloroethene	-	(3)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,1-Dichloropropene	-		µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,2,3-Trichlorobenzene	-		µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,2,3-Trichloropropane	0.0096	(1)	µg/L	<100	<200	<200	<2.0	<2.0	<40	<10	<40	<20	<2.0	<2.0	<40	<20
1,2,4-Trichlorobenzene	70	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,2,4-Trimethylbenzene	15	(1)	µg/L	**1500**	**1300**	**4800**	<1.0	<1.0	**510**	**340**	**2400**	**2900**	<1.0	<1.0	**1400**	**1300**
1,2-Dibromo-3-chloropropane	0.2	(2)	µg/L	<100	<200	<200	<2.0	<2.0	<40	<10	<40	<20	<2.0	<2.0	<40	<20
1,2-Dibromoethane (EDB)	0.05	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,2-Dichlorobenzene	600	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,2-Dichloroethane (EDC)	5	(2)	µg/L	**61**	<100	**220**	<1.0	<1.0	<20	<5.0	<20	<10	1.9	1.4	**220**	**270**
1,2-Dichloropropane	5	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,3,5-Trimethylbenzene	12	(1)	µg/L	**240**	<100	**1300**	<1.0	<1.0	**120**	**61**	**820**	**550**	<1.0	<1.0	**500**	**490**
1,3-Dichlorobenzene	-		µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1,3-Dichloropropane	730	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10

Table 3
Ground Water Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	AOC 22-12 (GW)	AOC 22-12/TW-01	AOC 22-13 (GW)	MW-52	MW-52	MW-55	MW-56	MW-61	MW-61	MW-63	MW-63	MW-65	MW-65
1,4-Dichlorobenzene	75	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
1-Methylnaphthalene	2.3	(1)	µg/L	<200	<400	<400	<4.0	<4.0	**100**	**210**	**270**	**150**	<4.0	<4.0	**150**	**130**
2,2-Dichloropropane	-		µg/L	<100	<200	<200	<2.0	<2.0	<40	<10	<40	<20	<2.0	<2.0	<40	<20
2-Butanone	7100	(1)	µg/L	<500	<1000	<1000	<10	<10	<200	50	<200	<100	<10	<10	<200	<100
2-Chlorotoluene	730	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
2-Hexanone	-		µg/L	<500	<1000	<1000	<10	<10	<200	<50	<200	<100	<10	<10	<200	<100
2-Methylnaphthalene	150	(1)	µg/L	<200	<400	**710**	<4.0	<4.0	120	**260**	**450**	**260**	<4.0	<4.0	**220**	**210**
4-Chlorotoluene	2600	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
4-Isopropyltoluene	-		µg/L	<50	<100	<100	<1.0	<1.0	<20	8.2	22	13	<1.0	<1.0	<20	<10
4-Methyl-2-pentanone	-		µg/L	<500	<1000	<1000	<10	<10	<200	<50	<200	<100	<10	<10	<200	<100
Acetone	22000	(1)	µg/L	<500	<1000	<1000	<10	<10	<200	82	1100	3000	<10	<10	<200	110
Benzene	5	(2)	µg/L	**8600**	**8200**	**13000**	<1.0	<1.0	**10000**	**2800**	**49**	**48**	<1.0	<1.0	**6800**	**5400**
Bromobenzene	20	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Bromodichloromethane	0.12	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Bromoform	8.5	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Bromomethane	8.7	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Carbon disulfide	1000	(1)	µg/L	<500	<1000	<1000	<10	<10	<200	<50	<200	<100	<10	<10	<200	<100
Carbon Tetrachloride	5	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Chlorobenzene	100	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Chloroethane	-		µg/L	<100	<200	<200	<2.0	<2.0	<40	<10	<40	<20	<2.0	<2.0	<40	<20
Chloroform	100	(3)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Chloromethane	190	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
cis-1,2-DCE	70	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
cis-1,3-Dichloropropene	-		µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Dibromochloromethane	0.15	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Dibromomethane	370	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Dichlorodifluoromethane	390	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Ethylbenzene	700	(2)	µg/L	**2100**	**2200**	**4300**	<1.0	<1.0	**1300**	310	**1400**	**1500**	<1.0	<1.0	**1800**	**1400**
Hexachlorobutadiene	0.86	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Isopropylbenzene (Cumene)	680	(1)	µg/L	69	190	240	<1.0	<1.0	55	42	100	70	<1.0	<1.0	84	81
Methyl tert-butyl ether (MTBE)	12	(1)	µg/L	**20000**	**23000**	**14000**	<1.0	<1.0	**1900**	**2100**	**380**	**410**	**48**	**54**	**1700**	**1700**
Methylene Chloride	5	(2)	µg/L	<150	<300	<300	<3.0	<3.0	<60	<15	<60	<30	<3.0	<3.0	<60	<30
Naphthalene	0.14	(1)	µg/L	**380**	**480**	**800**	<2.0	<2.0	**330**	**360**	**690**	**500**	<2.0	<2.0	**480**	**450**
n-Butylbenzene	-		µg/L	<50	<100	420	<1.0	<1.0	<20	16	110	97	<1.0	<1.0	49	85
n-Propylbenzene	-		µg/L	200	180	700	<1.0	<1.0	98	71	310	240	<1.0	<1.0	230	260
sec-Butylbenzene	-		µg/L	<50	<100	110	<1.0	<1.0	<20	11	<20	15	<1.0	<1.0	<20	14
Styrene	100	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
tert-Butylbenzene	-		µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Tetrachloroethene (PCE)	5	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Toluene	750	(3)	µg/L	**870**	380	**16000**	<1.0	<1.0	**760**	5.5	<20	11	<1.0	<1.0	**2500**	150
trans-1,2-DCE	100	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
trans-1,3-Dichloropropene	0.43	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Trichloroethene (TCE)	5	(2)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Trichlorofluoromethane	1300	(1)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Vinyl chloride	1	(3)	µg/L	<50	<100	<100	<1.0	<1.0	<20	<5.0	<20	<10	<1.0	<1.0	<20	<10
Xylenes, Total	620	(3)	µg/L	**6100**	**5000**	**23000**	<1.5	<1.5	**1500**	390	**7300**	**6800**	<1.5	<1.5	**8500**	**6400**
Semi Volatile Organics - (EPA Method 8270W)																
1,2,4-Trichlorobenzene	70	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
1,2-Dichlorobenzene	600	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50

Table 3
Ground Water Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	AOC 22-12 (GW)	AOC 22-12/TW-01	AOC 22-13 (GW)	MW-52	MW-52	MW-55	MW-56	MW-61	MW-61	MW-63	MW-63	MW-65	MW-65
1,3-Dichlorobenzene	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
1,4-Dichlorobenzene	75	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2,4,5-Trichlorophenol	3700	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2,4,6-Trichlorophenol	6.1	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2,4-Dichlorophenol	110	(1)	µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<100
2,4-Dimethylphenol	730	(1)	µg/L	30	<50	<10	<10	<10	<10	<10	<50	130	<10	<10	24	<50
2,4-Dinitrophenol	73	(1)	µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<100
2,4-Dinitrotoluene	0.22	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2,6-Dinitrotoluene	37	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2-Chloronaphthalene	2900	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2-Chlorophenol	180	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2-Methylnaphthalene	150	(1)	µg/L	81	71	100	<10	<10	53	85	**17000**	**1200**	<10	<10	**160**	130
2-Methylphenol	1800	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2-Nitroaniline	110	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
2-Nitrophenol	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
3,3'-Dichlorobenzidine	0.15	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
3+4-Methylphenol	180	(1)	µg/L	16	<50	10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
3-Nitroaniline	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
4,6-Dinitro-2-methylphenol	-		µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<100
4-Bromophenyl phenyl ether	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
4-Chloro-3-methylphenol	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
4-Chloroaniline	0.34	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
4-Chlorophenyl phenyl ether	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
4-Nitroaniline	3.4	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
4-Nitrophenol	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Acenaphthene	2200	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Acenaphthylene	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Aniline	12	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Anthracene	11000	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Azobenzene	0.12	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Benz(a)anthracene	0.029	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Benzo(a)pyrene	0.2	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Benzo(b)fluoranthene	0.029	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Benzo(g,h,i)perylene	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Benzo(k)fluoranthene	0.29	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Benzoic acid	150000	(1)	µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<100
Benzyl alcohol	18000	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Bis(2-chloroethoxy)methane	110	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Bis(2-chloroethyl)ether	0.012	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Bis(2-chloroisopropyl)ether	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Bis(2-ethylhexyl)phthalate	6	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	**140**	<50	<10	<10	<10	<50
Butyl benzyl phthalate	35	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Carbazole	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Chrysene	2.9	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Dibenz(a,h)anthracene	0.0029	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Dibenzofuran	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Diethyl phthalate	29000	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Dimethyl phthalate	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Di-n-butyl phthalate	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50

Table 3
Ground Water Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	AOC 22-12 (GW)	AOC 22-12/TW-01	AOC 22-13 (GW)	MW-52	MW-52	MW-55	MW-56	MW-61	MW-61	MW-63	MW-63	MW-65	MW-65
Di-n-octyl phthalate	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Fluoranthene	1500	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Fluorene	1500	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	300	<50	<10	<10	<10	<50
Hexachlorobenzene	1	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Hexachlorobutadiene	0.86	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Hexachlorocyclopentadiene	50	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Hexachloroethane	4.8	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Indeno(1,2,3-cd)pyrene	0.029	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Isophorone	71	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Naphthalene	0.14	(1)	µg/L	**250**	**220**	**110**	<10	<10	**200**	**120**	**7500**	**690**	<10	<10	**370**	**290**
Nitrobenzene	0.12	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
N-Nitrosodimethylamine	0.00042	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
N-Nitrosodi-n-propylamine	0.0096	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
N-Nitrosodiphenylamine	14	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Pentachlorophenol	1	(2)	µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<100
Phenanthrene	-		µg/L	<10	<50	<10	<10	<10	<10	<10	1500	130	<10	<10	<10	<50
Phenol	5	(3)	µg/L	**30**	<50	**19**	<10	<10	**15**	<10	<50	<50	<10	<10	**49**	<50
Pyrene	1100	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	58	<50	<10	<10	<10	<50
Pyridine	37	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<50
Alkalinity, Total (As CaCO3)	-		mg/L CaCO3	1100	1200	1200	260	500	570	1100	590	520	640	630	1000	990
Bicarbonate	-		mg/L CaCO3	1100	1200	1200	260	500	570	1100	590	520	640	630	1000	990
Bromide	-		mg/L	--			--	--	--	--						
Carbonate	-		mg/L CaCO3	<5.0	<5.0	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Chloride	250	(3)	mg/L	140	170	210	**450**	**580**	77	**270**	67	70	210	240	140	160
Fluoride	1.6	(3)	mg/L	--	0.28	--	--	--	0.56	0.56	0.38	0.39	0.19	0.17	0.21	0.24
Nitrate (As N)+Nitrite (As N)			mg/L	--	--	--	--	--	--	--	--	<1.0	72	--	<1.0	<1.0
Nitrogen, Nitrate (As N)	10	(2)	mg/L	0.12	0.19	0.15	2.1	2.2	0.32	8.1	<1.0	--	--	**74**	--	--
Nitrogen, Nitrite (As N)	1	(2)	mg/L	<1.0	<2.0	<1.0	**2.2**	<5.0	<0.10	<1.0	<1.0	--	--	<2.0	--	--
Sulfate	600	(3)	mg/L	56	39	110	**1000**	**760**	4	19	65	110	**1600**	**1500**	**790**	**950**
Phosphorus, Orthophosphate (As P)	-		mg/L	--	<0.50	--	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Dissolved Solids	1000	(3)	mg/L	**2500**	**1720**	**1700**	--	--	740	**1700**	820	872	**3500**	**3710**	**2300**	**2420**
Diesel Range Organics (DRO)	1.34	(4)	mg/L	**9.4**	**5.7**	**65**	<1.0	<1.0	**5.7**	**5.2**	**550**	**59**	<1.0	<1.0	**14**	**11**
Gasoline Range Organics (GRO)	1.34	(4)	mg/L	**84**	**54**	**190**	<0.050	<0.050	**42**	**16**	**24**	**30**	0.055	0.077	**42**	**43**
Motor Oil Range Organics (MRO)	-		mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0
Ethanol	-		mg/L	--	--	--	--	--	--	--	--	--	--	--	<1.0	<1.0

-- No screening level or analytical result available
450 - bolded value exceeds screening level
(1) EPA - Regional Screening Levels (April 2009) - EPA Screening Levels.Tap Water
(2) EPA - Regional Screening Levels (April 2009) - MCL
(3) NMED WQCC standards - Title 20 Chapter 6, Part 2, - 20.6.2.3101 Standards for Ground Water of 10,000 mg/l TDS Concentration or less
(4) NMED TPH Screening Guidelines Oct. 2006 - #3 and #6 fuel oil
* = General Chemistry analytes not required by Work Plan.

TABLE 4
Group 8 Soil Boring Samples - Vapor Screening Results
Bloomfield Refinery - Bloomfield, New Mexico

Sample Interval Depth	SWMU 3-1	SWMU 3-3	SWMU 3-4	SWMU 3-5	SWMU 3-6	SWMU 3-7	SWMU 3-8	SWMU 3-9	SWMU 3-10	SWMU 3-11
0 – 2'	4.1	29		0.0	4.9	126.7	0.0	0.0	3.0	0.0
2 – 4'	0.5	71.2	0.0	0.0	0.0	6.9	0.0	0.0	21.7	0.0
4 – 6'	0.0	21.7	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0
6 – 8'	0.0	123	8.6	0.0	0.0	0.2	0.0	0.0	0.0	0.0
8 –10'	0.0	81.4	38.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 – 12'		73	50.6		0.0		0.0	0.0	0.0	
12 – 14'		91.9	238				0.0	0.0		
14 – 16'		81					0.0	0.0		
16 – 18'		103.0						0.0		
18 – 20'		93.8								
20 – 22'		10.7								
22 – 24'		112.9								
24 – 26'		1379								
26 – 27'		1055								

Sample Interval Depth	SWMU 3-12	SWMU 3-13	SWMU 3-14	SWMU 3-15	SWMU 3-16	SWMU 3-17	SWMU 3-18	SWMU 3-19	SWMU 3-20
0 – 2'	19.6	0.0	9.7	0.0	1.7	0.0	0.6	0.0	7.4
2 – 4'	0.0	0.0	0.0	0.0	0.0	0.0	7.8	0.0	56
4 – 6'	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.8
6 – 8'	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.3
8 –10'	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	3.9
10 – 12'		0.0		0.0					2.3
12 – 14'									2.8
14 – 16'									1.4

Sample Interval Depth	SWMU 3-21	SWMU 3-22	SWMU 3-23	SWMU 3-24	SWMU 3-25	SWMU 3-26	SWMU 3-27	SWMU 3-28	SWMU 6-4
0 – 2'	1.1	0.0	6.3	0.0	0.0	0.0	0.1	0.0	0.1
2 – 4'	0.0	0.0	0.0	0.0		0.0		0.0	0.0
4 – 6'	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0
6 – 8'	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 –10'	0.0	0.0	0.0	0.0	0.0	0.0			0.0
10 – 12'	0.0		0.0	0.0					
12 – 14'			0.0						

UNITS - PPM

TABLE 5
Residential Soil Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

					Cross Media Soil-to-Ground Water			Cross Media Soil-to-Ground Water			
	NMED		EPA		NMED	EPA		NMED	EPA		
Analyte	Residential Soil (mg/kg)	Endpoint	Residential Soil (mg/kg)	ResSoil key	DAF1 (mg/kg)	GW_Risk-based SSL (mgkg)	GW_MCL-based SSL (mg/kg)	DAF (11.25) (mg/kg)	GW_Risk-based SSL (11.25) (mgkg)	GW_MCL-based SSL (11.25) (mg/kg)	Constituent Detected
Applicable depth interval	0-10'		0-2'		All depths			All depths			
Acenaphthene	3.44E+03	n	3.40E+03	n	1.69E+01	2.70E+01	-	1.90E+02	3.04E+02	-	N
Acenaphthylene	-	-	-	-	-	-	-	-	-	-	N
Acetone	6.66E+04	n	6.10E+04	n	3.86E+00	4.40E+00	-	4.34E+01	4.95E+01	-	N
Aniline	-	-	8.50E+01	c**	-	3.40E-03	-	-	3.83E-02	-	N
Anthracene	1.72E+04	n	1.70E+04	n	2.71E+02	4.50E+02	-	3.04E+03	5.06E+03	-	N
Antimony	3.13E+01	n	3.10E+01	n	6.61E-01	6.60E-01	2.70E-01	7.44E+00	7.43E+00	3.04E+00	N
Arsenic	3.90E+00	c	3.90E-01	c*	1.31E-02	1.30E-03	2.90E-01	1.48E-01	1.46E-02	3.26E+00	Y
Azobenzene	-	-	4.90E+00	c	-	5.10E-04	-	-	5.74E-03	-	N
Barium	1.56E+04	n	1.50E+04	n	3.01E+02	3.00E+02	8.20E+01	3.39E+03	3.38E+03	9.23E+02	Y
Benz(a)anthracene	1.48E+00	c	1.50E-01	c	7.83E-02	1.40E-02	-	8.81E-01	1.58E-01	-	N
Benzene	1.54E+01	c	1.10E+00	c*	1.73E-03	2.30E-04	2.80E-03	1.94E-02	2.59E-03	3.15E-02	Y
Benzo(a)pyrene	1.48E-01	c	1.50E-02	c	2.60E-02	4.60E-03	3.10E-01	2.92E-01	5.18E-02	3.49E+00	N
Benzo(b)fluoranthene	1.48E+00	c	1.50E-01	c	2.65E-01	4.70E-02	-	2.98E+00	5.29E-01	-	N
Benzo(g,h,i)perylene	-	-	-	-	-	-	-	-	-	-	N
Benzo(k)fluoranthene	1.48E+01	c	1.50E+00	c	2.60E+00	4.60E-01	-	2.92E+01	5.18E+00	-	N
Benzoic acid	-	-	2.40E+05	-	-	3.30E+01	-	-	3.71E+02	-	N
Benzyl alcohol	-	-	3.10E+04	-	-	4.20E+00	-	-	4.73E+01	-	N
Beryllium	1.56E+02	n	1.60E+02	n	5.77E+01	5.80E+01	3.20E+00	6.49E+02	6.53E+02	3.60E+01	Y
Bis(2-chloroethoxy)methane	-	-	1.80E+02	n	-	2.30E-02	-	-	2.59E-01	-	N
Bis(2-chloroethyl)ether	2.68E+00	c	1.90E-01	c	2.63E-05	2.70E-06	-	2.96E-04	3.04E-05	-	N
Bis(2-chloroisopropyl)ether	9.15E+01	c	-	-	2.33E-03	-	-	2.62E-02	-	-	N
Bis(2-ethylhexyl)phthalate	3.47E+02	cs	3.50E+01	c*	8.62E+00	1.60E+00	2.00E+00	9.70E+01	1.80E+01	2.25E+01	Y
Bromobenzene	-	-	9.40E+01	n	-	1.50E-02	-	-	1.69E-01	-	N
Bromodichloromethane	5.41E+00	c	2.80E-01	c	2.71E-04	3.30E-05	-	3.05E-03	3.71E-04	-	Y
Bromoform	6.16E+02	c	6.10E+01	c*	6.04E-01	2.30E-03	-	6.79E+00	2.59E-02	-	N
Bromomethane	1.65E+01	n	7.90E+00	n	1.92E-03	2.20E-03	-	2.16E-02	2.48E-02	-	N
4-Bromophenyl phenyl ether	-	-	-	-	-	-	-	-	-	-	N
2-Butanone (MEK)	3.71E+04	n	2.80E+04	ns	1.27E+00	1.50E+00	-	1.43E+01	1.69E+01	-	N
Butyl benzyl phthalate	-	-	2.60E+02	c*	-	6.70E-01	-	-	7.54E+00	-	N
Cadmium	7.03E+01	n	7.00E+01	n	1.37E+00	1.40E+00	3.80E-01	1.55E+01	1.58E+01	4.28E+00	Y
Carbazole	-	-	-	-	-	-	-	-	-	-	N
Carbon disulfide	1.53E+03	ns	6.70E+02	ns	2.83E-01	2.70E-01	-	3.18E+00	3.04E+00	-	Y
Carbon tetrachloride	1.08E+01	c	2.50E-01	c	1.60E-03	7.90E-05	2.00E-03	1.80E-02	8.89E-04	2.25E-02	N

TABLE 5
Residential Soil Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

					Cross Media Soil-to-Ground Water			Cross Media Soil-to-Ground Water			
	NMED		EPA		NMED	EPA		NMED	EPA		
Analyte	Residential Soil (mg/kg)	Endpoint	Residential Soil (mg/kg)	ResSoil key	DAF1 (mg/kg)	GW_Risk-based SSL (mgkg)	GW_MCL-based SSL (mg/kg)	DAF (11.25) (mg/kg)	GW_Risk-based SSL (11.25) (mgkg)	GW_MCL-based SSL (11.25) (mg/kg)	Constituent Detected
Applicable depth interval	0-10'		0-2'		All depths			All depths			
Chlorobenzene	3.76E+02	ns	3.10E+02	n	4.92E-02	6.80E-02	7.50E-02	5.53E-01	7.65E-01	8.44E-01	N
Chloroethane	-	-	-	-	-	-	-	-	-	-	N
Chloroform	5.86E+00	c	3.00E-01	c	4.59E-04	5.50E-05	-	5.16E-03	6.19E-04	-	N
Chloromethane	2.75E+02	n	1.20E+02	n	4.40E-02	4.90E-02	-	4.94E-01	5.51E-01	-	Y
4-Chloro-3-methylphenol	-	-	-	-	-	-	-	-	-	-	N
4-Chloroaniline	-	-	2.40E+00	c	-	1.20E-04	-	-	1.35E-03	-	N
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	-	-	-	-	N
4-Chlorotoluene	-	-	5.50E+03	ns	-	2.80E+00	-	-	3.15E+01	-	N
2-Chloronaphthalene	6.26E+03	ns	6.30E+03	ns	1.14E+01	1.80E+01	-	1.28E+02	2.03E+02	-	N
2-Chlorophenol	3.91E+02	n	3.90E+02	n	1.16E-01	2.00E-01	-	1.30E+00	2.25E+00	-	N
2-Chlorotoluene	1.56E+03	ns	1.60E+03	ns	5.58E-01	8.00E-01	-	6.28E+00	9.00E+00	-	N
Chromium III	1.17E+05	nl	1.20E+05	nm	9.86E+07	9.90E+07	-	1.11E+09	1.11E+09	-	Y
Chromium VI	2.97E+00	c	2.30E+02	n	8.31E-03	2.10E+00	-	9.34E-02	2.36E+01	-	Y
Chrysene	1.48E+02	c	1.50E+01	c	7.99E+00	1.40E+00	-	8.99E+01	1.58E+01	-	Y
cis-1,2-DCE	1.56E+02	n	7.80E+02	n	1.84E-02	1.10E-01	2.10E-02	2.07E-01	1.24E+00	2.36E-01	N
cis-1,3-Dichloropropene	3.37E+01	c	1.70E+00	c*	1.24E-03	1.60E-04	-	1.39E-02	1.80E-03	-	N
Cobalt	-	-	2.30E+01	n	-	4.90E-01	-	-	5.51E+00	-	Y
Cyanide	4.69E+01	n	1.60E+03	n	2.21E-01	7.40E+00	2.00E+00	2.48E+00	8.33E+01	2.25E+01	Y
1,1-Dichloroethane	6.45E+01	c	3.40E+00	c	5.98E-03	7.00E-04	-	6.72E-02	7.88E-03	-	N
1,1-Dichloroethene	4.49E+02	n	2.50E+02	n	1.16E-01	1.20E-01	2.60E-03	1.31E+00	1.35E+00	2.93E-02	N
1,1-Dichloropropene	-	-	-	-	1.24E-03	-	-	1.39E-02	-	-	N
1,2-Dibromo-3-chloropropane	1.86E+00	c	5.60E-03	c	1.10E-06	1.50E-07	9.20E-05	1.24E-05	1.69E-06	1.04E-03	N
1,2-Dibromoethane (EDB)	5.88E-01	c	3.40E-02	c	1.54E-05	1.90E-06	1.50E-05	1.73E-04	2.14E-05	1.69E-04	N
1,2-Dichlorobenzene	2.31E+03	ns	2.00E+03	ns	2.80E-01	4.00E-01	6.60E-01	3.15E+00	4.50E+00	7.43E+00	N
3,3'-Dichlorobenzidine	1.08E+01	c	1.10E+00	c	7.40E-03	2.30E-03	-	8.33E-02	2.59E-02	-	N
1,2-Dichloroethane (EDC)	7.89E+00	c	4.50E-01	c	3.56E-04	4.40E-05	1.50E-03	4.00E-03	4.95E-04	1.69E-02	N
1,2-Dichloropropane	1.52E+01	c	9.30E-01	c*	1.07E-03	1.30E-04	1.70E-03	1.20E-02	1.46E-03	1.91E-02	N
1,3-Dichlorobenzene	-	-	-	-	-	-	-	-	-	-	N
1,3-Dichloropropane	-	-	1.60E+03	n	-	2.70E-01	-	-	3.04E+00	-	N
1,4-Dichlorobenzene	3.17E+01	c	2.60E+00	c	3.19E-03	4.60E-04	8.10E-02	3.59E-02	5.18E-03	9.11E-01	N
2,2-Dichloropropane	-	-	-	-	-	-	-	-	-	-	N
2,4-Dichlorophenol	1.83E+02	n	1.80E+02	n	9.98E-02	1.80E-01	-	1.12E+00	2.03E+00	-	N
2,4-Dimethylphenol	1.22E+03	n	1.20E+03	n	6.65E-01	1.20E+00	-	7.48E+00	1.35E+01	-	N

TABLE 5
Residential Soil Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

					Cross Media Soil-to-Ground Water			Cross Media Soil-to-Ground Water			
	NMED		EPA		NMED	EPA		NMED	EPA		
Analyte	Residential Soil (mg/kg)	Endpoint	Residential Soil (mg/kg)	ResSoil key	DAF1 (mg/kg)	GW_Risk-based SSL (mgkg)	GW_MCL-based SSL (mg/kg)	DAF (11.25) (mg/kg)	GW_Risk-based SSL (11.25) (mgkg)	GW_MCL-based SSL (11.25) (mg/kg)	Constituent Detected
Applicable depth interval	0-10'		0-2'		All depths			All depths			
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	-	-	-	-	N
2,4-Dinitrophenol	1.22E+02	n	1.20E+02	n	6.31E-02	6.80E-02	-	7.10E-01	7.65E-01	-	N
2,4-Dinitrotoluene	1.57E+01	c	1.60E+00	c*	2.25E-03	2.00E-04	-	2.53E-02	2.25E-03	-	N
2,6-Dinitrotoluene	6.11E+01	n	6.10E+01	n	3.85E-02	3.40E-02	-	4.33E-01	3.83E-01	-	N
Dibenz(a,h)anthracene	1.48E-01	c	1.50E-02	c	8.46E-02	1.50E-02	-	9.52E-01	1.69E-01	-	N
Dibenzofuran	-	-	-	-	-	-	-	-	-	-	N
Dibromochloromethane	1.21E+01	c	7.00E-01	c	3.31E-04	4.00E-05	-	3.72E-03	4.50E-04	-	N
Dibromomethane	-	-	7.80E+02	n	-	9.10E-02	-	-	1.02E+00	-	N
Dichlorodifluoromethane	1.68E+02	n	1.90E+02	n	3.72E-01	6.10E-01	-	4.18E+00	6.86E+00	-	N
Diethyl phthalate	4.89E+04	n	4.90E+04	n	9.66E+00	1.30E+01	-	1.09E+02	1.46E+02	-	N
Dimethyl phthalate	6.11E+05	nl	-	-	8.06E+01	-	-	9.06E+02	-	-	N
Di-n-butyl phthalate	6.11E+03	n	-	-	6.97E+00	-	-	7.84E+01	-	-	N
Di-n-octyl phthalate	-	-	-	-	-	-	-	-	-	-	N
Ethylbenzene	6.84E+01	c	5.70E+00	c	1.30E-02	1.90E-03	8.90E-01	1.46E-01	2.14E-02	1.00E+01	Y
Fluoranthene	2.29E+03	n	2.30E+03	n	1.22E+02	2.10E+02	-	1.37E+03	2.36E+03	-	Y
Fluorene	2.29E+03	n	2.30E+03	n	2.03E+01	3.30E+01	-	2.29E+02	3.71E+02	-	Y
Hexachlorobenzene	3.04E+00	c	3.00E-01	c	3.98E-03	2.90E-04	7.00E-03	4.48E-02	3.26E-03	7.88E-02	N
Hexachlorobutadiene	-	-	6.20E+00	c**	-	1.90E-03	-	-	2.14E-02	-	N
Hexachlorocyclopentadiene	3.67E+02	n	3.70E+02	n	5.27E-01	8.00E-01	1.80E-01	5.92E+00	9.00E+00	2.03E+00	N
Hexachloroethane	4.28E+01	n	3.50E+01	c**	8.18E-03	3.20E-03	-	9.20E-02	3.60E-02	-	N
2-Hexanone	-	-	-	-	-	-	-	-	-	-	N
Indeno(1,2,3-cd)pyrene	1.48E+00	c	1.50E-01	c	8.63E-01	1.60E-01	-	9.71E+00	1.80E+00	-	N
Isophorone	5.12E+03	c	5.10E+02	c*	1.92E-01	2.20E-02	-	2.16E+00	2.48E-01	-	N
Isopropylbenzene (cumene)	2.43E+03	ns	2.20E+03	ns	8.65E-01	1.30E+00	-	9.73E+00	1.46E+01	-	Y
4-Isopropyltoluene	-	-	-	-	-	-	-	-	-	-	Y
Lead	4.00E+02	IEUBK	4.00E+02	nL		-	-	0.00E+00	-	-	Y
Mercury	1.56E+01	ns	4.30E+00	ns	3.27E-02	3.00E-02	1.00E-01	3.68E-01	3.38E-01	1.13E+00	Y
Methyl tert-butyl ether (MTBE)	9.01E+02	c	3.90E+01	c	2.41E-02	2.70E-03	-	2.71E-01	3.04E-02	-	N
Methylene chloride	4.09E+02	n	1.10E+01	c	4.12E-02	1.20E-03	1.30E-03	4.63E-01	1.35E-02	1.46E-02	Y
1-Methylnaphthalene	-	-	2.20E+01	c	-	1.50E-02	-	-	1.69E-01	-	Y
2-Methylnaphthalene	-	-	3.10E+02	n	-	9.00E-01	-	-	1.01E+01	-	Y
2-Methylphenol	-	-	3.10E+03	n	-	2.00E+00	-	-	2.25E+01	-	N
3+4-Methylphenol	-	-	3.10E+02	n	-	1.90E-01	-	-	2.14E+00	-	N

TABLE 5
Residential Soil Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

					Cross Media Soil-to-Ground Water			Cross Media Soil-to-Ground Water			
	NMED		EPA		NMED	EPA		NMED	EPA		
Analyte	Residential Soil (mg/kg)	Endpoint	Residential Soil (mg/kg)	ResSoil key	DAF1 (mg/kg)	GW_Risk-based SSL (mgkg)	GW_MCL-based SSL (mg/kg)	DAF (11.25) (mg/kg)	GW_Risk-based SSL (11.25) (mgkg)	GW_MCL-based SSL (11.25) (mg/kg)	Constituent Detected
Applicable depth interval	0-10'		0-2'		All depths			All depths			
4-Methyl-2-pentanone	-	-	-	-	-	-	-	-	-	-	N
2-Nitroaniline	-	-	1.80E+02	n	-	3.30E-02	-	-	3.71E-01	-	N
3-Nitroaniline	-	-	-	-	-	-	-	-	-	-	N
4-Nitroaniline	-	-	2.40E+01	c*	-	1.00E-03	-	-	1.13E-02	-	N
2-Nitrophenol	-	-	-	-	-	-	-	-	-	-	N
4-Nitrophenol	-	-	-	-	-	-	-	-	-	-	N
Naphthalene	4.30E+01	c	3.90E+00	c*	3.57E-03	5.50E-04	-	4.01E-02	6.19E-03	-	Y
n-Butylbenzene	-	-	-	-	-	-	-	-	-	-	Y
Nickel	1.56E+03	n	1.40E+04	c	4.77E+01	4.80E+01	-	5.36E+02	5.40E+02	-	Y
Nitrobenzene	5.35E+01	c	4.40E+00	c*	6.24E-04	7.10E-05	-	7.02E-03	7.99E-04	-	N
N-Nitrosodi-n-propylamine	-	-	6.90E-02	c	-	1.10E-05	-	-	1.24E-04	-	N
N-Nitrosodiphenylamine	9.93E+02	c	9.90E+01	c	5.65E-01	1.70E-01	-	6.36E+00	1.91E+00	-	N
n-Propylbenzene	-	-	-	-	-	-	-	-	-	-	Y
Pentachlorophenol	8.94E+00	c	3.00E+00	c	1.28E-02	3.90E-03	7.00E-03	1.44E-01	4.39E-02	7.88E-02	N
Phenanthrene	1.83E+03	ns	-	-	2.86E+01	-	-	3.21E+02	-	-	Y
Phenol	1.83E+04	n	1.80E+04	n	4.97E+00	8.10E+00	-	5.59E+01	9.11E+01	-	N
Pyrene	1.72E+03	n	1.70E+03	n	8.94E+01	1.50E+02	-	1.01E+03	1.69E+03	-	Y
Pyridine	-	-	7.80E+01	n	-	9.70E-03	-	-	1.09E-01	-	N
sec-Butylbenzene	-	-	-	-	-	-	-	-	-	-	Y
Selenium	3.91E+02	n	3.90E+02	n	9.65E-01	9.50E-01	2.60E-01	1.09E+01	1.07E+01	2.93E+00	N
Silver	3.91E+02	n	3.90E+02	n	1.57E+00	1.60E+00	-	1.76E+01	1.80E+01	-	N
Styrene	7.28E+03	ns	6.50E+03	ns	1.39E+00	2.00E+00	1.20E-01	1.56E+01	2.25E+01	1.35E+00	N
1,2,3-Trichlorobenzene	-	-	-	-	-	-	-	-	-	-	N
1,1,1,2-Tetrachloroethane	-	-	2.00E+00	c	1.65E-03	2.10E-04	-	1.85E-02	2.36E-03	-	N
1,1,1-Trichloroethane	1.56E+04	ns	9.00E+03	ns	2.91E+00	3.30E+00	7.20E-02	3.28E+01	3.71E+01	8.10E-01	N
1,1,2,2-Tetrachloroethane	8.02E+00	c	5.90E-01	c	2.13E-04	2.80E-05	-	2.40E-03	3.15E-04	-	N
1,1,2-Trichloroethane	2.81E+00	n	1.10E+00	c	1.12E-04	8.20E-05	1.70E-03	1.26E-03	9.23E-04	1.91E-02	Y
2,4,5-Trichlorophenol	6.11E+03	n	6.10E+03	n	1.04E+01	9.40E+00	-	1.17E+02	1.06E+02	-	N
2,4,6-Trichlorophenol	6.11E+01	n	4.40E+01	c**	1.04E-01	1.60E-02	-	1.17E+00	1.80E-01	-	N
1,2,3-Trichloropropane	4.97E-02	c	9.10E-02	c	2.50E-06	4.40E-06	-	2.82E-05	4.95E-05	-	N
1,2,4-Trichlorobenzene	7.30E+01	n	8.70E+01	n	9.13E-03	1.30E-02	1.10E-01	1.03E-01	1.46E-01	1.24E+00	N
1,2,4-Trimethylbenzene	-	-	6.70E+01	n	-	2.40E-02	-	-	2.70E-01	-	Y
1,3,5-Trimethylbenzene	-	-	4.70E+01	n	-	2.00E-02	-	-	2.25E-01	-	Y

TABLE 5
Residential Soil Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

					Cross Media Soil-to-Ground Water			Cross Media Soil-to-Ground Water			
	NMED		EPA		NMED	EPA		NMED	EPA		
Analyte	Residential Soil (mg/kg)	Endpoint	Residential Soil (mg/kg)	ResSoil key	DAF1 (mg/kg)	GW_Risk-based SSL (mgkg)	GW_MCL-based SSL (mg/kg)	DAF (11.25) (mg/kg)	GW_Risk-based SSL (11.25) (mgkg)	GW_MCL-based SSL (11.25) (mg/kg)	Constituent Detected
Applicable depth interval	0-10'		0-2'		All depths			All depths			
tert-Butylbenzene	-	-	-	-	-	-	-	-	-	-	N
Tetrachloroethene (PCE)	7.02E+00	c	5.70E-01	c	4.30E-04	5.20E-05	2.40E-03	4.84E-03	5.85E-04	2.70E-02	N
Toluene	5.27E+03	ns	5.00E+03	ns	1.27E+00	1.70E+00	7.60E-01	1.42E+01	1.91E+01	8.55E+00	Y
trans-1,2-DCE	2.70E+02	n	1.10E+02	n	2.69E-02	3.40E-02	3.20E-02	3.02E-01	3.83E-01	3.60E-01	N
trans-1,3-Dichloropropene	3.37E+01	c	1.70E+00	c*	1.24E-03	1.60E-04	-	1.39E-02	1.80E-03	-	N
Trichloroethene (TCE)	8.77E+00	n	2.80E+00	c	1.05E-03	6.10E-04	1.90E-03	1.18E-02	6.86E-03	2.14E-02	N
Trichlorofluoromethane	1.41E+03	ns	8.00E+02	n	8.89E-01	8.40E-01	-	1.00E+01	9.45E+00	-	N
Vanadium	3.91E+02	n	5.50E+02	n	1.83E+02	2.60E+02	-	2.05E+03	2.93E+03	-	Y
Vinyl chloride	7.28E-01	c	6.00E-02	c	5.42E-05	5.60E-06	7.00E-04	6.10E-04	6.30E-05	7.88E-03	N
Xylenes, Total	8.14E+02	ns	6.00E+02	ns	1.56E-01	2.30E-01	1.10E+01	1.76E+00	2.59E+00	1.24E+02	Y
Zinc	2.35E+04	n	2.30E+04	n	6.82E+02	6.80E+02	-	7.67E+03	7.65E+03	-	Y

c - carcinogen
n - noncarcinogen
cs - carcinogen, SSL may exceed saturation
ns - noncarcinogen, SSL may exceed saturation
nl - noncarcinogen, SSL may exceed ceiling limit
nls - noncarcinogen, SSL may exceed both saturation and ceiling limit
- no screenig value currently available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)
EPA - Regional Screening Levels (April 2009)

TABLE 6
Non- Residential Soil Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

	NMED				EPA		Cross Media Soil-to-Ground Water NMED	Cross Media Soil-to-Ground Water EPA		Cross Media Soil-to-Ground Water NMED	Cross Media Soil-to-Ground Water EPA		
Analyte	IndOccSoil (mg/kg)	IndOccSoil (Endpoint)	ConsWork (mg/kg)	ConsWork Soil (Endpoint)	Industrial (mg/kg)	IndSoil_key	DAF1 (mg/kg)	GW_Risk-based SSL (mg/kg)	GW_MCL-based SSL (mg/kg)	DAF (11.25) (mg/kg)	GW_Risk-based SSL (11.25) (mgkg)	GW_MCL-based SSL (11.25) (mg/kg)	Constituent Detected
Applicable depth interval	0-2'		0-10'		0-2'		All depths			All depths			
Acenaphthene	3.67E+04	n	1.86E+04	n	3.30E+04	n	1.69E+01	2.70E+01	-	1.90E+02	3.04E+02	-	N
Acenaphthylene	-	-	-	-	-	-	-	-	-	-	-	-	N
Acetone	8.68E+05	nls	2.21E+05	nls	6.10E+05	nms	3.86E+00	4.40E+00	-	4.34E+01	4.95E+01	-	Y
Aniline	-	-	-	-	3.00E+02	c*	-	3.40E-03	-	-	3.83E-02	-	N
Anthracene	1.83E+05	nl	6.68E+04	n	1.70E+05	nm	2.71E+02	4.50E+02	-	3.04E+03	5.06E+03	-	N
Antimony	4.54E+02	n	1.24E+02	n	4.10E+02	n	6.61E-01	6.60E-01	2.70E-01	7.44E+00	7.43E+00	3.04E+00	N
Arsenic	1.77E+01	c	5.30E+01	n	1.60E+00	c	1.31E-02	1.30E-03	2.90E-01	1.48E-01	1.46E-02	3.26E+00	Y
Azobenzene	-	-	-	-	2.20E+01	c	-	5.10E-04	-	-	5.74E-03	-	N
Barium	2.23E+05	nl	4.35E+03	n	1.90E+05	nm	3.01E+02	3.00E+02	8.20E+01	3.39E+03	3.38E+03	9.23E+02	Y
Benz(a)anthracene	2.34E+01	c	2.13E+02	c	2.10E+00	c	7.83E-02	1.40E-02	-	8.81E-01	1.58E-01	-	Y
Benzene	8.47E+01	c	1.38E+02	n	5.60E+00	c*	1.73E-03	2.30E-04	2.80E-03	1.94E-02	2.59E-03	3.15E-02	Y
Benzo(a)pyrene	2.34E+00	c	2.13E+01	c	2.10E-01	c	2.60E-02	4.60E-03	3.10E-01	2.92E-01	5.18E-02	3.49E+00	N
Benzo(b)fluoranthene	2.34E+01	c	2.13E+02	c	2.10E+00	c	2.65E-01	4.70E-02	-	2.98E+00	5.29E-01	-	N
Benzo(g,h,i)perylene	-	-	-	-	-	-	-	-	-	-	-	-	N
Benzo(k)fluoranthene	2.34E+02	c	2.06E+03	c	2.10E+01	c	2.60E+00	4.60E-01	-	2.92E+01	5.18E+00	-	N
Benzoic acid	-	-	-	-	2.50E+06	nm	-	3.30E+01	-	-	3.71E+02	-	Y
Benzyl alcohol	-	-	-	-	3.10E+05	nm	-	4.20E+00	-	-	4.73E+01	-	Y
Beryllium	2.26E+03	n	1.44E+02	n	2.00E+03	n	5.77E+01	5.80E+01	3.20E+00	6.49E+02	6.53E+02	3.60E+01	Y
Bis(2-chloroethoxy)methane	-	-	-	-	1.80E+03	n	-	2.30E-02	-	-	2.59E-01	-	N
Bis(2-chloroethyl)ether	1.42E+01	c	7.78E+01	c	9.00E-01	c	2.63E-05	2.70E-06	-	2.96E-04	3.04E-05	-	N
Bis(2-chloroisopropyl)ether	4.54E+02	cs	3.10E+03	cs	-	-	2.33E-03	-	-	2.62E-02	-	-	N
Bis(2-ethylhexyl)phthalate	1.37E+03	cs	4.76E+03	n	1.20E+02	c	8.62E+00	1.60E+00	2.00E+00	9.70E+01	1.80E+01	2.25E+01	N
Bromobenzene	-	-	-	-	4.10E+02	n	-	1.50E-02	-	-	1.69E-01	-	N
Bromodichloromethane	3.01E+01	c	1.43E+02	c	1.40E+00	c	2.71E-04	3.30E-05	-	3.05E-03	3.71E-04	-	N
Bromoform	2.42E+03	c	4.76E+03	n	2.20E+02	c*	6.04E-01	2.30E-03	-	6.79E+00	2.59E-02	-	N
Bromomethane	8.65E+01	n	1.64E+01	n	3.50E+01	n	1.92E-03	2.20E-03	-	2.16E-02	2.48E-02	-	N
4-Bromophenyl phenyl ether	-	-	-	-	-	-	-	-	-	-	-	-	N
2-Butanone (MEK)	3.75E+05	nls	8.43E+04	nls	1.90E+05	nms	1.27E+00	1.50E+00	-	1.43E+01	1.69E+01	-	Y
Butyl benzyl phthalate	-	-	-	-	9.10E+02	c	-	6.70E-01	-	-	7.54E+00	-	N
Cadmium	8.97E+02	n	2.77E+02	n	8.00E+02	n	1.37E+00	1.40E+00	3.80E-01	1.55E+01	1.58E+01	4.28E+00	Y
Carbazole	-	-	-	-	-	-	-	-	-	-	-	-	N
Carbon disulfide	8.33E+03	ns	1.58E+03	ns	3.00E+03	ns	2.83E-01	2.70E-01	-	3.18E+00	3.04E+00	-	N
Carbon tetrachloride	5.98E+01	c	2.26E+02	ns	1.30E+00	c	1.60E-03	7.90E-05	2.00E-03	1.80E-02	8.89E-04	2.25E-02	N
Chlorobenzene	2.12E+03	ns	4.06E+02	ns	1.50E+03	ns	4.92E-02	6.80E-02	7.50E-02	5.53E-01	7.65E-01	8.44E-01	N
Chloroethane	-	-	-	-	-	-	-	-	-	-	-	-	N
Chloroform	3.27E+01	c	1.54E+02	c	1.50E+00	c	4.59E-04	5.50E-05	-	5.16E-03	6.19E-04	-	N
Chloromethane	1.29E+03	cs	2.41E+02	n	5.10E+02	n	4.40E-02	4.90E-02	-	4.94E-01	5.51E-01	-	N
4-Chloro-3-methylphenol	-	-	-	-	-	-	-	-	-	-	-	-	N
4-Chloroaniline	-	-	-	-	8.60E+00	c	-	1.20E-04	-	-	1.35E-03	-	N
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	-	-	-	-	-	-	N
4-Chlorotoluene	-	-	-	-	7.20E+04	ns	-	2.80E+00	-	-	3.15E+01	-	N
2-Chloronaphthalene	9.08E+04	ns	2.48E+04	ns	8.20E+04	ns	1.14E+01	1.80E+01	-	1.28E+02	2.03E+02	-	N

TABLE 6
Non- Residential Soil Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

							Cross Media Soil-to-Ground Water			Cross Media Soil-to-Ground Water			
	NMED				EPA		NMED	EPA		NMED	EPA		
Analyte	IndOccSoil (mg/kg)	IndOccSoil (Endpoint)	ConsWork (mg/kg)	ConsWork Soil (Endpoint)	Industrial (mg/kg)	IndSoil _key	DAF1 (mg/kg)	GW_Risk-based SSL (mg/kg)	GW_MCL-based SSL (mg/kg)	DAF (11.25) (mg/kg)	GW_Risk-based SSL (11.25) (mgkg)	GW_MCL-based SSL (11.25) (mg/kg)	Constituent Detected
Applicable depth interval	0-2'		0-10'		0-2'		All depths			All depths			
2-Chlorophenol	5.68E+03	n	1.55E+03	n	5.10E+03	n	1.16E-01	2.00E-01	-	1.30E+00	2.25E+00	-	N
2-Chlorotoluene	2.27E+04	ns	6.19E+03	ns	2.00E+04	ns	5.58E-01	8.00E-01	-	6.28E+00	9.00E+00	-	N
Chromium III	1.70E+06	nl	4.65E+05	nl	1.50E+06	nm	9.86E+07	9.90E+07	-	1.11E+09	1.11E+09	-	Y
Chromium VI	6.31E+01	n	6.56E+01	c	1.40E+03	c	8.31E-03	2.10E+00	-	9.34E-02	2.36E+01	-	Y
Chrysene	2.34E+03	c	2.06E+04	c	2.10E+02	c	7.99E+00	1.40E+00	-	8.99E+01	1.58E+01	-	N
cis-1,2-DCE	2.27E+03	ns	6.19E+02	c	1.00E+04	ns	1.84E-02	1.10E-01	2.10E-02	2.07E-01	1.24E+00	2.36E-01	N
cis-1,3-Dichloropropene	1.77E+02	c	2.09E+02	ns	8.40E+00	c*	1.24E-03	1.60E-04	-	1.39E-02	1.80E-03	-	N
Cobalt	-	-	-	-	3.00E+02	n	-	4.90E-01	-	-	5.51E+00	-	Y
Cyanide	6.81E+02	n	1.86E+02	n	2.00E+04	n	2.21E-01	7.40E+00	2.00E+00	2.48E+00	8.33E+01	2.25E+01	N
1,1-Dichloroethane	3.59E+02	c	1.70E+03	cs	1.70E+01	c	5.98E-03	7.00E-04	-	6.72E-02	7.88E-03	-	N
1,1-Dichloroethene	2.29E+03	ns	4.32E+02	ns	1.10E+03	n	1.16E-01	1.20E-01	2.60E-03	1.31E+00	1.35E+00	2.93E-02	N
1,1-Dichloropropene	-	-	-	-	-	-	1.24E-03	-	-	1.39E-02	-	-	N
1,2-Dibromo-3-chloropropane	1.08E+00	c	5.07E+00	c	7.30E-02	c	1.10E-06	1.50E-07	9.20E-05	1.24E-05	1.69E-06	1.04E-03	N
1,2-Dibromoethane (EDB)	3.22E+00	c	1.60E+01	c	1.70E-01	c	1.54E-05	1.90E-06	1.50E-05	1.73E-04	2.14E-05	1.69E-04	N
1,2-Dichlorobenzene	1.40E+04	ns	2.71E+03	ns	1.00E+04	ns	2.80E-01	4.00E-01	6.60E-01	3.15E+00	4.50E+00	7.43E+00	N
3,3'-Dichlorobenzidine	4.26E+01	c	3.64E+02	c	3.80E+00	c	7.40E-03	2.30E-03	-	8.33E-02	2.59E-02	-	N
1,2-Dichloroethane (EDC)	4.35E+01	c	5.87E+01	n	2.20E+00	c	3.56E-04	4.40E-05	1.50E-03	4.00E-03	4.95E-04	1.69E-02	N
1,2-Dichloropropane	8.44E+01	c	2.50E+01	n	4.70E+00	c*	1.07E-03	1.30E-04	1.70E-03	1.20E-02	1.46E-03	1.91E-02	N
1,3-Dichlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-	N
1,3-Dichloropropane	-	-	-	-	2.00E+04	ns	-	2.70E-01	-	-	3.04E+00	-	N
1,4-Dichlorobenzene	1.77E+02	c	8.31E+02	cs	1.30E+01	c	3.19E-03	4.60E-04	8.10E-02	3.59E-02	5.18E-03	9.11E-01	N
2,2-Dichloropropane	-	-	-	-	-	-	-	-	-	-	-	-	N
2,4-Dichlorophenol	2.05E+03	n	7.15E+02	n	1.80E+03	n	9.98E-02	1.80E-01	-	1.12E+00	2.03E+00	-	N
2,4-Dimethylphenol	1.37E+04	n	4.76E+03	n	1.20E+04	n	6.65E-01	1.20E+00	-	7.48E+00	1.35E+01	-	N
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	-	-	-	-	-	-	N
2,4-Dinitrophenol	1.37E+03	n	4.76E+02	n	1.20E+03	n	6.31E-02	6.80E-02	-	7.10E-01	7.65E-01	-	N
2,4-Dinitrotoluene	6.18E+01	c	4.76E+02	n	5.50E+00	c	2.25E-03	2.00E-04	-	2.53E-02	2.25E-03	-	N
2,6-Dinitrotoluene	6.84E+02	n	2.38E+02	n	6.20E+02	n	3.85E-02	3.40E-02	-	4.33E-01	3.83E-01	-	N
Dibenz(a,h)anthracene	2.34E+00	c	2.13E+01	c	2.10E-01	c	8.46E-02	1.50E-02	-	9.52E-01	1.69E-01	-	N
Dibenzofuran	-	-	-	-	-	-	-	-	-	-	-	-	N
Dibromochloromethane	6.24E+01	c	3.32E+02	cs	3.40E+00	c	3.31E-04	4.00E-05	-	3.72E-03	4.50E-04	-	N
Dibromomethane	-	-	-	-	1.00E+04	ns	-	9.10E-02	-	-	1.02E+00	-	N
Dichlorodifluoromethane	7.98E+02	ns	1.49E+02	ns	7.80E+02	n	3.72E-01	6.10E-01	-	4.18E+00	6.86E+00	-	N
Diethyl phthalate	5.47E+05	nl	1.91E+05	nl	4.90E+05	nm	9.66E+00	1.30E+01	-	1.09E+02	1.46E+02	-	N
Dimethyl phthalate	6.84E+06	nl	2.38E+06	nl	-	-	8.06E+01	-	-	9.06E+02	-	-	N
Di-n-butyl phthalate	6.84E+04	n	2.38E+04	n	-	-	6.97E+00	-	-	7.84E+01	-	-	N
Di-n-octyl phthalate	-	-	-	-	-	-	-	-	-	-	-	-	N
Ethylbenzene	3.78E+02	cs	1.83E+03	cs	2.90E+01	c	1.30E-02	1.90E-03	8.90E-01	1.46E-01	2.14E-02	1.00E+01	Y
Fluoranthene	2.44E+04	n	8.91E+03	n	2.20E+04	n	1.22E+02	2.10E+02	-	1.37E+03	2.36E+03	-	N
Fluorene	2.44E+04	ns	8.91E+03	ns	2.20E+04	n	2.03E+01	3.30E+01	-	2.29E+02	3.71E+02	-	N
Hexachlorobenzene	1.20E+01	c	1.03E+02	c	1.10E+00	c	3.98E-03	2.90E-04	7.00E-03	4.48E-02	3.26E-03	7.88E-02	N
Hexachlorobutadiene	-	-	-	-	2.20E+01	c*	-	1.90E-03	-	-	2.14E-02	-	N

TABLE 6
Non- Residential Soil Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

	NMED				EPA		Cross Media Soil-to-Ground Water NMED	Cross Media Soil-to-Ground Water EPA		Cross Media Soil-to-Ground Water NMED	Cross Media Soil-to-Ground Water EPA		
Analyte	IndOccSoil (mg/kg)	IndOccSoil (Endpoint)	ConsWork (mg/kg)	ConsWork Soil (Endpoint)	Industrial (mg/kg)	IndSoil _key	DAF1 (mg/kg)	GW_Risk-based SSL (mg/kg)	GW_MCL-based SSL (mg/kg)	DAF (11.25) (mg/kg)	GW_Risk-based SSL (11.25) (mgkg)	GW_MCL-based SSL (11.25) (mg/kg)	Constituent Detected
Applicable depth interval	0-2'		0-10'		0-2'		All depths			All depths			
Hexachlorocyclopentadiene	4.10E+03	n	8.11E+02	n	3.70E+03	n	5.27E-01	8.00E-01	1.80E-01	5.92E+00	9.00E+00	2.03E+00	N
Hexachloroethane	4.79E+02	n	1.67E+02	n	1.20E+02	c**	8.18E-03	3.20E-03	-	9.20E-02	3.60E-02	-	N
2-Hexanone	-	-	-	-	-	-	-	-	-	-	-	-	N
Indeno(1,2,3-cd)pyrene	2.34E+01	c	2.13E+02	c	2.10E+00	c	8.63E-01	1.60E-01	-	9.71E+00	1.80E+00	-	N
Isophorone	1.37E+05	cs	4.75E+04	n	1.80E+03	c*	1.92E-01	2.20E-02	-	2.16E+00	2.48E-01	-	N
Isopropylbenzene (cumene)	1.45E+04	ns	2.81E+03	ns	1.10E+04	ns	8.65E-01	1.30E+00	-	9.73E+00	1.46E+01	-	Y
4-Isopropyltoluene	-	-	-	-	-	-	-	-	-	-	-	-	Y
Lead	8.00E+02	IEUBK	8.00E+02	IEUBK	8.00E+02	nL		-	-	0.00E+00	-	-	Y
Mercury	7.36E+01	ns	1.36E+01	ns	2.40E+01	ns	3.27E-02	3.00E-02	1.00E-01	3.68E-01	3.38E-01	1.13E+00	Y
Methyl tert-butyl ether (MTBE)	4.89E+03	c	2.49E+04	cs	1.90E+02	c	2.41E-02	2.70E-03	-	2.71E-01	3.04E-02	-	Y
Methylene chloride	4.70E+03	c	1.12E+03	ns	5.40E+01	c	4.12E-02	1.20E-03	1.30E-03	4.63E-01	1.35E-02	1.46E-02	Y
1-Methylnaphthalene	-	-	-	-	9.90E+01	c	-	1.50E-02	-	-	1.69E-01	-	Y
2-Methylnaphthalene	-	-	-	-	4.10E+03	ns	-	9.00E-01	-	-	1.01E+01	-	Y
2-Methylphenol	-	-	-	-	3.10E+04	n	-	2.00E+00	-	-	2.25E+01	-	N
3+4-Methylphenol	-	-	-	-	3.10E+03	n	-	1.90E-01	-	-	2.14E+00	-	Y
4-Methyl-2-pentanone	-	-	-	-	-	-	-	-	-	-	-	-	N
2-Nitroaniline	-	-	-	-	1.80E+03	n	-	3.30E-02	-	-	3.71E-01	-	N
3-Nitroaniline	-	-	-	-	-	-	-	-	-	-	-	-	N
4-Nitroaniline	-	-	-	-	8.60E+01	c*	-	1.00E-03	-	-	1.13E-02	-	N
2-Nitrophenol	-	-	-	-	-	-	-	-	-	-	-	-	N
4-Nitrophenol	-	-	-	-	-	-	-	-	-	-	-	-	N
Naphthalene	2.41E+02	c	1.58E+02	n	2.00E+01	c*	3.57E-03	5.50E-04	-	4.01E-02	6.19E-03	-	Y
n-Butylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	Y
Nickel	2.25E+04	n	6.19E+03	n	6.90E+04	c	4.77E+01	4.80E+01	-	5.36E+02	5.40E+02	-	Y
Nitrobenzene	3.00E+02	c	3.32E+02	n	2.20E+01	c*	6.24E-04	7.10E-05	-	7.02E-03	7.99E-04	-	N
N-Nitrosodi-n-propylamine	-	-	-	-	2.50E-01	c	-	1.10E-05	-	-	1.24E-04	-	N
N-Nitrosodiphenylamine	3.91E+03	c	3.36E+04	c	3.50E+02	c	5.65E-01	1.70E-01	-	6.36E+00	1.91E+00	-	N
n-Propylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	Y
Pentachlorophenol	3.00E+01	c	3.10E+02	c	9.00E+00	c	1.28E-02	3.90E-03	7.00E-03	1.44E-01	4.39E-02	7.88E-02	N
Phenanthrene	2.05E+04	n	7.15E+03	n	-	-	2.86E+01	-	-	3.21E+02	-	-	Y
Phenol	2.05E+05	nl	6.88E+04	n	1.80E+05	nm	4.97E+00	8.10E+00	-	5.59E+01	9.11E+01	-	N
Pyrene	1.83E+04	n	6.68E+03	n	1.70E+04	n	8.94E+01	1.50E+02	-	1.01E+03	1.69E+03	-	Y
Pyridine	-	-	-	-	1.00E+03	n	-	9.70E-03	-	-	1.09E-01	-	N
sec-Butylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	Y
Selenium	5.68E+03	n	1.55E+03	n	5.10E+03	n	9.65E-01	9.50E-01	2.60E-01	1.09E+01	1.07E+01	2.93E+00	N
Silver	5.68E+03	n	1.55E+03	n	5.10E+03	n	1.57E+00	1.60E+00	-	1.76E+01	1.80E+01	-	N
Styrene	5.00E+04	ns	9.99E+03	ns	3.80E+04	ns	1.39E+00	2.00E+00	1.20E-01	1.56E+01	2.25E+01	1.35E+00	N
1,2,3-Trichlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-	N
1,1,1,2-Tetrachloroethane	-	-	-	-	9.80E+00	c	1.65E-03	2.10E-04	-	1.85E-02	2.36E-03	-	N
1,1,1-Trichloroethane	7.89E+04	ns	1.48E+04	ns	3.90E+04	ns	2.91E+00	3.30E+00	7.20E-02	3.28E+01	3.71E+01	8.10E-01	N
1,1,2,2-Tetrachloroethane	4.35E+01	c	2.21E+02	c	2.90E+00	c	2.13E-04	2.80E-05	-	2.40E-03	3.15E-04	-	N
1,1,2-Trichloroethane	1.33E+01	c	4.72E+02	ns	5.50E+00	c	1.12E-04	8.20E-05	1.70E-03	1.26E-03	9.23E-04	1.91E-02	N

TABLE 6
Non- Residential Soil Screening Levels
Bloomfield Refinery - Bloomfield, New Mexico

	NMED				EPA		Cross Media Soil-to-Ground Water NMED	Cross Media Soil-to-Ground Water EPA		Cross Media Soil-to-Ground Water NMED	Cross Media Soil-to-Ground Water EPA		
Analyte	IndOccSoil (mg/kg)	IndOccSoil (Endpoint)	ConsWork (mg/kg)	ConsWork Soil (Endpoint)	Industrial (mg/kg)	IndSoil _key	DAF1 (mg/kg)	GW_Risk-based SSL (mg/kg)	GW_MCL-based SSL (mg/kg)	DAF (11.25) (mg/kg)	GW_Risk-based SSL (11.25) (mgkg)	GW_MCL-based SSL (11.25) (mg/kg)	Constituent Detected
Applicable depth interval	0-2'		0-10'		0-2'		All depths			All depths			
2,4,5-Trichlorophenol	6.84E+04	n	2.38E+04	n	6.20E+04	n	1.04E+01	9.40E+00	-	1.17E+02	1.06E+02	-	N
2,4,6-Trichlorophenol	6.84E+02	n	2.38E+02	n	1.60E+02	c**	1.04E-01	1.60E-02	-	1.17E+00	1.80E-01	-	N
1,2,3-Trichloropropane	3.76E+01	c	7.23E+00	c	4.10E-01	c	2.50E-06	4.40E-06	-	2.82E-05	4.95E-05	-	N
1,2,4-Trichlorobenzene	3.67E+02	ns	6.87E+01	ns	4.00E+02	ns	9.13E-03	1.30E-02	1.10E-01	1.03E-01	1.46E-01	1.24E+00	N
1,2,4-Trimethylbenzene	-	-	-	-	2.80E+02	ns	-	2.40E-02	-	-	2.70E-01	-	Y
1,3,5-Trimethylbenzene	-	-	-	-	2.00E+02	n	-	2.00E-02	-	-	2.25E-01	-	Y
tert-Butylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	Y
Tetrachloroethene (PCE)	3.66E+01	c	2.12E+02	cs	2.70E+00	c	4.30E-04	5.20E-05	2.40E-03	4.84E-03	5.85E-04	2.70E-02	N
Toluene	5.77E+04	ns	1.34E+04	ns	4.60E+04	ns	1.27E+00	1.70E+00	7.60E-01	1.42E+01	1.91E+01	8.55E+00	Y
trans-1,2-DCE	1.44E+03	ns	2.73E+02	ns	5.00E+02	n	2.69E-02	3.40E-02	3.20E-02	3.02E-01	3.83E-01	3.60E-01	N
trans-1,3-Dichloropropene	1.77E+02	c	2.09E+02	ns	8.40E+00	c*	1.24E-03	1.60E-04	-	1.39E-02	1.80E-03	-	N
Trichloroethene (TCE)	4.13E+01	c	7.68E+00	cs	1.40E+01	c	1.05E-03	6.10E-04	1.90E-03	1.18E-02	6.86E-03	2.14E-02	N
Trichlorofluoromethane	6.94E+03	ns	1.30E+03	ns	3.40E+03	ns	8.89E-01	8.40E-01	-	1.00E+01	9.45E+00	-	N
Vanadium	5.68E+03	n	1.55E+03	n	7.20E+03	n	1.83E+02	2.60E+02	-	2.05E+03	2.93E+03	-	Y
Vinyl chloride	2.61E+01	c	1.49E+02	c	1.70E+00	c	5.42E-05	5.60E-06	7.00E-04	6.10E-04	6.30E-05	7.88E-03	N
Xylenes, Total	3.98E+03	ns	7.43E+02	ns	2.60E+03	ns	1.56E-01	2.30E-01	1.10E+01	1.76E+00	2.59E+00	1.24E+02	Y
Zinc	3.41E+05	nl	9.29E+04	n	3.10E+05	nm	6.82E+02	6.80E+02	-	7.67E+03	7.65E+03	-	Y

c - carcinogen
n - noncarcinogen
cs - carcinogen, SSL may exceed saturation
ns - noncarcinogen, SSL may exceed saturation
nl - noncarcinogen, SSL may exceed ceiling limit
nls - noncarcinogen, SSL may exceed both saturation and ceiling limit
- no screenig value currently available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)
EPA - Regional Screening Levels (April 2009)

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-1 (3.5-4.5')	SWMU 3-1 (7.5-8.5')	SWMU 3-3 (3.5-4.5')	SWMU 3-3 (7.5-8.5')	SWMU 3-3 (24-26')	SWMU 3-3 (26-27')	SWMU 3-4 (6-7')	SWMU 3-4 (10-11')	SWMU 3-4 (12-14')	SWMU 3-5 (4.5-5.5')	SWMU 3-5 (8.5-9.5')	SWMU 3-6 (6-7')	SWMU 3-6 (10-11')	SWMU 3-7 (0-2')	SWMU 3-7 (4.25-5.25')	SWMU 3-7 (8.25-9.25')	SWMU 3-8 (6-7')	SWMU 3-8 (10-11')	SWMU 3-8 (12-14')	SWMU 3-8 (14-16')	SWMU 3-9 (14-16')
							1201871-001	1201871-002	1201827-005	1201827-006	1201827-007	1201827-008	1201800-001	1201800-002	1201800-003	1201871-010	1201871-011	1202199-005	1202199-006	1202147-007	1202147-005	1202147-006	1202199-001	1202199-002	1202199-003	1202199-004	1202151-004
							1/30/2012	1/30/2012	1/27/2012	1/27/2012	1/27/2012	1/27/2012	1/25/2012	1/25/2012	1/25/2012	1/30/2012	1/30/2012	2/6/2012	2/6/2012	2/2/2012	2/2/2012	2/2/2012	2/6/2012	2/6/2012	2/6/2012	2/6/2012	2/3/2012
Metals (mg/kg)																											
Antimony	3.13E+01	(1)	1.24E+02	(5)	7.44E+00	(8)	<5.0	<5.0	<5.0	<2.5	<2.5	<12	<2.5	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<2.5	<5.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Arsenic	3.90E+00	(1)	1.77E+01	(4)	1.48E-01	(8)	<5.0	<5.0	<5.0	<2.5	<2.5	17	<2.5	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<2.5	<5.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Barium	1.56E+04	(1)	4.35E+03	(5)	3.39E+03	(8)	150	150	210	160	44	170	150	160	170	140	87	74	61	130	37	33	71	14	24	23	10
Beryllium	1.56E+02	(1)	1.44E+02	(5)	6.49E+02	(8)	0.49	0.47	0.54	0.35	<0.15	<0.75	<0.15	<0.15	<0.15	0.41	<0.30	0.37	0.3	0.33	<0.30	<0.15	0.33	0.69	0.49	0.38	0.59
Cadmium	7.03E+01	(1)	2.77E+02	(5)	1.55E+01	(8)	<0.20	<0.20	<0.20	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium III	1.17E+05	(1)	4.65E+05	(5)	1.11E+09	(8)	7.5	7.4	8.5	5.3	1.8	3	2.7	6	3.7	6.3	4	5.4	4	4.7	3.3	2	3.6	3.9	3.8	2.4	3.3
Chromium VI	2.97E+00	(1)	6.31E+01	(4)	9.34E-02	(8)	**7.5**	**7.4**	**8.5**	**5.3**	1.8	**3**	2.7	**6**	**3.7**	**6.3**	**4**	**5.4**	**4**	**4.7**	**3.3**	2	**3.6**	**3.9**	**3.8**	2.4	**3.3**
Cobalt	2.30E+01	(2)	3.00E+02	(6)	5.51E+00	(9)	4.2	4	5.2	3.3	1.5	4.6	2.7	3	2.8	3.6	2.3	3	2.4	2.7	2	1.4	2.2	2.1	2.1	1.9	3.2
Cyanide	4.69E+01	(1)	1.86E+02	(5)	2.48E+00	(8)	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Lead	4.00E+02	(1)	8.00E+02	(4)	-	-	3.3	3.4	4.4	2.8	2.9	7.3	1	0.71	0.94	3.1	2	2.9	2.4	2.5	2	1.6	2.5	3	3.3	2.8	2.8
Mercury	1.56E+01	(1)	1.36E+01	(5)	3.68E-01	(8)	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Nickel	1.56E+03	(1)	6.19E+03	(5)	5.36E+02	(8)	6.6	5.8	7.8	4.7	1.4	2.8	1.7	2.2	1.4	5.3	3.6	4.9	3.7	3.9	2.8	1.8	2.8	2.8	2.6	2	3
Selenium	3.91E+02	(1)	1.55E+03	(5)	1.09E+01	(8)	<5.0	<5.0	<5.0	<2.5	<2.5	<12	<2.5	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<2.5	<5.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Silver	3.91E+02	(1)	1.55E+03	(5)	1.76E+01	(8)	<0.50	<0.50	<0.50	<0.25	<0.25	<1.2	<0.25	<0.25	<0.25	<0.50	<0.50	<0.25	<0.25	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Vanadium	3.91E+02	(1)	1.55E+03	(5)	2.05E+03	(8)	21	20	29	18	7	24	16	17	18	20	12	15	12	14	11	7.2	11	12	9.3	7.4	8.7
Zinc	2.35E+04	(1)	9.29E+04	(5)	7.67E+03	(8)	25	25	33	19	7.1	25	13	15	14	21	15	18	14	17	12	8.2	14	20	17	13	18
Volatile Organic Compounds - (EPA Method 8260) mg/kg																											
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,1,2,2-Tetrachloroethane	8.02E+00	(1)	4.35E+01	(4)	2.80E-05	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,1-Dichloropropene	-	-	-	-	-	-	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2,3-Trichlorobenzene	-	-	-	-	-	-	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	<0.001	<0.0009	0.077	0.058	1.4	1.8	<0.001	0.00658	0.14	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	0.00634	<0.005	<0.005	<0.001
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	<0.001	<0.0009	<0.050	<0.050	0.16	0.4	<0.001	0.00234	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	0.0056	<0.005	<0.005	<0.001
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
1-Methylnaphthalene	2.20E+01	(3)	9.90E+02	(7)	1.69E-01	(9)	<0.004	<0.0039	<0.20	<0.20	2.2	1.2	<0.004	<0.004	<0.20	<0.004	<0.004	<0.025	<0.025	<0.004	<0.004	<0.004	<0.025	<0.025	<0.025	<0.025	<0.004
2,2-Dichloropropane	-	-	-	-	-	-	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	<0.001	<0.0009	<0.50	<0.50	<0.50	<0.48	<0.001	0.00297	<0.50	<0.001	<0.001	<0.025	<0.025	0.00135	<0.001	<0.001	<0.025	<0.025	<0.025	<0.025	<0.001
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
2-Hexanone	-	-	-	-	-	-	<0.001	<0.0009	<0.50	<0.50	<0.50	<0.48	<0.001	<0.001	<0.50	<0.001	<0.001	<0.025	<0.025	<0.001	<0.001	<0.001	<0.025	<0.025	<0.025	<0.025	<0.001
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.004	<0.0039	<0.20	<0.20	3.9	2.6	<0.004	<0.004	<0.20	<0.004	<0.004	<0.025	<0.025	<0.004	<0.004	<0.004	<0.025	<0.025	<0.025	<0.025	<0.004
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
4-Isopropyltoluene	-	-	-	-	-	-	<0.001	<0.0009	<0.050	<0.050	<0.050	0.052	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
4-Methyl-2-pentanone	-	-	-	-	-	-	<0.001	<0.0009	<0.50	<0.50	<0.50	<0.48	<0.001	<0.001	<0.50	<0.001	<0.001	<0.025	<0.025	<0.001	<0.001	<0.001	<0.025	<0.025	<0.025	<0.025	<0.001
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	<0.005	<0.0049	<0.75	<0.75	<0.75	<0.72	<0.005	0.0122	<0.75	<0.005	<0.005	<0.025	<0.025	0.0155	<0.005	<0.005	<0.025	<0.025	<0.025	<0.025	0.013
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	0.00351	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	<0.001	<0.0009	<0.40	<0.40	<0.40	<0.38	<0.001	<0.001	<0.40	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	<0.001	<0.0009	<0.50	<0.50	<0.50	<0.48	<0.001	<0.001	<0.50	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Chloroethane	-	-	-	-	-	-	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	<0.001	<0.0009	0.062	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	<0.001	<0.0009	<0.15	<0.15	<0.15	<0.14	<0.001	<0.001	<0.15	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
cis-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-1 (3.5-4.5')	SWMU 3-1 (7.5-8.5')	SWMU 3-3 (3.5-4.5')	SWMU 3-3 (7.5-8.5')	SWMU 3-3 (24-26')	SWMU 3-3 (26-27')	SWMU 3-4 (6-7')	SWMU 3-4 (10-11')	SWMU 3-4 (12-14')	SWMU 3-5 (4.5-5.5')	SWMU 3-5 (8.5-9.5')	SWMU 3-6 (6-7')	SWMU 3-6 (10-11')	SWMU 3-7 (0-2')	SWMU 3-7 (4.25-5.25')	SWMU 3-7 (8.25-9.25')	SWMU 3-8 (6-7')	SWMU 3-8 (10-11')	SWMU 3-8 (12-14')	SWMU 3-8 (14-16')	SWMU 3-9 (14-16')
							1201871-001	1201871-002	1201827-005	1201827-006	1201827-007	1201827-008	1201800-001	1201800-002	1201800-003	1201871-010	1201871-011	1202199-005	1202199-006	1202147-007	1202147-005	1202147-006	1202199-001	1202199-002	1202199-003	1202199-004	1202151-004
							1/30/2012	1/30/2012	1/27/2012	1/27/2012	1/27/2012	1/27/2012	1/25/2012	1/25/2012	1/25/2012	1/30/2012	1/30/2012	2/6/2012	2/6/2012	2/2/2012	2/2/2012	2/2/2012	2/6/2012	2/6/2012	2/6/2012	2/6/2012	2/3/2012
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	<0.001	<0.0009	<0.050	<0.050	2.9	0.11	<0.001	0.00269	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	<0.001	<0.0009	<0.10	<0.10	<0.10	<0.096	<0.001	<0.001	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	<0.001	<0.0009	<0.050	<0.050	0.65	0.071	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	0.0192	<0.005	<0.005	<0.001
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	<0.001	<0.0009	<0.15	<0.15	<0.15	<0.14	<0.001	<0.001	<0.15	<0.001	<0.001	<0.025	<0.025	<0.001	<0.001	<0.001	<0.025	<0.025	<0.025	<0.025	<0.001
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.002	<0.0019	<0.10	<0.10	2.5	1.3	<0.002	0.00231	<0.10	<0.002	<0.002	<0.005	<0.005	<0.002	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.001
n-Butylbenzene	-	-	-	-	-	-	<0.001	<0.0009	<0.050	<0.050	2.5	0.96	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
n-Propylbenzene	-	-	-	-	-	-	<0.001	<0.0009	<0.050	<0.050	3.2	0.57	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
sec-Butylbenzene	-	-	-	-	-	-	<0.001	<0.0009	<0.050	<0.050	0.73	0.21	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
tert-Butylbenzene	-	-	-	-	-	-	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	0.0296	0.00295	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
trans-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	<0.001	<0.0009	<0.050	<0.050	<0.050	<0.048	<0.001	<0.001	<0.050	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.001
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	<0.001	<0.0009	<0.10	<0.10	0.33	0.17	<0.001	0.0105	<0.10	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.005	<0.005	0.0055	<0.005	<0.001
Semi Volatile Organics - (EPA Method 8270) mg/kg																											
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	6.11E+03	(1)	2.38E+04	(5)	1.17E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
2,4,6-Trichlorophenol	6.11E+01	(1)	2.38E+02	(5)	1.17E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
2,4-Dichlorophenol	1.83E+02	(1)	7.15E+02	(5)	1.12E+00	(8)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40
2,4-Dimethylphenol	1.22E+03	(1)	4.76E+03	(5)	7.48E+00	(8)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.60	<0.30	<0.30	<0.30	<0.30
2,4-Dinitrophenol	1.22E+02	(1)	4.76E+02	(5)	7.10E-01	(8)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40
2,4-Dinitrotoluene	1.57E+01	(1)	6.18E+01	(4)	2.53E-02	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50
2,6-Dinitrotoluene	6.11E+01	(1)	2.38E+02	(5)	4.33E-01	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50
2-Chloronaphthalene	6.26E+03	(1)	2.48E+04	(5)	1.28E+02	(8)	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25
2-Chlorophenol	3.91E+02	(1)	1.55E+03	(5)	1.30E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.20	<0.20	<0.20	<0.20	4.1	2.4	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
2-Methylphenol	3.10E+03	(2)	3.10E+04	(6)	2.25E+01	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50
2-Nitroaniline	1.80E+02	(2)	1.80E+03	(6)	3.71E-01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
2-Nitrophenol	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
3,3'-Dichlorobenzidine	1.08E+01	(1)	4.26E+01	(4)	8.33E-02	(8)	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25
3+4-Methylphenol	3.10E+02	(2)	3.10E+03	(6)	2.14E+00	(9)	<0.20	<0.20	<0.20	0.21	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
3-Nitroaniline	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50
4-Bromophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
4-Chloro-3-methylphenol	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50
4-Chloroaniline	2.40E+00	(3)	8.60E+01	(7)	1.35E-03	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
4-Nitroaniline	2.40E+01	(3)	8.60E+02	(7)	1.13E-02	(9)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40
4-Nitrophenol	-	-	-	-	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25
Acenaphthene	3.44E+03	(1)	1.86E+04	(5)	1.90E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Acenaphthylene	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Aniline	8.50E+01	(3)	3.00E+03	(7)	3.83E-02	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Anthracene	1.72E+04	(1)	6.68E+04	(5)	3.04E+03	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Azobenzene	4.90E+00	(3)	2.20E+02	(7)	5.74E-03	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Benz(a)anthracene	1.48E+00	(1)	2.34E+01	(4)	8.81E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	1.48E-01	(1)	2.34E+00	(4)	2.92E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Benzo(b)fluoranthene	1.48E+00	(1)	2.34E+01	(4)	2.98E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Benzo(k)fluoranthene	1.48E+01	(1)	2.34E+02	(4)	2.92E+01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Benzoic acid	2.40E+05	(2)	2.50E+06	(6)	3.71E+02	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50
Benzyl alcohol	3.10E+04	(2)	3.10E+05	(6)	4.73E+01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethoxy)methane	1.80E+02	(2)	1.80E+03	(6)	2.59E-01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethyl)ether	2.68E+00	(1)	1.42E+01	(4)	2.96E-04	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	4.54E+02	(4)	2.62E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Bis(2-ethylhexyl)phthalate	3.47E+02	(1)	1.37E+03	(4)	9.70E+01	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<0.50	<1.0	<0.50	<0.50	<0.50
Butyl benzyl phthalate	2.60E+02	(3)	9.10E+03	(7)	7.54E+00	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-1 (3.5-4.5')	SWMU 3-1 (7.5-8.5')	SWMU 3-3 (3.5-4.5')	SWMU 3-3 (7.5-8.5')	SWMU 3-3 (24-26')	SWMU 3-3 (26-27')	SWMU 3-4 (6-7')	SWMU 3-4 (10-11')	SWMU 3-4 (12-14')	SWMU 3-5 (4.5-5.5')	SWMU 3-5 (8.5-9.5')	SWMU 3-6 (6-7')	SWMU 3-6 (10-11')	SWMU 3-7 (0-2')	SWMU 3-7 (4.25-5.25')	SWMU 3-7 (8.25-9.25')	SWMU 3-8 (6-7')	SWMU 3-8 (10-11')	SWMU 3-8 (12-14')	SWMU 3-8 (14-16')	SWMU 3-9 (14-16')
							1201871-001	1201871-002	1201827-005	1201827-006	1201827-007	1201827-008	1201800-001	1201800-002	1201800-003	1201871-010	1201871-011	1202199-005	1202199-006	1202147-007	1202147-005	1202147-006	1202199-001	1202199-002	1202199-003	1202199-004	1202151-004
							1/30/2012	1/30/2012	1/27/2012	1/27/2012	1/27/2012	1/27/2012	1/25/2012	1/25/2012	1/25/2012	1/30/2012	1/30/2012	2/6/2012	2/6/2012	2/2/2012	2/2/2012	2/2/2012	2/6/2012	2/6/2012	2/6/2012	2/6/2012	2/3/2012
Carbazole	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Chrysene	1.48E+02	(1)	2.34E+03	(4)	8.99E+01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	1.48E-01	(1)	2.34E+00	(4)	9.52E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Dibenzofuran	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Diethyl phthalate	4.89E+04	(1)	1.91E+05	(5)	1.09E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Dimethyl phthalate	6.11E+05	(1)	2.38E+06	(5)	9.06E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Di-n-butyl phthalate	*6.11E+03*	*(1)*	*2.38E+04*	*(5)*	*7.84E+01*	*(8)*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.49*	*<0.50*	*<1.0*	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Di-n-octyl phthalate	-	-	-	-	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25
Fluoranthene	2.29E+03	(1)	8.91E+03	(5)	1.37E+03	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Fluorene	2.29E+03	(1)	8.91E+03	(5)	2.29E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Hexachlorobenzene	3.04E+00	(1)	1.20E+01	(4)	4.48E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Hexachlorobutadiene	6.20E+00	(3)	2.20E+02	(7)	2.14E-02	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Hexachlorocyclopentadiene	3.67E+02	(1)	8.11E+02	(5)	5.92E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Hexachloroethane	*4.28E+01*	*(1)*	*1.67E+02*	*(5)*	*9.20E-02*	*(8)*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.40*	*<0.20*	*<0.20*	*<0.20*	*<0.20*
Indeno(1,2,3-cd)pyrene	1.48E+00	(1)	2.34E+01	(4)	9.71E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Isophorone	5.12E+03	(1)	4.75E+04	(5)	2.16E+00	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.20	<0.20	<0.20	<0.20	1.5	0.93	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Nitrobenzene	5.35E+01	(1)	3.00E+02	(4)	7.02E-03	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
N-Nitrosodi-n-propylamine	6.90E-02	(3)	2.50E+00	(7)	1.24E-04	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
N-Nitrosodiphenylamine	9.93E+02	(1)	3.91E+03	(4)	6.36E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Pentachlorophenol	8.94E+00	(1)	3.00E+01	(4)	1.44E-01	(8)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40
Phenanthrene	1.83E+03	(1)	7.15E+03	(5)	3.21E+02	(8)	<0.20	<0.20	<0.20	<0.20	0.25	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Phenol	1.83E+04	(1)	6.88E+04	(5)	5.59E+01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Pyrene	1.72E+03	(1)	6.68E+03	(5)	1.01E+03	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20
Pyridine	7.80E+01	(2)	1.00E+03	(6)	1.09E-01	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.49	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg																											
Diesel Range Organics (DRO)	1.00E+03	(11)	1.00E+03	(11)	1.00E+03	(11)	<9.9	30	<9.8	12	380	150	<10	<10	<10	<10	<9.9	<9.8	<9.7	<10	<9.8	<9.7	<10	<10	<9.9	<9.9	<10
Gasoline Range Organics (GRO)	--		--		--		<5.0	<5.0	<5.0	<5.0	100	28	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Motor Oil Range Organics (MRO)	3.00E+03	(12)	5.00E+03	(12)	3.00E+03	(12)	<49	51	<49	<49	<50	<48	<50	<50	<50	<50	<49	<49	<48	<51	<49	<49	<50	<51	<50	<50	<50

-- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)

EPA - Regional Screening Levels (April 2009)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels (April 2009)

(7) EPA Industrial - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(8) SoilGW NMED Dilution Attenuation Factor (DAF) = 11.25

(9) SoilGW Risk-based EPA DAF = 11.25

(10) SoilGW MCL-based EPA DAF = 11.25

(11) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "uknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

(12) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "Waste Oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Non-Residential Screening Level
yellow highlight represents value above Leachate (DAF) Screening Level
Bold with yellow highlight value exceeds Non-Residential Screening Level and DAF

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-9 (18-19')	SWMU 3-10 (2-4')	SWMU 3-10 (10-12')	SWMU 3-10 (13.5-14')	SWMU 3-11 (6.5-7.5')	SWMU 3-11 (10.5-11.5')	SWMU 3-12 (5-6')	SWMU 3-12 (9-10')	SWMU 3-13 (5.5-6.5')	SWMU 3-13 (9.5-10.5')	SWMU 3-14 (4.5-5.5')	SWMU 3-14 (8.5-9.5')	SWMU 3-15 (5.5-6.5')	SWMU 3-16 (9.5-10.5')	SWMU 3-16 (4.25-5.25')	SWMU 3-16 (8.25-9.25')	SWMU 3-17 (5-6')	SWMU 3-17 (9-10')	SWMU 3-18 (4.5-5.5')	SWMU 3-18 (8.5-9.5')	SWMU 3-19 (4.5-5.5')
							1202151-005	1202151-001	1202151-002	1202151-003	1202147-003	1202147-004	1201800-015	1201800-016	1201800-012	1201800-014	1202017-001	1202017-002	1201800-008	1201800-009	1202148-006	1202148-008	1201800-006	1201800-007	1201800-010	1201800-011	1201827-003
							2/3/2012	2/3/2012	2/3/2012	2/3/2012	2/2/2012	2/2/2012	1/26/2012	1/26/2012	1/26/2012	1/26/2012	1/30/2012	1/30/2012	1/26/2012	1/26/2012	2/2/2012	2/2/2012	1/25/2012	1/25/2012	1/26/2012	1/26/2012	1/26/2012
Metals (mg/kg)																											
Antimony	3.13E+01	(1)	1.24E+02	(5)	7.44E+00	(8)	<2.5	<2.5	<2.5	<2.5	<2.5	<12	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<12	<12	<5.0	<2.5	<2.5	<2.5	<12
Arsenic	3.90E+00	(1)	1.77E+01	(4)	1.48E-01	(8)	<2.5	<2.5	<2.5	<2.5	<2.5	<12	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0	2.5	<2.5	<12	<12	<5.0	<2.5	<2.5	<2.5	<12
Barium	1.56E+04	(1)	4.35E+03	(5)	3.39E+03	(8)	23	83	260	230	590	640	140	77	160	120	150	73	160	76	180	140	170	120	150	170	300
Beryllium	1.56E+02	(1)	1.44E+02	(5)	6.49E+02	(8)	0.53	0.33	0.21	0.19	0.17	<0.75	0.33	0.27	0.35	0.33	0.49	0.42	0.43	0.37	<0.75	<0.75	0.52	0.36	0.4	0.33	<0.75
Cadmium	7.03E+01	(1)	2.77E+02	(5)	1.55E+01	(8)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.50	<0.50	<0.20	<0.10	<0.10	<0.10	<0.50
Chromium III	1.17E+05	(1)	4.65E+05	(5)	1.11E+09	(8)	3.7	5.4	3.9	28	83	11	5	4.1	5.3	4.9	7.6	6.1	6.6	5.5	12	8.7	8.5	4.9	6.2	5	10
Chromium VI	2.97E+00	(1)	6.31E+01	(4)	9.34E-02	(8)	**3.7**	**5.4**	**3.9**	**28**	**83**	**11**	**5**	**4.1**	**5.3**	**4.9**	**7.6**	**6.1**	**6.6**	**5.5**	**12**	**8.7**	**8.5**	**4.9**	**6.2**	**5**	**10**
Cobalt	2.30E+01	(2)	3.00E+02	(6)	5.51E+00	(9)	3.3	2.4	3.4	3.5	4.3	5.8	2.7	2.3	3.1	2.9	5	3.8	4.2	3.1	7.5	4.4	5.3	2.9	3.8	2.9	6
Cyanide	4.69E+01	(1)	1.86E+02	(5)	2.48E+00	(8)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30	<0.30	<0.3	<0.3	<0.3	<0.3	<0.3
Lead	4.00E+02	(1)	8.00E+02	(4)	-	-	2.7	2	1.2	1.1	1.2	1.5	2.5	2.2	2.7	2.5	3.9	3.1	3.2	2.8	6.7	4.3	4.6	2.9	3.1	2.5	5.1
Mercury	1.56E+01	(1)	1.36E+01	(5)	3.68E-01	(8)	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Nickel	1.56E+03	(1)	6.19E+03	(5)	5.36E+02	(8)	2.9	3.8	3	5.6	9.8	4.9	4.2	3.4	4.6	4.2	6.9	5.5	5.8	4.7	9.9	6.8	7.4	4.4	5.4	4.3	8.4
Selenium	3.91E+02	(1)	1.55E+03	(5)	1.09E+01	(8)	<2.5	<2.5	<2.5	<2.5	<2.5	<12	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<12	<12	<5.0	<2.5	<2.5	<2.5	<12
Silver	3.91E+02	(1)	1.55E+03	(5)	1.76E+01	(8)	<0.25	<0.25	<0.25	<0.25	<0.25	<1.2	<0.25	<0.25	<0.25	<0.25	<0.50	<0.50	<0.25	<0.25	<1.2	<1.2	<0.50	<0.25	<0.25	<0.25	<1.2
Vanadium	3.91E+02	(1)	1.55E+03	(5)	2.05E+03	(8)	8.4	12	18	19	24	35	16	13	17	15	25	18	22	16	40	23	27	15	21	15	31
Zinc	2.35E+04	(1)	9.29E+04	(5)	7.67E+03	(8)	14	15	17	17	18	29	16	14	18	16	31	23	23	19	46	29	35	18	22	17	39
Volatile Organic Compounds - (EPA Method 8260) mg/kg																											
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,1,2,2-Tetrachloroethane	8.02E+00	(1)	4.35E+01	(4)	2.80E-05	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,1-Dichloropropene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2,3-Trichlorobenzene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
1-Methylnaphthalene	2.20E+01	(3)	9.90E+02	(7)	1.69E-01	(9)	<0.0220	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0036	<0.0036	<0.004	<0.0036	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0035
2,2-Dichloropropane	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	0.00672	0.0027	0.00127	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	0.00149	0.00202	<0.001	<0.001	<0.001	<0.001	<0.0008
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
2-Hexanone	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.0220	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0036	<0.0036	<0.004	<0.0036	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0035
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
4-Isopropyltoluene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
4-Methyl-2-pentanone	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	<0.0276	0.0137	0.00502	0.00518	<0.005	<0.005	<0.0046	<0.0046	<0.005	<0.0045	<0.005	<0.005	<0.005	<0.005	0.00825	0.00526	<0.005	<0.005	<0.005	<0.005	<0.0043
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Chloroethane	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
cis-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-9 (18-19')	SWMU 3-10 (2-4')	SWMU 3-10 (10-12')	SWMU 3-10 (13.5-14')	SWMU 3-11 (6.5-7.5')	SWMU 3-11 (10.5-11.5')	SWMU 3-12 (5-6')	SWMU 3-12 (9-10')	SWMU 3-13 (5.5-6.5')	SWMU 3-13 (9.5-10.5')	SWMU 3-14 (4.5-5.5')	SWMU 3-14 (8.5-9.5')	SWMU 3-15 (5.5-6.5')	SWMU 3-15 (9.5-10.5')	SWMU 3-16 (4.25-5.25')	SWMU 3-16 (8.25-9.25')	SWMU 3-17 (5-6')	SWMU 3-17 (9-10')	SWMU 3-18 (4.5-5.5')	SWMU 3-18 (8.5-9.5')	SWMU 3-19 (4.5-5.5')
							1202151-005	1202151-001	1202151-002	1202151-003	1202147-003	1202147-004	1201800-015	1201800-016	1201800-012	1201800-014	1202017-001	1202017-002	1201800-008	1201800-009	1202148-006	1202148-008	1201800-006	1201800-007	1201800-010	1201800-011	1201827-003
							2/3/2012	2/3/2012	2/3/2012	2/3/2012	2/2/2012	2/2/2012	1/26/2012	1/26/2012	1/26/2012	1/26/2012	1/30/2012	1/30/2012	1/26/2012	1/26/2012	2/2/2012	2/2/2012	1/25/2012	1/25/2012	1/26/2012	1/26/2012	1/26/2012
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.002	<0.002	<0.0018	<0.0018	<0.002	<0.0018	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0017
n-Butylbenzene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
n-Propylbenzene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
sec-Butylbenzene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
tert-Butylbenzene	-	-	-	-	-	-	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Toluene	*5.27E+03*	*(1)*	*1.34E+04*	*(5)*	*1.42E+01*	*(8)*	*<0.0055*	*0.00865*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.0009*	*<0.0009*	*<0.001*	*<0.0009*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.0008*
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
trans-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	<0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	<0.0110	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0009	<0.0009	<0.001	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Semi Volatile Organics - (EPA Method 8270) mg/kg																												
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	6.11E+03	(1)	2.38E+04	(5)	1.17E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4,6-Trichlorophenol	6.11E+01	(1)	2.38E+02	(5)	1.17E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4-Dichlorophenol	1.83E+02	(1)	7.15E+02	(5)	1.12E+00	(8)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
2,4-Dimethylphenol	1.22E+03	(1)	4.76E+03	(5)	7.48E+00	(8)	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2,4-Dinitrophenol	1.22E+02	(1)	4.76E+02	(5)	7.10E-01	(8)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
2,4-Dinitrotoluene	1.57E+01	(1)	6.18E+01	(4)	2.53E-02	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,6-Dinitrotoluene	6.11E+01	(1)	2.38E+02	(5)	4.33E-01	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2-Chloronaphthalene	6.26E+03	(1)	2.48E+04	(5)	1.28E+02	(8)	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Chlorophenol	3.91E+02	(1)	1.55E+03	(5)	1.30E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Methylphenol	3.10E+03	(2)	3.10E+04	(6)	2.25E+01	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2-Nitroaniline	1.80E+02	(2)	1.80E+03	(6)	3.71E-01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Nitrophenol	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3,3'-Dichlorobenzidine	1.08E+01	(1)	4.26E+01	(4)	8.33E-02	(8)	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
3+4-Methylphenol	*3.10E+02*	*(2)*	*3.10E+03*	*(6)*	*2.14E+00*	*(9)*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*	*<0.20*
3-Nitroaniline	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Bromophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4-Chloro-3-methylphenol	-	-	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chloroaniline	2.40E+00	(3)	8.60E+01	(7)	1.35E-03	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4-Nitroaniline	2.40E+01	(3)	8.60E+02	(7)	1.13E-02	(9)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
4-Nitrophenol	-	-	-	-	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Acenaphthene	3.44E+03	(1)	1.86E+04	(5)	1.90E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthylene	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Aniline	8.50E+01	(3)	3.00E+03	(7)	3.83E-02	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Anthracene	1.72E+04	(1)	6.68E+04	(5)	3.04E+03	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Azobenzene	4.90E+00	(3)	2.20E+02	(7)	5.74E-03	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benz(a)anthracene	1.48E+00	(1)	2.34E+01	(4)	8.81E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	1.48E-01	(1)	2.34E+00	(4)	2.92E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(b)fluoranthene	1.48E+00	(1)	2.34E+01	(4)	2.98E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(k)fluoranthene	1.48E+01	(1)	2.34E+02	(4)	2.92E+01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzoic acid	2.40E+05	(2)	2.50E+06	(6)	3.71E+02	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzyl alcohol	3.10E+04	(2)	3.10E+05	(6)	4.73E+01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethoxy)methane	1.80E+02	(2)	1.80E+03	(6)	2.59E-01	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethyl)ether	2.68E+00	(1)	1.42E+01	(4)	2.96E-04	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	4.54E+02	(4)	2.62E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-ethylhexyl)phthalate	3.47E+02	(1)	1.37E+03	(4)	9.70E+01	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Butyl benzyl phthalate	2.60E+02	(3)	9.10E+03	(7)	7.54E+00	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-9 (18-19')	SWMU 3-10 (2-4')	SWMU 3-10 (10-12')	SWMU 3-10 (13.5-14')	SWMU 3-11 (6.5-7.5')	SWMU 3-11 (10.5-11.5')	SWMU 3-12 (5-6')	SWMU 3-12 (9-10')	SWMU 3-13 (5.5-6.5')	SWMU 3-13 (9.5-10.5')	SWMU 3-14 (4.5-5.5')	SWMU 3-14 (8.5-9.5')	SWMU 3-15 (5.5-6.5')	SWMU 3-15 (9.5-10.5')	SWMU 3-16 (4.25-5.25')	SWMU 3-16 (8.25-9.25')	SWMU 3-17 (5-6')	SWMU 3-17 (9-10')	SWMU 3-18 (4.5-5.5')	SWMU 3-18 (8.5-9.5')	SWMU 3-19 (4.5-5.5')
							1202151-005	1202151-001	1202151-002	1202151-003	1202147-003	1202147-004	1201800-015	1201800-016	1201800-012	1201800-014	1202017-001	1202017-002	1201800-008	1201800-009	1202148-006	1202148-008	1201800-006	1201800-007	1201800-010	1201800-011	1201827-003
							2/3/2012	2/3/2012	2/3/2012	2/3/2012	2/2/2012	2/2/2012	1/26/2012	1/26/2012	1/26/2012	1/26/2012	1/30/2012	1/30/2012	1/26/2012	1/26/2012	2/2/2012	2/2/2012	1/25/2012	1/25/2012	1/26/2012	1/26/2012	1/26/2012
Carbazole	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chrysene	1.48E+02	(1)	2.34E+03	(4)	8.99E+01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	1.48E-01	(1)	2.34E+00	(4)	9.52E-01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenzofuran	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Diethyl phthalate	4.89E+04	(1)	1.91E+05	(5)	1.09E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dimethyl phthalate	6.11E+05	(1)	2.38E+06	(5)	9.06E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Di-n-butyl phthalate	6.11E+03	(1)	2.38E+04	(5)	7.84E+01	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Di-n-octyl phthalate	-	-	-	-	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Fluoranthene	2.29E+03	(1)	8.91E+03	(5)	1.37E+03	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Fluorene	2.29E+03	(1)	8.91E+03	(5)	2.29E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorobenzene	3.04E+00	(1)	1.20E+01	(4)	4.48E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorobutadiene	6.20E+00	(3)	2.20E+02	(7)	2.14E-02	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorocyclopentadiene	3.67E+02	(1)	8.11E+02	(5)	5.92E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachloroethane	4.28E+01	(1)	1.67E+02	(5)	9.20E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Indeno(1,2,3-cd)pyrene	1.48E+00	(1)	2.34E+01	(4)	9.71E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Isophorone	5.12E+03	(1)	4.75E+04	(5)	2.16E+00	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Nitrobenzene	5.35E+01	(1)	3.00E+02	(4)	7.02E-03	(8)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
N-Nitrosodi-n-propylamine	6.90E-02	(3)	2.50E+00	(7)	1.24E-04	(9)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
N-Nitrosodiphenylamine	9.93E+02	(1)	3.91E+03	(4)	6.36E+00	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pentachlorophenol	8.94E+00	(1)	3.00E+01	(4)	1.44E-01	(8)	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Phenanthrene	1.83E+03	(1)	7.15E+03	(5)	3.21E+02	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Phenol	1.83E+04	(1)	6.88E+04	(5)	5.59E+01	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pyrene	1.72E+03	(1)	6.68E+03	(5)	1.01E+03	(8)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pyridine	7.80E+01	(2)	1.00E+03	(6)	1.09E-01	(9)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg																											
Diesel Range Organics (DRO)	1.00E+03	(11)	1.00E+03	(11)	1.00E+03	(11)	<9.8	<10	<9.9	<9.8	<10	<9.7	<10	<9.7	<10	<9.6	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Gasoline Range Organics (GRO)	--		--		--		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Motor Oil Range Organics (MRO)	3.00E+03	(12)	5.00E+03	(12)	3.00E+03	(12)	<49	<50	<50	<49	<51	<49	<50	<48	<50	<48	<50	<50	<51	<50	<50	<50	<52	<50	<50	<51	<50

-- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)

EPA - Regional Screening Levels (April 2009)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels (April 2009)

(7) EPA Industrial - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(8) SoilGW NMED Dilution Attenuation Factor (DAF) = 11.25

(9) SoilGW Risk-based EPA DAF = 11.25

(10) SoilGW MCL-based EPA DAF = 11.25

(11) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "uknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

(12) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "Waste Oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Non-Residential Screening Level
yellow highlight represents value above Leachate (DAF) Screening Level
Bold with yellow highlight value exceeds Non-Residential Screening Level and DAF

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-19 (8.5-9.5')	SWMU 3-20 (2-4')	SWMU 3-20 (10.5-11.5')	SWMU 3-20 (14.5-15.5')	SWMU 3-21 (6.5-7.5')	SWMU 3-21 (10.5-11.5')	SWMU 3-22 (5-6')	SWMU 3-22 (9-10')	SWMU 3-23 (8-9')	SWMU 3-23 (12-13')	SWMU 3-24 (5.5-6.5)	SWMU 3-24 (9.5-10.5')	SWMU 3-25 (5-6')	SWMU 3-25 (9-10')	SWMU 3-26 (2.5-3.5')	SWMU 3-26 (6.5-7.5')	SWMU 3-27 (2.5-3.5')	SWMU 3-27 (6.5-7.5')	SWMU 3-28 (2.5-3.5')	SWMU 3-28 (6.5-7.5')
							1201827-004	1202148-003	1202148-004	1202148-005	1202148-001	1202148-002	1201827-001	1201827-002	1201800-017	1201800-018	1202147-001	1202147-002	1201800-004	1201800-005	1201871-003	1201871-004	1201871-005	1201871-007	1201871-008	1201871-009
							1/26/2012	2/2/2012	2/2/2012	2/2/2012	2/2/2012	2/2/2012	1/26/2012	1/26/2012	1/26/2012	1/26/2012	2/2/2012	2/2/2012	1/25/2012	1/25/2012	1/30/2012	1/30/2012	1/30/2012	1/30/2012	1/30/2012	1/30/2012
Metals (mg/kg)																										
Antimony	3.13E+01	(1)	1.24E+02	(5)	7.44E+00	(8)	<5.0	<12	<13	<5.0	<5.0	<12	<5.0	<5.0	<2.5	<2.5	<13	<5.0	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<5.0	<5.0
Arsenic	3.90E+00	(1)	1.77E+01	(4)	1.48E-01	(8)	<5.0	<12	<13	<5.0	<5.0	<12	<5.0	<5.0	<2.5	2.6	<13	<5.0	2.6	<2.5	<5.0	<5.0	<2.5	<2.5	<5.0	<5.0
Barium	1.56E+04	(1)	4.35E+03	(5)	3.39E+03	(8)	120	160	120	120	180	180	300	130	41	210	210	190	150	55	50	36	46	190	64	45
Beryllium	1.56E+02	(1)	1.44E+02	(5)	6.49E+02	(8)	0.42	<0.75	<0.75	<0.30	0.48	<0.75	0.49	0.47	0.18	0.36	<0.75	0.43	0.44	0.3	<0.30	<0.30	0.21	<0.15	<0.30	<0.30
Cadmium	7.03E+01	(1)	2.77E+02	(5)	1.55E+01	(8)	<0.20	<0.50	<0.50	<0.20	<0.20	<0.50	<0.20	<0.20	<0.10	<0.10	<0.50	<0.20	<0.10	<0.10	<0.20	<0.20	<0.10	<0.10	<0.20	<0.20
Chromium III	1.17E+05	(1)	4.65E+05	(5)	1.11E+09	(8)	6.7	11	3.8	3.9	7.5	7.7	7.6	6.9	2.6	5.6	8.9	6.2	6.8	4.5	3.4	2.8	2.8	1.7	3.3	2.8
Chromium VI	2.97E+00	(1)	6.31E+01	(4)	9.34E-02	(8)	**6.7**	**11**	**3.8**	**3.9**	**7.5**	**7.7**	**7.6**	**6.9**	2.6	**5.6**	**8.9**	**6.2**	**6.8**	**4.5**	**3.4**	2.8	2.8	1.7	**3.3**	2.8
Cobalt	2.30E+01	(2)	3.00E+02	(6)	5.51E+00	(9)	3.7	5	4.7	2.2	4.5	4.5	5.1	4.1	1.6	3.1	5.4	3.3	3.8	2.3	2.2	1.9	1.7	1.3	2	1.8
Cyanide	4.69E+01	(1)	1.86E+02	(5)	2.48E+00	(8)	<0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.3	<0.3	<0.3	<0.3	<0.30	<0.30	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Lead	4.00E+02	(1)	8.00E+02	(4)	-	-	3.3	3.6	2.2	2.1	4.1	3.8	4.3	4	1.8	2.8	4.5	3.4	3.2	2	2.1	2.2	1.9	1.5	1.9	1.9
Mercury	1.56E+01	(1)	1.36E+01	(5)	3.68E-01	(8)	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
Nickel	1.56E+03	(1)	6.19E+03	(5)	5.36E+02	(8)	5.9	7.3	3.8	3.3	6.5	6.8	6.9	6.4	2.2	4.7	7.6	5.3	5.8	3.6	3	2.6	2.6	1.6	3.1	2.4
Selenium	3.91E+02	(1)	1.55E+03	(5)	1.09E+01	(8)	<5.0	<12	<13	<5.0	<5.0	<12	<5.0	<5.0	<2.5	<2.5	<13	<5.0	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<5.0	<5.0
Silver	3.91E+02	(1)	1.55E+03	(5)	1.76E+01	(8)	<0.50	<1.2	<1.2	<0.50	<0.50	<1.2	<0.50	<0.50	<0.25	<0.25	<1.3	<0.50	<0.25	<0.25	<0.50	<0.50	<0.25	<0.25	<0.50	<0.50
Vanadium	3.91E+02	(1)	1.55E+03	(5)	2.05E+03	(8)	19	27	13	13	23	20	27	20	8	16	27	18	20	14	10	9.4	10	6.4	11	8.5
Zinc	2.35E+04	(1)	9.29E+04	(5)	7.67E+03	(8)	22	35	15	14	26	29	30	25	9.4	19	33	20	22	15	13	12	11	7	13	11
Volatile Organic Compounds - (EPA Method 8260) mg/kg																										
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2,2-Tetrachloroethane	8.02E+00	(1)	4.35E+01	(4)	2.80E-05	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-Dichloropropene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,3-Trichlorobenzene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1-Methylnaphthalene	2.20E+01	(3)	9.90E+02	(7)	1.69E-01	(9)	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0035	<0.0035	<0.0038	<0.0036	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
2,2-Dichloropropane	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	<0.001	0.00683	0.00186	0.0017	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2-Hexanone	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0035	<0.0035	<0.0038	<0.0036	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
4-Isopropyltoluene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
4-Methyl-2-pentanone	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	<0.005	0.022	<0.005	0.00701	<0.005	<0.005	<0.0043	<0.0044	<0.0048	<0.0045	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroethane	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-19 (8.5-9.5')	SWMU 3-20 (2-4')	SWMU 3-20 (10.5-11.5')	SWMU 3-20 (14.5-15.5')	SWMU 3-21 (6.5-7.5')	SWMU 3-21 (10.5-11.5')	SWMU 3-22 (5-6')	SWMU 3-22 (9-10')	SWMU 3-23 (8-9')	SWMU 3-23 (12-13')	SWMU 3-24 (5.5-6.5)	SWMU 3-24 (9.5-10.5')	SWMU 3-25 (5-6')	SWMU 3-25 (9-10')	SWMU 3-26 (2.5-3.5')	SWMU 3-26 (6.5-7.5')	SWMU 3-27 (2.5-3.5')	SWMU 3-27 (6.5-7.5')	SWMU 3-28 (2.5-3.5')	SWMU 3-28 (6.5-7.5')
							1201827-004	1202148-003	1202148-004	1202148-005	1202148-001	1202148-002	1201827-001	1201827-002	1201800-017	1201800-018	1202147-001	1202147-002	1201800-004	1201800-005	1201871-003	1201871-004	1201871-005	1201871-007	1201871-008	1201871-009
							1/26/2012	2/2/2012	2/2/2012	2/2/2012	2/2/2012	2/2/2012	1/26/2012	1/26/2012	1/26/2012	1/26/2012	2/2/2012	2/2/2012	1/25/2012	1/25/2012	1/30/2012	1/30/2012	1/30/2012	1/30/2012	1/30/2012	1/30/2012
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.002	<0.001	<0.001	<0.001	<0.002	<0.002	<0.0017	<0.0017	<0.0019	<0.0018	<0.002	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
n-Butylbenzene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
n-Propylbenzene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
sec-Butylbenzene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
tert-Butylbenzene	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	*<0.001*	*0.00126*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.0008*	*<0.0008*	*<0.0009*	*<0.0009*	*0.00101*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*0.00135*	*<0.001*	*<0.001*	*<0.001*
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
trans-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008	<0.0008	<0.0009	<0.0009	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Semi Volatile Organics - (EPA Method 8270) mg/kg																										
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	6.11E+03	(1)	2.38E+04	(5)	1.17E+02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4,6-Trichlorophenol	6.11E+01	(1)	2.38E+02	(5)	1.17E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4-Dichlorophenol	1.83E+02	(1)	7.15E+02	(5)	1.12E+00	(8)	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
2,4-Dimethylphenol	1.22E+03	(1)	4.76E+03	(5)	7.48E+00	(8)	<0.30	<0.60	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2,4-Dinitrophenol	1.22E+02	(1)	4.76E+02	(5)	7.10E-01	(8)	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
2,4-Dinitrotoluene	1.57E+01	(1)	6.18E+01	(4)	2.53E-02	(8)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,6-Dinitrotoluene	6.11E+01	(1)	2.38E+02	(5)	4.33E-01	(8)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2-Chloronaphthalene	6.26E+03	(1)	2.48E+04	(5)	1.28E+02	(8)	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Chlorophenol	3.91E+02	(1)	1.55E+03	(5)	1.30E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Methylphenol	3.10E+03	(2)	3.10E+04	(6)	2.25E+01	(9)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2-Nitroaniline	1.80E+02	(2)	1.80E+03	(6)	3.71E-01	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Nitrophenol	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3,3'-Dichlorobenzidine	1.08E+01	(1)	4.26E+01	(4)	8.33E-02	(8)	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
3+4-Methylphenol	3.10E+02	(2)	3.10E+03	(6)	2.14E+00	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3-Nitroaniline	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Bromophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4-Chloro-3-methylphenol	-	-	-	-	-	-	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chloroaniline	2.40E+00	(3)	8.60E+01	(7)	1.35E-03	(9)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4-Nitroaniline	2.40E+01	(3)	8.60E+02	(7)	1.13E-02	(9)	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
4-Nitrophenol	-	-	-	-	-	-	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Acenaphthene	3.44E+03	(1)	1.86E+04	(5)	1.90E+02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthylene	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Aniline	8.50E+01	(3)	3.00E+03	(7)	3.83E-02	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Anthracene	1.72E+04	(1)	6.68E+04	(5)	3.04E+03	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Azobenzene	4.90E+00	(3)	2.20E+02	(7)	5.74E-03	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benz(a)anthracene	1.48E+00	(1)	2.34E+01	(4)	8.81E-01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	1.48E-01	(1)	2.34E+00	(4)	2.92E-01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(b)fluoranthene	1.48E+00	(1)	2.34E+01	(4)	2.98E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(k)fluoranthene	1.48E+01	(1)	2.34E+02	(4)	2.92E+01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzoic acid	2.40E+05	(2)	2.50E+06	(6)	3.71E+02	(9)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzyl alcohol	3.10E+04	(2)	3.10E+05	(6)	4.73E+01	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethoxy)methane	1.80E+02	(2)	1.80E+03	(6)	2.59E-01	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethyl)ether	2.68E+00	(1)	1.42E+01	(4)	2.96E-04	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	4.54E+02	(4)	2.62E-02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-ethylhexyl)phthalate	3.47E+02	(1)	1.37E+03	(4)	9.70E+01	(8)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Butyl benzyl phthalate	2.60E+02	(3)	9.10E+03	(7)	7.54E+00	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 3-19 (8.5-9.5')	SWMU 3-20 (2-4')	SWMU 3-20 (10.5-11.5')	SWMU 3-20 (14.5-15.5')	SWMU 3-21 (6.5-7.5')	SWMU 3-21 (10.5-11.5')	SWMU 3-22 (5-6')	SWMU 3-22 (9-10')	SWMU 3-23 (8-9')	SWMU 3-23 (12-13')	SWMU 3-24 (5.5-6.5)	SWMU 3-24 (9.5-10.5')	SWMU 3-25 (5-6')	SWMU 3-25 (9-10')	SWMU 3-26 (2.5-3.5')	SWMU 3-26 (6.5-7.5')	SWMU 3-27 (2.5-3.5')	SWMU 3-27 (6.5-7.5')	SWMU 3-28 (2.5-3.5')	SWMU 3-28 (6.5-7.5')
							1201827-004	1202148-003	1202148-004	1202148-005	1202148-001	1202148-002	1201827-001	1201827-002	1201800-017	1201800-018	1202147-001	1202147-002	1201800-004	1201800-005	1201871-003	1201871-004	1201871-005	1201871-007	1201871-008	1201871-009
							1/26/2012	2/2/2012	2/2/2012	2/2/2012	2/2/2012	2/2/2012	1/26/2012	1/26/2012	1/26/2012	1/26/2012	2/2/2012	2/2/2012	1/25/2012	1/25/2012	1/30/2012	1/30/2012	1/30/2012	1/30/2012	1/30/2012	1/30/2012
Carbazole	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chrysene	1.48E+02	(1)	2.34E+03	(4)	8.99E+01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	1.48E-01	(1)	2.34E+00	(4)	9.52E-01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenzofuran	-	-	-	-	-	-	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Diethyl phthalate	4.89E+04	(1)	1.91E+05	(5)	1.09E+02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dimethyl phthalate	6.11E+05	(1)	2.38E+06	(5)	9.06E+02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Di-n-butyl phthatate	6.11E+03	(1)	2.38E+04	(5)	7.84E+01	(8)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Di-n-octyl phthalate	-	-	-	-	-	-	<0.25	<0.50	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Fluoranthene	2.29E+03	(1)	8.91E+03	(5)	1.37E+03	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Fluorene	2.29E+03	(1)	8.91E+03	(5)	2.29E+02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorobenzene	3.04E+00	(1)	1.20E+01	(4)	4.48E-02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorobutadiene	6.20E+00	(3)	2.20E+02	(7)	2.14E-02	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorocyclopentadiene	3.67E+02	(1)	8.11E+02	(5)	5.92E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachloroethane	4.28E+01	(1)	1.67E+02	(5)	9.20E-02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Indeno(1,2,3-cd)pyrene	1.48E+00	(1)	2.34E+01	(4)	9.71E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Isophorone	5.12E+03	(1)	4.75E+04	(5)	2.16E+00	(8)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Nitrobenzene	5.35E+01	(1)	3.00E+02	(4)	7.02E-03	(8)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
N-Nitrosodi-n-propylamine	6.90E-02	(3)	2.50E+00	(7)	1.24E-04	(9)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
N-Nitrosodiphenylamine	9.93E+02	(1)	3.91E+03	(4)	6.36E+00	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pentachlorophenol	8.94E+00	(1)	3.00E+01	(4)	1.44E-01	(8)	<0.40	<0.80	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Phenanthrene	1.83E+03	(1)	7.15E+03	(5)	3.21E+02	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Phenol	1.83E+04	(1)	6.88E+04	(5)	5.59E+01	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pyrene	1.72E+03	(1)	6.68E+03	(5)	1.01E+03	(8)	<0.20	<0.40	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pyridine	7.80E+01	(2)	1.00E+03	(6)	1.09E-01	(9)	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg																										
Diesel Range Organics (DRO)	1.00E+03	(11)	1.00E+03	(11)	1.00E+03	(11)	<9.9	370	<10	<10	<9.9	<9.8	<9.9	<9.8	<9.8	<10	<9.9	<10	<9.8	<10	<9.8	<9.9	<9.7	<10	<10	<9.8
Gasoline Range Organics (GRO)	–		–		–		<5.0	5.4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Motor Oil Range Organics (MRO)	3.00E+03	(12)	5.00E+03	(12)	3.00E+03	(12)	<49	<510	<50	<51	<49	<49	<49	<49	<49	<51	<49	<50	<49	<52	<49	<49	<49	<50	<50	<49

– No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)

EPA - Regional Screening Levels (April 2009)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels (April 2009)

(7) EPA Industrial - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(8) SoilGW NMED Dilution Attenuation Factor (DAF) = 11.25

(9) SoilGW Risk-based EPA DAF = 11.25

(10) SoilGW MCL-based EPA DAF = 11.25

(11) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "uknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

(12) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "Waste Oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Non-Residential Screening Level
yellow highlight represents value above Leachate (DAF) Screening Level
Bold with yellow highlight value exceeds Non-Residential Screening Level and DAF

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 6-4 (5-6')	SWMU 6-4 (9-10')
							1201828-001	1201828-002
							1/27/2012	1/27/2012
Metals (mg/kg)								
Antimony	3.13E+01	(1)	1.24E+02	(5)	7.44E+00	(8)	<2.5	<12
Arsenic	3.90E+00	(1)	1.77E+01	(4)	1.48E-01	(8)	<2.5	<12
Barium	1.56E+04	(1)	4.35E+03	(5)	3.39E+03	(8)	200	350
Beryllium	1.56E+02	(1)	1.44E+02	(5)	6.49E+02	(8)	0.35	<0.75
Cadmium	7.03E+01	(1)	2.77E+02	(5)	1.55E+01	(8)	<0.10	<0.50
Chromium III	1.17E+05	(1)	4.65E+05	(5)	1.11E+09	(8)	5.4	4.6
Chromium VI	2.97E+00	(1)	6.31E+01	(4)	9.34E-02	(8)	**5.4**	**4.6**
Cobalt	2.30E+01	(2)	3.00E+02	(6)	5.51E+00	(9)	2.9	3.6
Cyanide	4.69E+01	(1)	1.86E+02	(5)	2.48E+00	(8)	<0.3	<0.3
Lead	4.00E+02	(1)	8.00E+02	(4)	-	-	2.6	2.5
Mercury	1.56E+01	(1)	1.36E+01	(5)	3.68E-01	(8)	<0.033	<0.033
Nickel	1.56E+03	(1)	6.19E+03	(5)	5.36E+02	(8)	4.7	3.8
Selenium	3.91E+02	(1)	1.55E+03	(5)	1.09E+01	(8)	<2.5	<12
Silver	3.91E+02	(1)	1.55E+03	(5)	1.76E+01	(8)	<0.25	<1.2
Vanadium	3.91E+02	(1)	1.55E+03	(5)	2.05E+03	(8)	16	21
Zinc	2.35E+04	(1)	9.29E+04	(5)	7.67E+03	(8)	18	18
Volatile Organic Compounds - (EPA Method 8260) mg/kg								
1,1,1,2-Tetrachloroethane	2.00E+00	(2)	9.80E+00	(6)	2.10E-04	(8)	<0.001	<0.001
1,1,1-Trichloroethane	1.56E+04	(1)	1.48E+04	(5)	3.28E+01	(8)	<0.001	<0.001
1,1,2,2-Tetrachloroethane	8.02E+00	(1)	4.35E+01	(4)	2.80E-05	(8)	<0.001	<0.001
1,1,2-Trichloroethane	2.81E+00	(1)	1.33E+01	(4)	1.26E-03	(8)	<0.001	<0.001
1,1-Dichloroethane	6.45E+01	(1)	3.59E+02	(4)	6.72E-02	(8)	<0.001	<0.001
1,1-Dichloroethene	4.49E+02	(1)	4.32E+02	(5)	1.31E+00	(8)	<0.001	<0.001
1,1-Dichloropropene	-	-	-	-	-	-	<0.001	<0.001
1,2,3-Trichlorobenzene	-	-	-	-	-	-	<0.001	<0.001
1,2,3-Trichloropropane	4.97E-02	(1)	7.23E+00	(5)	2.82E-05	(8)	<0.001	<0.001
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.001	<0.001
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.80E+02	(6)	2.70E-01	(9)	<0.001	<0.001
1,2-Dibromo-3-chloropropane	1.86E+00	(1)	1.08E+00	(4)	1.24E-05	(8)	<0.001	<0.001
1,2-Dibromoethane (EDB)	5.88E-01	(1)	3.22E+00	(4)	1.73E-04	(8)	<0.001	<0.001
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.001	<0.001
1,2-Dichloroethane (EDC)	7.89E+00	(1)	4.35E+01	(4)	4.00E-03	(8)	<0.001	<0.001
1,2-Dichloropropane	1.52E+01	(1)	2.50E+01	(5)	1.20E-02	(8)	<0.001	<0.001
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.00E+02	(6)	2.25E-01	(9)	<0.001	<0.001
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.001	<0.001
1,3-Dichloropropane	1.60E+03	(2)	2.00E+04	(6)	3.04E+00	(9)	<0.001	<0.001
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.001	<0.001
1-Methylnaphthalene	2.20E+01	(3)	9.90E+02	(7)	1.69E-01	(9)	<0.004	<0.004
2,2-Dichloropropane	-	-	-	-	-	-	<0.001	<0.001
2-Butanone (MEK)	3.71E+04	(1)	8.43E+04	(5)	1.43E+01	(8)	<0.001	<0.001
2-Chlorotoluene	1.56E+03	(1)	6.19E+03	(5)	6.28E+00	(8)	<0.001	<0.001
2-Hexanone	-	-	-	-	-	-	<0.001	<0.001
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.004	<0.004
4-Chlorotoluene	5.50E+03	(2)	7.20E+04	(6)	3.15E+01	(9)	<0.001	<0.001
4-Isopropyltoluene	-	-	-	-	-	-	<0.001	<0.001
4-Methyl-2-pentanone	-	-	-	-	-	-	<0.001	<0.001
Acetone	6.66E+04	(1)	2.21E+05	(5)	4.34E+01	(8)	<0.005	<0.005
Benzene	1.54E+01	(1)	8.47E+01	(4)	1.94E-02	(8)	<0.001	<0.001
Bromobenzene	9.40E+01	(2)	4.10E+02	(6)	1.69E-01	(9)	<0.001	<0.001
Bromodichloromethane	5.41E+00	(1)	3.01E+01	(4)	3.05E-03	(8)	<0.001	<0.001
Bromoform	6.10E+01	(3)	2.42E+03	(7)	2.59E-02	(9)	<0.001	<0.001
Bromomethane	1.65E+01	(1)	1.64E+01	(5)	2.16E-02	(8)	<0.001	<0.001
Carbon disulfide	1.53E+03	(1)	1.58E+03	(5)	3.18E+00	(8)	<0.001	<0.001
Carbon tetrachloride	1.08E+01	(1)	5.98E+01	(4)	1.80E-02	(8)	<0.001	<0.001
Chlorobenzene	3.76E+02	(1)	4.06E+02	(5)	5.53E-01	(8)	<0.001	<0.001
Chloroethane	-	-	-	-	-	-	<0.001	<0.001
Chloroform	5.86E+00	(1)	3.27E+01	(4)	5.16E-03	(8)	<0.001	<0.001
Chloromethane	2.75E+02	(1)	2.41E+02	(5)	4.94E-01	(8)	<0.001	<0.001
cis-1,2-DCE	1.56E+02	(1)	6.19E+02	(5)	2.07E-01	(8)	<0.001	<0.001
cis-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.001	<0.001
Dibromochloromethane	1.21E+01	(1)	6.24E+01	(4)	3.72E-03	(8)	<0.001	<0.001
Dibromomethane	7.80E+02	(2)	1.00E+04	(6)	1.02E+00	(9)	<0.001	<0.001
Dichlorodifluoromethane	1.68E+02	(1)	1.49E+02	(5)	4.18E+00	(8)	<0.001	<0.001

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11,25) (mg/kg) SoilGW NMED	Source	SWMU 6-4 (5-6')	SWMU 6-4 (9-10')
							1201828-001	1201828-002
							1/27/2012	1/27/2012
Ethylbenzene	6.84E+01	(1)	3.78E+02	(4)	1.46E-01	(8)	<0.001	<0.001
Hexachlorobutadiene	6.20E+00	(3)	2.20E+01	(7)	2.14E-02	(9)	<0.001	<0.001
Isopropylbenzene	2.43E+03	(1)	2.81E+03	(5)	9.73E+00	(8)	<0.001	<0.001
Methyl tert-butyl ether (MTBE)	9.01E+02	(1)	4.89E+03	(4)	2.71E-01	(8)	<0.001	<0.001
Methylene chloride	4.09E+02	(1)	1.12E+03	(5)	4.63E-01	(8)	<0.001	<0.001
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.002	<0.002
n-Butylbenzene	-	-	-	-	-	-	<0.001	<0.001
n-Propylbenzene	-	-	-	-	-	-	<0.001	<0.001
sec-Butylbenzene	-	-	-	-	-	-	<0.001	<0.001
Styrene	7.28E+03	(1)	9.99E+03	(5)	1.56E+01	(8)	<0.001	<0.001
tert-Butylbenzene	-	-	-	-	-	-	<0.001	<0.001
Tetrachloroethene (PCE)	7.02E+00	(1)	3.66E+01	(4)	4.84E-03	(8)	<0.001	<0.001
Toluene	5.27E+03	(1)	1.34E+04	(5)	1.42E+01	(8)	<0.001	<0.001
trans-1,2-DCE	2.70E+02	(1)	2.73E+02	(5)	3.02E-01	(8)	<0.001	<0.001
trans-1,3-Dichloropropene	3.37E+01	(1)	1.77E+02	(4)	1.39E-02	(8)	<0.001	<0.001
Trichloroethene (TCE)	8.77E+00	(1)	7.68E+00	(5)	1.18E-02	(8)	<0.001	<0.001
Trichlorofluoromethane	1.41E+03	(1)	1.30E+03	(5)	1.00E+01	(8)	<0.001	<0.001
Vinyl chloride	7.28E-01	(1)	2.61E+01	(4)	6.10E-04	(8)	<0.001	<0.001
Xylenes, Total	8.14E+02	(1)	7.43E+02	(5)	1.76E+00	(8)	<0.001	<0.001
Semi Volatile Organics - (EPA Method 8270) mg/kg								
1,2,4-Trichlorobenzene	7.30E+01	(1)	6.87E+01	(5)	1.03E-01	(8)	<0.20	<0.20
1,2-Dichlorobenzene	2.31E+03	(1)	2.71E+03	(5)	3.15E+00	(8)	<0.20	<0.20
1,3-Dichlorobenzene	-	-	-	-	-	-	<0.20	<0.20
1,4-Dichlorobenzene	3.17E+01	(1)	1.77E+02	(4)	3.59E-02	(8)	<0.20	<0.20
2,4,5-Trichlorophenol	6.11E+03	(1)	2.38E+04	(5)	1.17E+02	(8)	<0.20	<0.20
2,4,6-Trichlorophenol	6.11E+01	(1)	2.38E+02	(5)	1.17E+00	(8)	<0.20	<0.20
2,4-Dichlorophenol	1.83E+02	(1)	7.15E+02	(5)	1.12E+00	(8)	<0.40	<0.40
2,4-Dimethylphenol	1.22E+03	(1)	4.76E+03	(5)	7.48E+00	(8)	<0.30	<0.30
2,4-Dinitrophenol	1.22E+02	(1)	4.76E+02	(5)	7.10E-01	(8)	<0.40	<0.40
2,4-Dinitrotoluene	1.57E+01	(1)	6.18E+01	(4)	2.53E-02	(8)	<0.50	<0.50
2,6-Dinitrotoluene	6.11E+01	(1)	2.38E+02	(5)	4.33E-01	(8)	<0.50	<0.50
2-Chloronaphthalene	6.26E+03	(1)	2.48E+04	(5)	1.28E+02	(8)	<0.25	<0.25
2-Chlorophenol	3.91E+02	(1)	1.55E+03	(5)	1.30E+00	(8)	<0.20	<0.20
2-Methylnaphthalene	3.10E+02	(2)	4.10E+03	(6)	1.01E+01	(9)	<0.20	<0.20
2-Methylphenol	3.10E+03	(2)	3.10E+04	(6)	2.25E+01	(9)	<0.50	<0.50
2-Nitroaniline	1.80E+02	(2)	1.80E+03	(6)	3.71E-01	(9)	<0.20	<0.20
2-Nitrophenol	-	-	-	-	-	-	<0.20	<0.20
3,3'-Dichlorobenzidine	1.08E+01	(1)	4.26E+01	(4)	8.33E-02	(8)	<0.25	<0.25
3+4-Methylphenol	3.10E+02	(2)	3.10E+03	(6)	2.14E+00	(9)	<0.20	<0.20
3-Nitroaniline	-	-	-	-	-	-	<0.20	<0.20
4,6-Dinitro-2-methylphenol	-	-	-	-	-	-	<0.50	<0.50
4-Bromophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20
4-Chloro-3-methylphenol	-	-	-	-	-	-	<0.50	<0.50
4-Chloroaniline	2.40E+00	(3)	8.60E+01	(7)	1.35E-03	(9)	<0.50	<0.50
4-Chlorophenyl phenyl ether	-	-	-	-	-	-	<0.20	<0.20
4-Nitroaniline	2.40E+01	(3)	8.60E+02	(7)	1.13E-02	(9)	<0.40	<0.40
4-Nitrophenol	-	-	-	-	-	-	<0.25	<0.25
Acenaphthene	3.44E+03	(1)	1.86E+04	(5)	1.90E+02	(8)	<0.20	<0.20
Acenaphthylene	-	-	-	-	-	-	<0.20	<0.20
Aniline	8.50E+01	(3)	3.00E+03	(7)	3.83E-02	(9)	<0.20	<0.20
Anthracene	1.72E+04	(1)	6.68E+04	(5)	3.04E+03	(8)	<0.20	<0.20
Azobenzene	4.90E+00	(3)	2.20E+02	(7)	5.74E-03	(9)	<0.20	<0.20
Benz(a)anthracene	1.48E+00	(1)	2.34E+01	(4)	8.81E-01	(8)	<0.20	<0.20
Benzo(a)pyrene	1.48E-01	(1)	2.34E+00	(4)	2.92E-01	(8)	<0.20	<0.20
Benzo(b)fluoranthene	1.48E+00	(1)	2.34E+01	(4)	2.98E+00	(8)	<0.20	<0.20
Benzo(g,h,i)perylene	-	-	-	-	-	-	<0.20	<0.20
Benzo(k)fluoranthene	1.48E+01	(1)	2.34E+02	(4)	2.92E+01	(8)	<0.20	<0.20
Benzoic acid	2.40E+05	(2)	2.50E+06	(6)	3.71E+02	(9)	<0.50	<0.50
Benzyl alcohol	3.10E+04	(2)	3.10E+05	(6)	4.73E+01	(9)	<0.20	<0.20
Bis(2-chloroethoxy)methane	1.80E+02	(2)	1.80E+03	(6)	2.59E-01	(9)	<0.20	<0.20
Bis(2-chloroethyl)ether	2.68E+00	(1)	1.42E+01	(4)	2.96E-04	(8)	<0.20	<0.20
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	4.54E+02	(4)	2.62E-02	(8)	<0.20	<0.20
Bis(2-ethylhexyl)phthalate	3.47E+02	(1)	1.37E+03	(4)	9.70E+01	(8)	<0.50	<0.50
Butyl benzyl phthalate	2.60E+02	(3)	9.10E+03	(7)	7.54E+00	(9)	<0.20	<0.20

Table 7
Group 8 Soil Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Source	Non-Residential Soil Screening Level	Source	Leachate DAF (11.25) (mg/kg) SoilGW NMED	Source	SWMU 6-4 (5-6')	SWMU 6-4 (9-10')
							1201828-001	1201828-002
							1/27/2012	1/27/2012
Carbazole	-	-	-	-	-	-	<0.20	<0.20
Chrysene	1.48E+02	(1)	2.34E+03	(4)	8.99E+01	(8)	<0.20	<0.20
Dibenz(a,h)anthracene	1.48E-01	(1)	2.34E+00	(4)	9.52E-01	(8)	<0.20	<0.20
Dibenzofuran	-	-	-	-	-	-	<0.20	<0.20
Diethyl phthalate	4.89E+04	(1)	1.91E+05	(5)	1.09E+02	(8)	<0.20	<0.20
Dimethyl phthalate	6.11E+05	(1)	2.38E+06	(5)	9.06E+02	(8)	<0.20	<0.20
Di-n-butyl phthalate	6.11E+03	(1)	2.38E+04	(5)	7.84E+01	(8)	<0.50	<0.50
Di-n-octyl phthalate	-	-	-	-	-	-	<0.25	<0.25
Fluoranthene	2.29E+03	(1)	8.91E+03	(5)	1.37E+03	(8)	<0.20	<0.20
Fluorene	2.29E+03	(1)	8.91E+03	(5)	2.29E+02	(8)	<0.20	<0.20
Hexachlorobenzene	3.04E+00	(1)	1.20E+01	(4)	4.48E-02	(8)	<0.20	<0.20
Hexachlorobutadiene	6.20E+00	(3)	2.20E+02	(7)	2.14E-02	(9)	<0.20	<0.20
Hexachlorocyclopentadiene	3.67E+02	(1)	8.11E+02	(5)	5.92E+00	(8)	<0.20	<0.20
Hexachloroethane	4.28E+01	(1)	1.67E+02	(5)	9.20E-02	(8)	<0.20	<0.20
Indeno(1,2,3-cd)pyrene	1.48E+00	(1)	2.34E+01	(4)	9.71E+00	(8)	<0.20	<0.20
Isophorone	5.12E+03	(1)	4.75E+04	(5)	2.16E+00	(8)	<0.50	<0.50
Naphthalene	4.30E+01	(1)	1.58E+02	(5)	4.01E-02	(8)	<0.20	<0.20
Nitrobenzene	5.35E+01	(1)	3.00E+02	(4)	7.02E-03	(8)	<0.50	<0.50
N-Nitrosodi-n-propylamine	6.90E-02	(3)	2.50E+00	(7)	1.24E-04	(9)	<0.20	<0.20
N-Nitrosodiphenylamine	9.93E+02	(1)	3.91E+03	(4)	6.36E+00	(8)	<0.20	<0.20
Pentachlorophenol	8.94E+00	(1)	3.00E+01	(4)	1.44E-01	(8)	<0.40	<0.40
Phenanthrene	1.83E+03	(1)	7.15E+03	(5)	3.21E+02	(8)	<0.20	<0.20
Phenol	1.83E+04	(1)	6.88E+04	(5)	5.59E+01	(8)	<0.20	<0.20
Pyrene	1.72E+03	(1)	6.68E+03	(5)	1.01E+03	(8)	<0.20	<0.20
Pyridine	7.80E+01	(2)	1.00E+03	(6)	1.09E-01	(9)	<0.50	<0.50
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg								
Diesel Range Organics (DRO)	1.00E+03	(11)	1.00E+03	(11)	1.00E+03	(11)	<9.9	<10
Gasoline Range Organics (GRO)	--		--		--		<5.0	<5.0
Motor Oil Range Organics (MRO)	3.00E+03	(12)	5.00E+03	(12)	3.00E+03	(12)	<49	<52

-- No screening level or analytical result available

NMED - Risk Assessment Guidance for Site Investigations and Remediation (June 14, 2012)

EPA - Regional Screening Levels (April 2009)

(1) NMED Residential Screening Level

(2) EPA Residential Screening Level

(3) EPA Residential - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(4) NMED Industrial Occupational Screening Level

(5) NMED Construction Worker Screening Level

(6) EPA Industrial - Screening Levels (April 2009)

(7) EPA Industrial - Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic

(8) SoilGW NMED Dilution Attenuation Factor (DAF) = 11.25

(9) SoilGW Risk-based EPA DAF = 11.25

(10) SoilGW MCL-based EPA DAF = 11.25

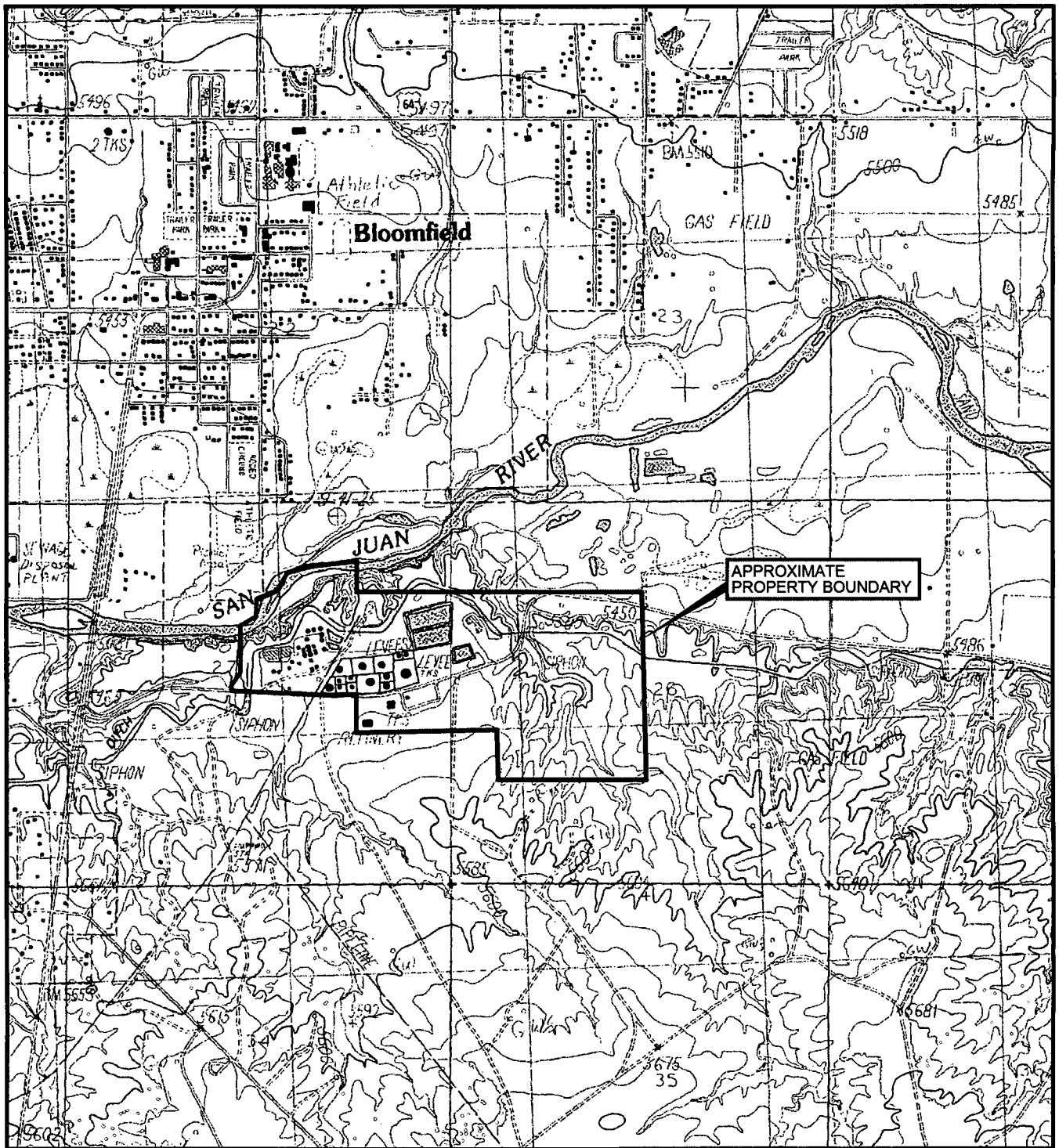
(11) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "uknown oil" with DAF = 1.0 - see report Section 5 for use of screening levels

(12) NMED Table 6-2 TPH Screening Guidelines for Potable Groundwater "Waste Oil" with DAF = 1.0 - see report Section 5 for use of screening levels

Bold represents value above Non-Residential Screening Level
yellow highlight represents value above Leachate (DAF) Screening Level
Bold with yellow highlight value exceeds Non-Residential Screening Level and DAF

Table 8
Soil Cumulative Risk and Hazard Index Evaluation
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level	Non-Residential Soil Screening Level	Maximum Concentration	Maximum Concentration divided by Residential Soil Screening Level	Maximum Concentration divided by Non-Residential Soil Screening Level
CARCINOGENIC CONSTITUENTS					
Metals (mg/kg)					
Arsenic	3.90E+00	1.77E+01	17	4.36E+00	9.61E-01
Chromium	2.97E+00	6.31E+01	83	2.80E+01	1.31E+00
Volatile Organic Compounds - (EPA Method 8260) mg/kg					
1-Methylnaphthalene	2.20E+01	9.90E+02	2.2	1.00E-01	2.22E-03
Benzene	1.54E+01	8.47E+01	0.00351	2.28E-04	4.14E-05
Chloroform	5.86E+00	3.27E+01	0.062	1.06E-02	1.89E-03
Ethylbenzene	6.84E+01	3.78E+02	2.9	4.24E-02	7.68E-03
Methyl tert-butyl ether (MTBE)	9.01E+02	4.89E+03	0.0192	2.13E-05	3.93E-06
Naphthalene	4.30E+01	1.58E+02	2.5	5.82E-02	1.58E-02
			total	3.25E+01	2.30E+00
NONCARCINOGENIC CONSTITUENTS					
Metals (mg/kg)					
Barium	1.56E+04	4.35E+03	640	4.11E-02	1.47E-01
Beryllium	1.56E+02	1.44E+02	0.69	4.42E-03	4.80E-03
Cobalt	2.30E+01	3.00E+02	7.5	3.26E-01	2.50E-02
Lead	4.00E+02	8.00E+02	7.3	1.83E-02	9.13E-03
Nickel	1.56E+03	6.19E+03	9.9	6.35E-03	1.60E-03
Vanadium	3.91E+02	1.55E+03	40	1.02E-01	2.58E-02
Zinc	2.35E+04	9.29E+04	46	1.96E-03	4.95E-04
Volatile Organic Compounds - (EPA Method 8260) mg/kg					
1,2,4-Trimethylbenzene	6.70E+01	2.80E+02	1.8	2.69E-02	6.43E-03
1,3,5-Trimethylbenzene	4.70E+01	2.00E+02	0.4	8.51E-03	2.00E-03
2-Butanone (MEK)	3.71E+04	8.43E+04	0.00683	1.84E-07	8.10E-08
2-Methylnaphthalene	3.10E+02	4.10E+03	3.9	1.26E-02	9.51E-04
4-Isopropyltoluene	-	-	0.052	-	-
Acetone	6.66E+04	2.21E+05	0.022	3.31E-07	9.96E-08
Isopropylbenzene	2.43E+03	2.81E+03	0.65	2.67E-04	2.31E-04
n-Butylbenzene	-	-	2.5	-	-
n-Propylbenzene	-	-	3.2	-	-
sec-Butylbenzene	-	-	0.73	-	-
Toluene	5.27E+03	1.34E+04	0.0296	5.61E-06	2.20E-06
Xylenes, Total	8.14E+02	7.43E+02	0.33	4.05E-04	4.44E-04
Semi Volatile Organics - (EPA Method 8270) mg/kg					
2-Methylnaphthalene	3.10E+02	4.10E+03	4.1	1.32E-02	1.00E-03
3+4-Methylphenol	3.10E+02	3.10E+03	0.21	6.77E-04	6.77E-05
Phenanthrene	1.83E+03	7.15E+03	0.25	1.36E-04	3.50E-05
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg					
Diesel Range Organics (DRO)	1.00E+03	1.00E+03	380	3.80E-01	3.80E-01
Gasoline Range Organics (GRO)	--	--	100	-	-
Motor Oil Range Organics (MRO)	3.00E+03	5.00E+03	51	1.70E-02	1.02E-02
			total	9.60E-01	6.15E-01



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

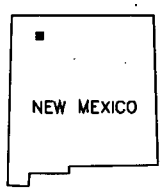
Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 12/08/10	FILE: WestRef-A42

FIGURE 1
SITE LOCATION MAP
BLOOMFIELD REFINERY

N

0 2000
SCALE IN FEET



QUADRANGLE LOCATION

RPS
404 Camp Craft Road
Austin, Texas 78746

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/13/12 | FILE: WestRef-B139

FIGURE 2
SAMPLE LOCATION MAP
BLOOMFIELD REFINERY

RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298

PIPELINE COULD NOT BE LOCATED

LEGEND

- MW-1 ● MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- RW-1 ⊙ RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
- 7-1 ▲ PREVIOUSLY EXISTING SOIL BORING LOCATION AND IDENTIFICATION NUMBER
- 3-1 ◔ SOIL BORING LOCATION AND IDENTIFICATION NUMBER
- 3-5 ⊗ PROPOSED SOIL BORING LOCATION THAT WAS RELOCATED
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- NC SAMPLE NOT COLLECTED
- —x—x— FENCE
- SWMU No. 6 ABANDONED UNDERGROUND PIPING
- SWMU No. 3 UNDERGROUND PIPING CURRENTLY IN USE: UNDERGROUND HYDROCARBON PIPING
- UNDERGROUND WASTEWATER PIPING
- A——A' LINE OF CROSS SECTION
- FORMER TANK LOCATION

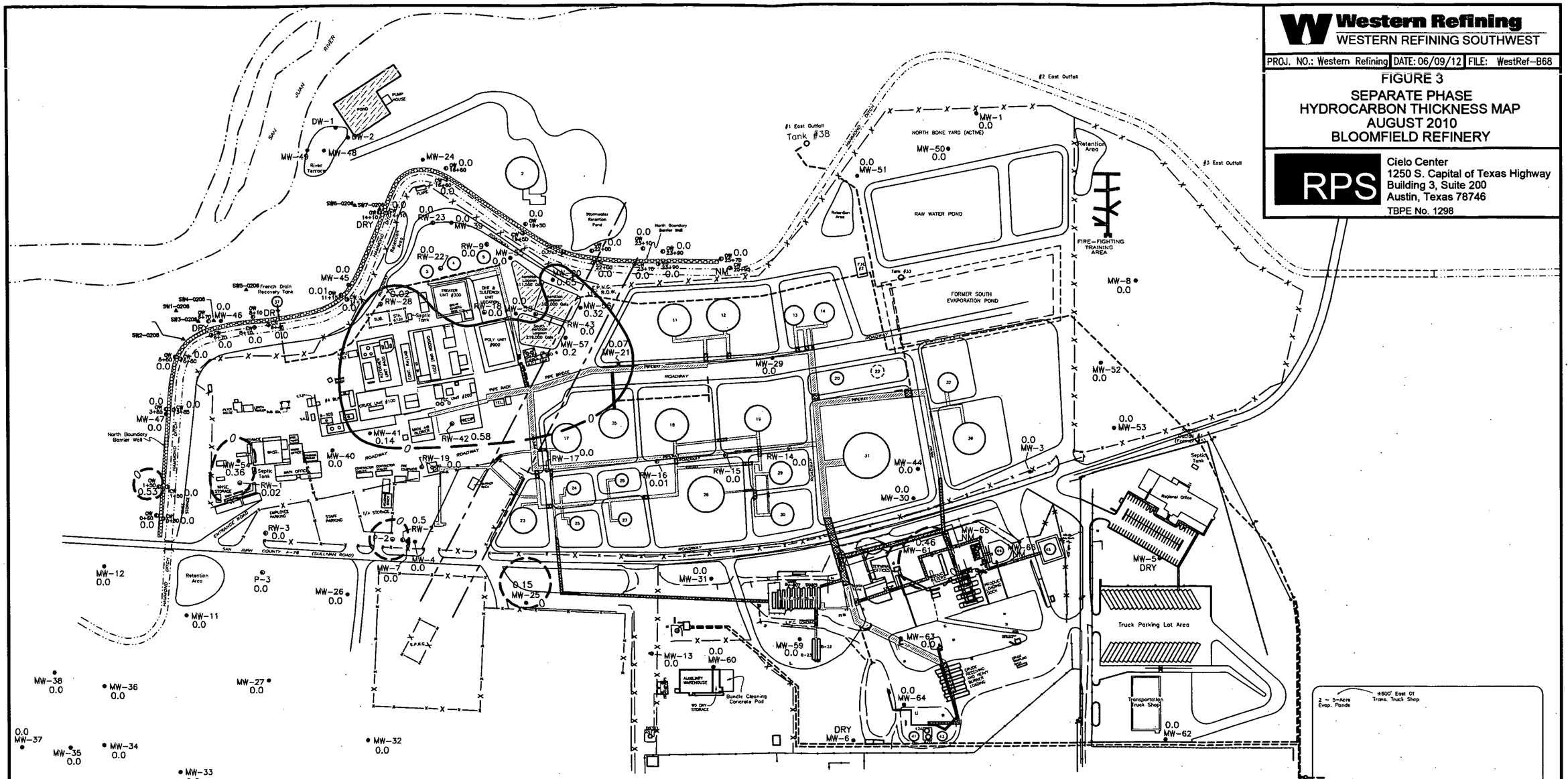
0 300
SCALE IN FEET

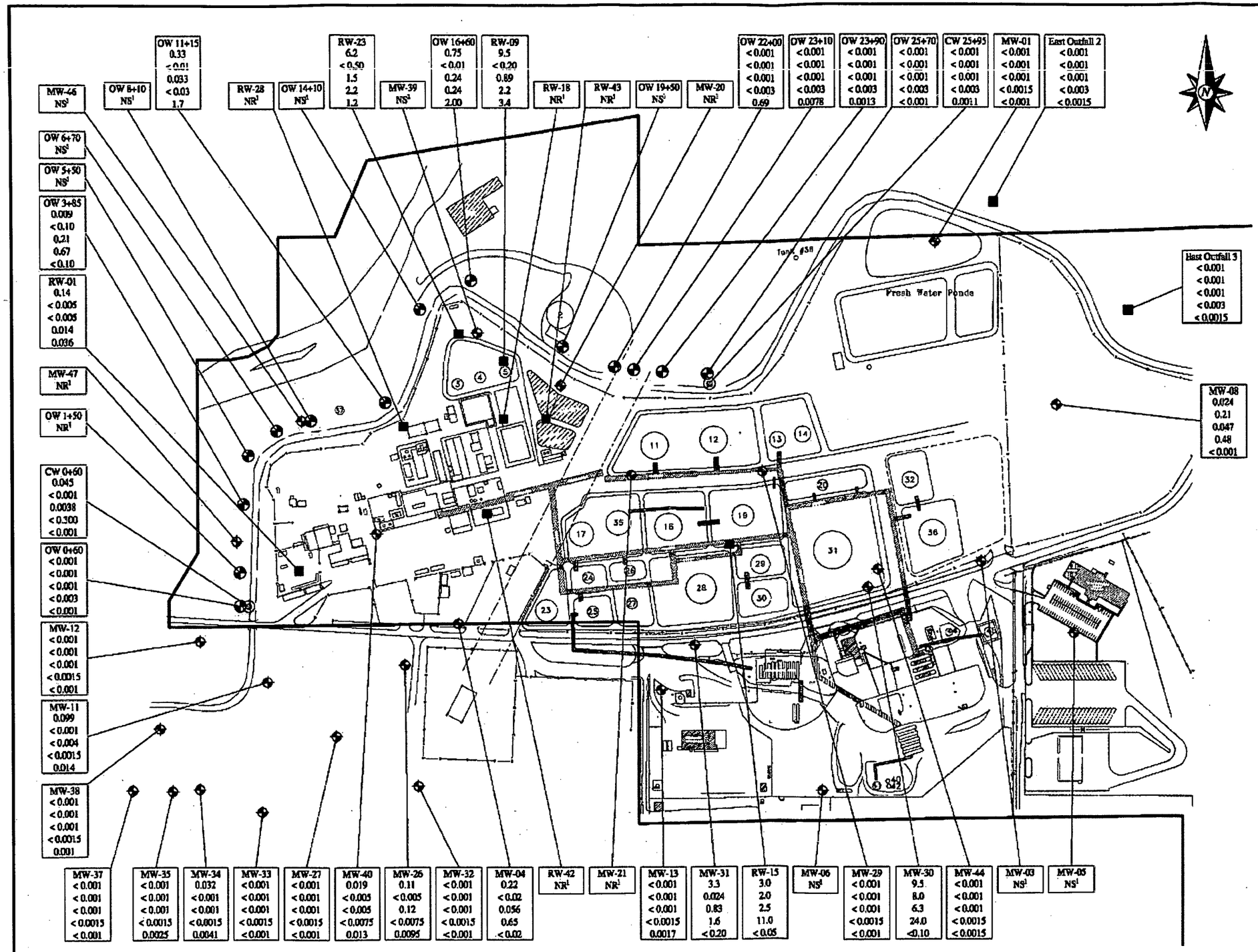
Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/09/12 | FILE: WestRef-B68

FIGURE 3
SEPARATE PHASE HYDROCARBON THICKNESS MAP
AUGUST 2010
BLOOMFIELD REFINERY

RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298


SAN JUAN RIVER
DW-1
DW-2
MW-48
River Terrace
MW-24
RW-23
MW-23
RW-22
MW-45
RW-28
RW-9
MW-39
MW-38
RW-43
MW-57
MW-21
MW-29
MW-41
RW-42
MW-40
RW-19
RW-17
RW-16
RW-15
RW-14
MW-44
MW-30
MW-54
RW-1
RW-3
RW-2
P-2
MW-4
MW-7
MW-25
MW-31
MW-12
MW-11
P-3
MW-26
MW-38
MW-36
MW-27
MW-37
MW-35
MW-34
MW-32
MW-33
MW-13
MW-60
MW-59
MW-63
MW-64
DRY MW-6
MW-65
MW-61
MW-66
MW-67
MW-50
MW-51
MW-1
MW-8
MW-52
MW-53
MW-3
MW-5
DRY
MW-62
#1 East Outfall
Tank #38
#2 East Outfall
#3 East Outfall
NORTH BONE YARD (ACTIVE)
RAW WATER POND
FORMER SOUTH EVAPORATION POND
FIRE-FIGHTING TRAINING AREA
Retention Area
Truck Parking Lot Area
Transportation Truck Shop
Regional Office
Septic Tank
Stormwater Retention Pond
North Boundary Barrier Wall
French Drain Recovery Tank
SW1-0206
SW2-0206
SW3-0206
SW4-0206
SW5-0206
SW6-0206
SW7-0206
TREATER UNIT #300
DAF & SUSPENDED SOLIDS UNIT
POLY UNIT #800
GRAVITY UNIT #100
EQUALIZATION TANK #200
SOUTH ADDITION TANK #400
Septic Tank
MAIN OFFICE
WASTE MGT. BUILDING
GUARD SHACK
EMPLOYEE PARKING
STATE PARKING
ENTRANCE ROAD
SAN JUAN COUNTY A-78 (SULLIVAN ROAD)
ROADWAY
PIPE RACK
AUXILIARY WAREHOUSE
90 DAY STORAGE
Bundle Cleaning Concrete Pad
LPG TANK
Retention Area
Retention Area
Tank #33
Tank #34
Tank #35
Tank #36
Tank #37
Tank #39
Tank #40
Tank #41
Tank #42
Tank #43
Tank #44
Tank #45
Tank #46
Tank #47
Tank #48
Tank #49
Tank #50
Tank #51
Tank #52
Tank #53
Tank #54
Tank #55
Tank #56
Tank #57
Tank #58
Tank



Map Source: Western Refining Southwest, Inc. 2010, Fig 17.

Legend

- Monitoring Well
- Observation Well
- Recovery Well
- Collection Well
- Outfall
- Site
- Approximate Property Line

MW-38	-Well ID
< 0.001	-Benzene
< 0.001	-Toluene
< 0.001	-Ethylbenzene
< 0.0015	-Xylenes, Total
0.001	-MTBE

Notes:

All concentrations in milligrams per liter (mg/L)

NS¹ = Well is Dry or Not Enough Water to Sample- No sample

NS² = Not sampled due to approved Facility-wide Monitoring Plan.

NS³ = Sample Inadvertently not Collected this Sampling Event.

NR¹ = No Sample Required - Well Contains Separate Phase Hydrocarbon

NR² = No Sample Required per OCD and NMED Conditions

Western Refining
WESTERN REFINING SOUTHWEST

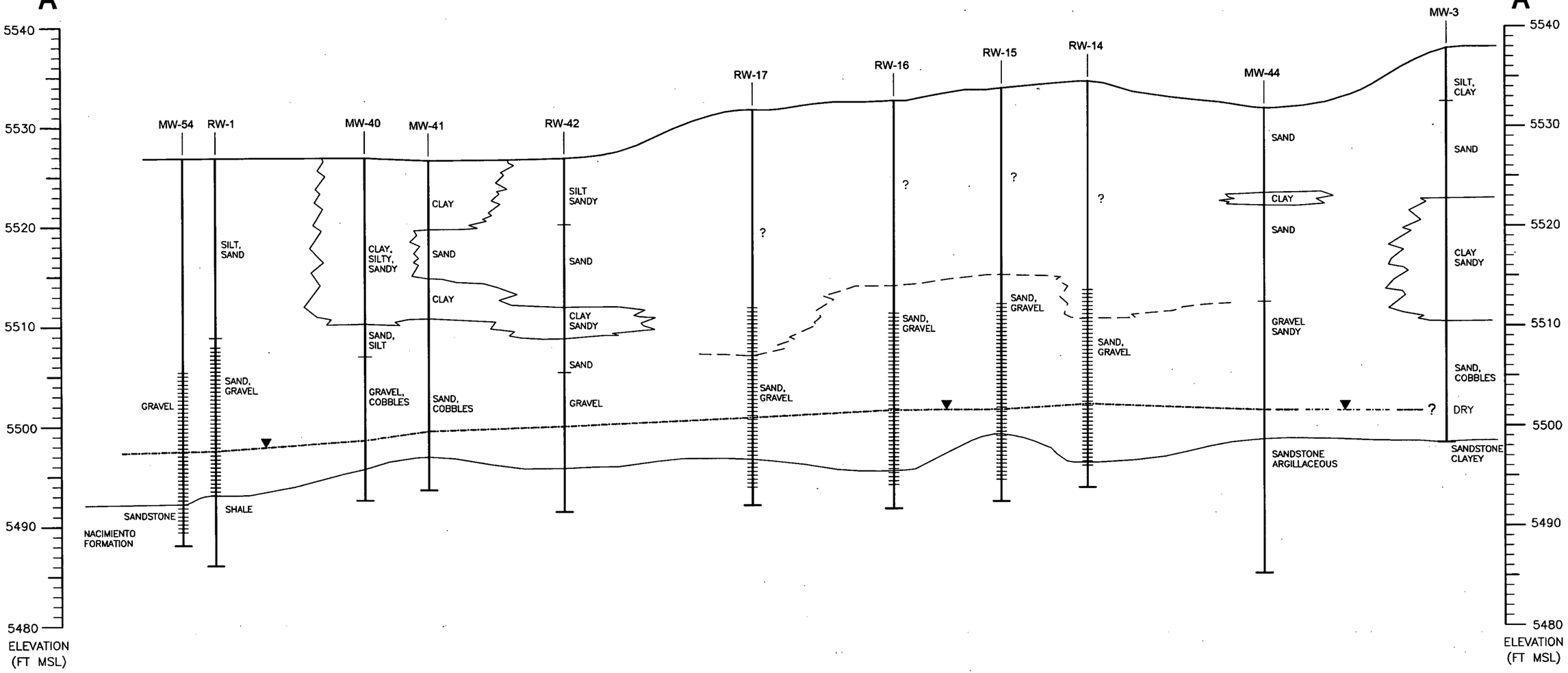
PROJ. NO.: Western Refining | DATE: 06/09/12 | FILE: WestRef-B69

FIGURE 4
DISSOLVED-PHASE GROUNDWATER DATA AUGUST 2009 BLOOMFIELD REFINERY

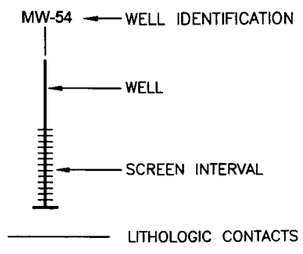
RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298

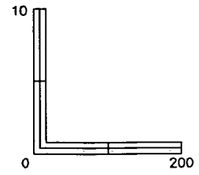
WEST
A

EAST
A'



EXPLANATION





SCALE IN FEET
VERTICAL EXAGGERATION = 20X

▼ – POTENTIOMETRIC SURFACE MEASURED APRIL 2012 (RECOVERY PUMPS OFF)

NOTE:
SCREEN INTERVAL NOT AVAILABLE FOR MW–3, MW–40, MW–41, MW–44, RW–42

Western Refining
WESTERN REFINING SOUTHWEST

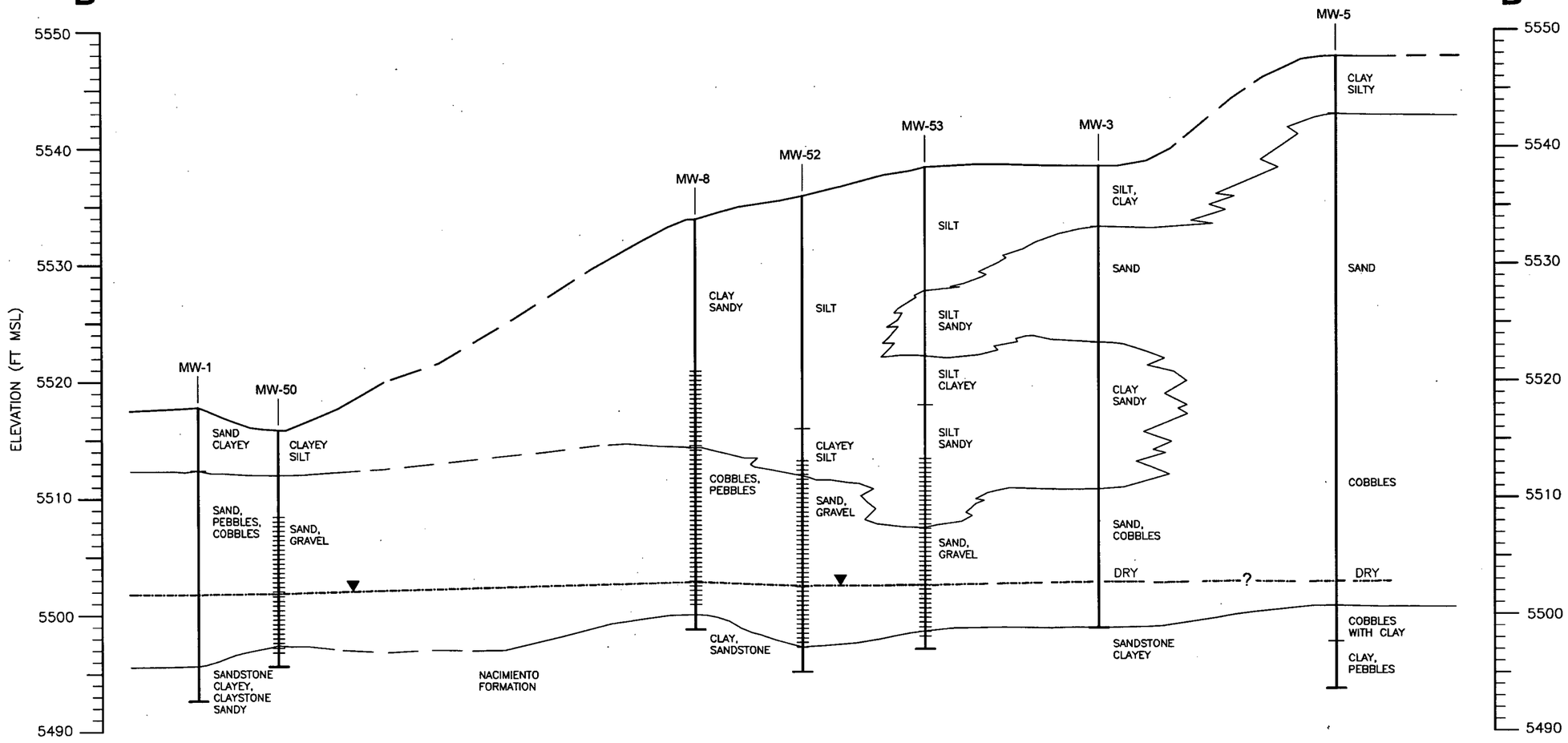
PROJ. NO.: Western Refining | DATE: 06/09/12 | FILE:WestRef–B135

FIGURE 5
CROSS SECTION A-A'
WEST TO EAST
BLOOMFIELD REFINERY

RPS
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NORTH
B

SOUTH
B'



EXPLANATION

MW-8 ← WELL IDENTIFICATION

← WELL

← SCREEN INTERVAL

LITHOLOGIC CONTACTS

▼ – POTENTIOMETRIC SURFACE MEASURED APRIL 2012 (RECOVERY PUMPS OFF)

10
0 200
SCALE IN FEET
VERTICAL EXAGGERATION = 20X

NOTE:
SCREEN INTERVAL NOT AVAILABLE FOR MW–1, MW–3, MW–5

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/09/12 | FILE:WestRef–B136

FIGURE 6
CROSS SECTION B-B'
NORTH TO SOUTH
BLOOMFIELD REFINERY

RPS
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1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298

NORTH
C

SOUTH
C'

ELEVATION (FT MSL)

5550
5540
5530
5520
5510
5500
5490

MW-68
MW-69
MW-29
MW-44
MW-61
MW-63
MW-64
MW-6

HAMMOND DITCH

SAND, SILTY
GRAVEL
SANDSTONE

FRENCH DRAIN
(ELEVATION ESTIMATED)

SAND
CLAY
GRAVEL & COBBLES
LIMESTONE, WEATHERED

GRAVELLY
SANDSTONE, WEATHERED

NACIMIENTO FORMATION

SILT
SAND
SILT
SAND
GRAVELLY
CLAY

SILT
SAND
GRAVELLY
SANDSTONE

SILT
SAND, CLAYEY, SILTY
SILT
SAND
GRAVELLY
CLAY

SAND
COBBLES & PEBBLES
DRY
SANDSTONE, CLAYSTONE

EXPLANATION

MW-6 — WELL IDENTIFICATION

WELL

SCREEN INTERVAL

LITHOLOGIC CONTACTS

POTENTIOMETRIC SURFACE MEASURED APRIL 2012

10
0
200
SCALE IN FEET
VERTICAL EXAGGERATION = 20X

NOTE:
WELL SCREEN INTERVALS NOT AVAILABLE FOR MW-6 & MW-44

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/09/12 | FILE:WestRef-B137

FIGURE 7
CROSS SECTION C-C'
NORTH TO SOUTH
BLOOMFIELD REFINERY

RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298

LEGEND

- MW-1 • MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- RW-1 • RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
- OW 1+50 • OBSERVATION WELL LOCATION AND IDENTIFICATION NUMBER
- CW 1+50 • COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
- SW1-0206 ▲ SUMP WELL LOCATION AND IDENTIFICATION NUMBER
- P-2 PIEZOMETER IDENTIFICATION
- 5500 CONTOUR OF GROUNDWATER ELEVATION (FT MSL)
- 5502.61 GROUNDWATER ELEVATION (FT MSL) (APRIL 2012)
- * 5501.51 DATA POINT NOT USED IN CONTOURS

- UNDER GROUND PIPING (HYDROCARBONS)
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- FORMER TANK LOCATION
- ABANDONED UNDERGROUND PIPING
- UNDER GROUND WASTEWATER PIPING
- UNDER GROUND DRAIN PIPING
- X FENCE

NOTE

CONTOUR INTERVAL CHANGES FROM 1 FT TO 10 FT ON THE SOUTHEASTERN PORTION OF THE MAP

0 400
SCALE IN FEET

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/09/12 | FILE: WestRef-B124.

FIGURE 8
POTENTIOMETRIC MAP
APRIL 2012
BLOOMFIELD REFINERY

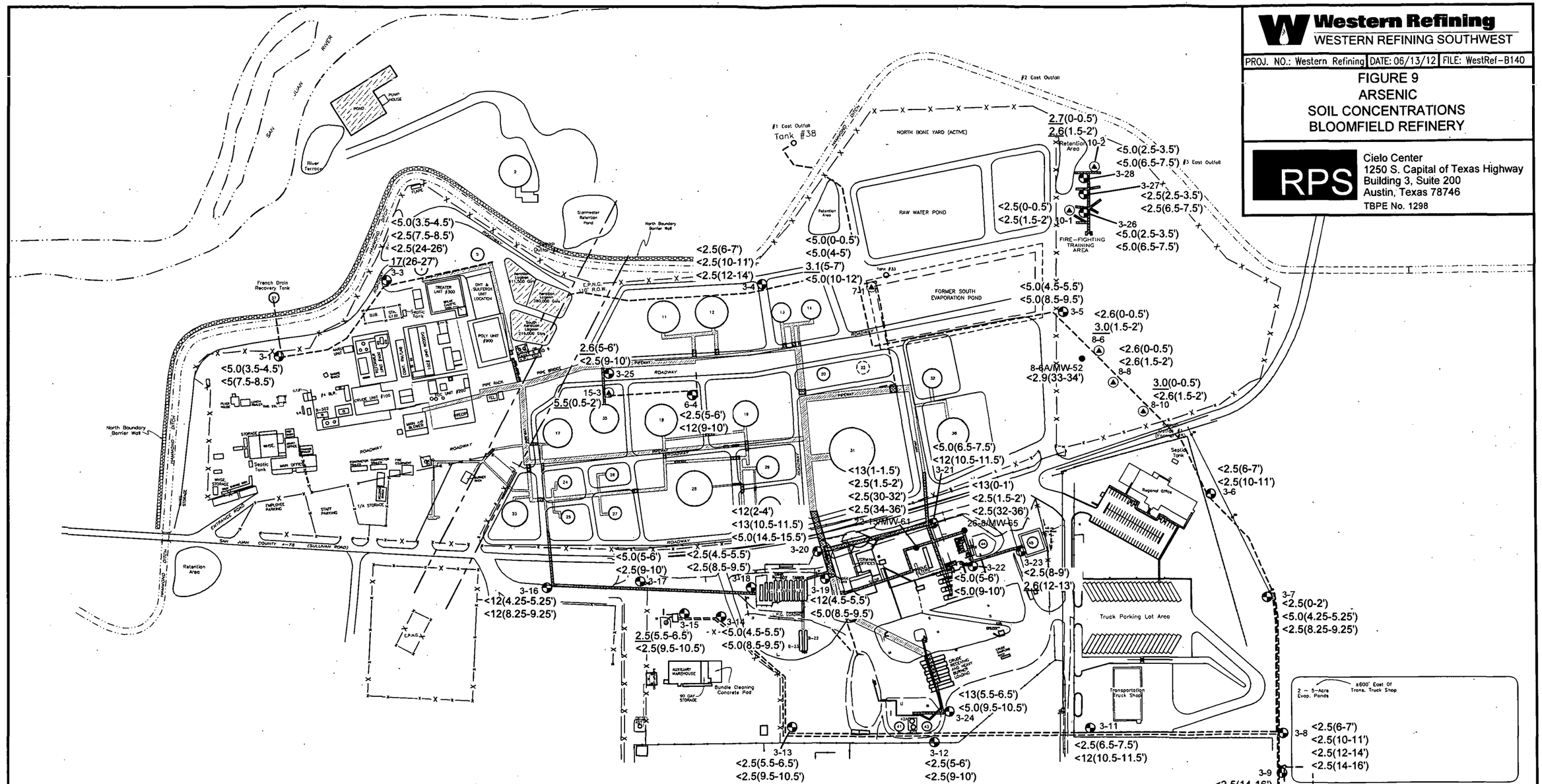
RPS
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Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/13/12 | FILE: WestRef-B140

FIGURE 9
ARSENIC
SOIL CONCENTRATIONS
BLOOMFIELD REFINERY

RPS
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Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298

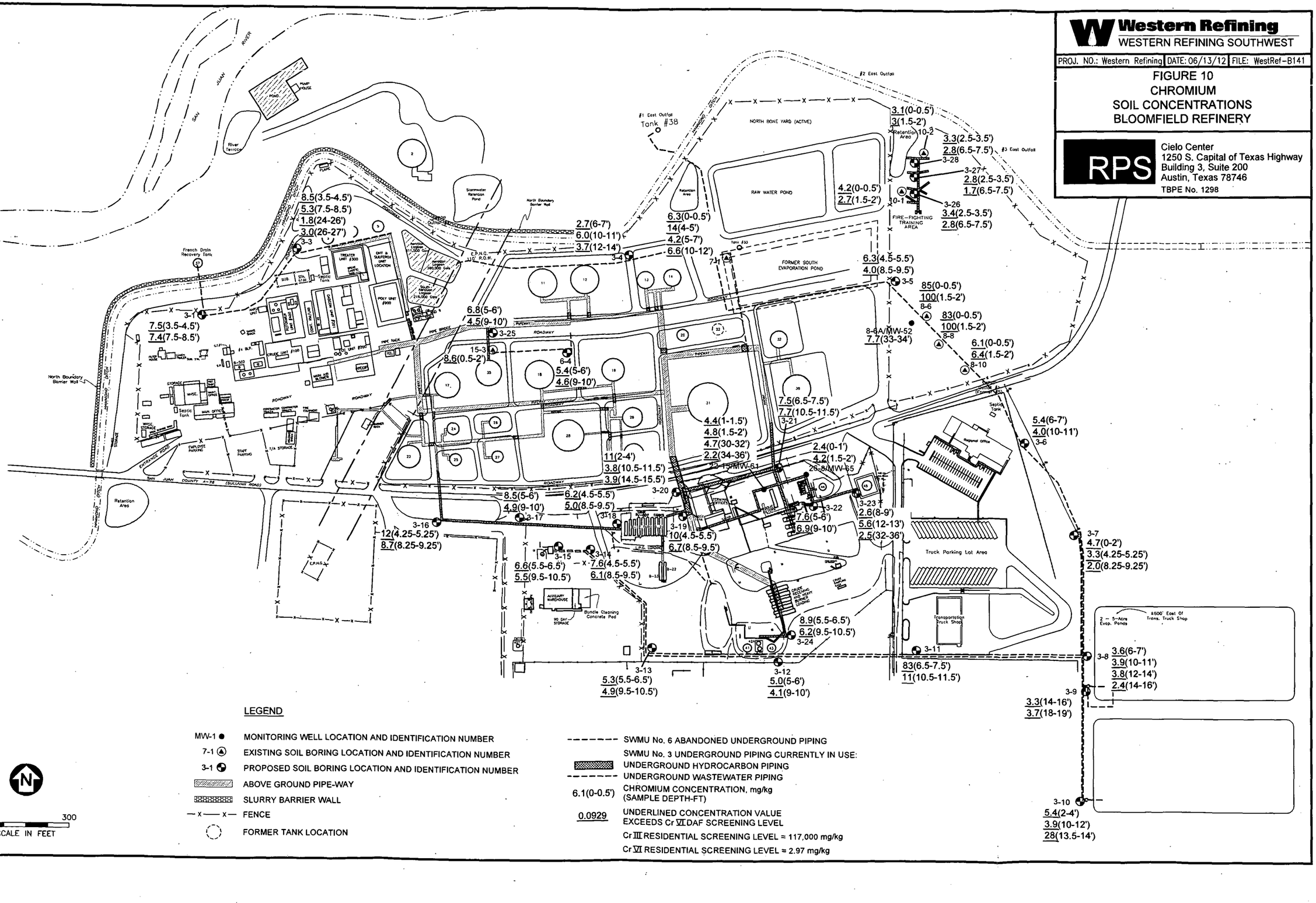


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/13/12 | FILE: WestRef-B141

FIGURE 10
CHROMIUM
SOIL CONCENTRATIONS
BLOOMFIELD REFINERY

RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298



LEGEND

- MW-1 ● MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- 7-1 ▲ EXISTING SOIL BORING LOCATION AND IDENTIFICATION NUMBER
- 3-1 ◔ PROPOSED SOIL BORING LOCATION AND IDENTIFICATION NUMBER
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- — x — x — FENCE
- FORMER TANK LOCATION
- ------- SWMU No. 6 ABANDONED UNDERGROUND PIPING
- SWMU No. 3 UNDERGROUND PIPING CURRENTLY IN USE:
- UNDERGROUND HYDROCARBON PIPING
- ------- UNDERGROUND WASTEWATER PIPING
- 6.1(0-0.5') CHROMIUM CONCENTRATION, mg/kg (SAMPLE DEPTH-FT)
- 0.0929 UNDERLINED CONCENTRATION VALUE EXCEEDS Cr VI DAF SCREENING LEVEL
- Cr III RESIDENTIAL SCREENING LEVEL = 117,000 mg/kg
- Cr VI RESIDENTIAL SCREENING LEVEL = 2.97 mg/kg

N

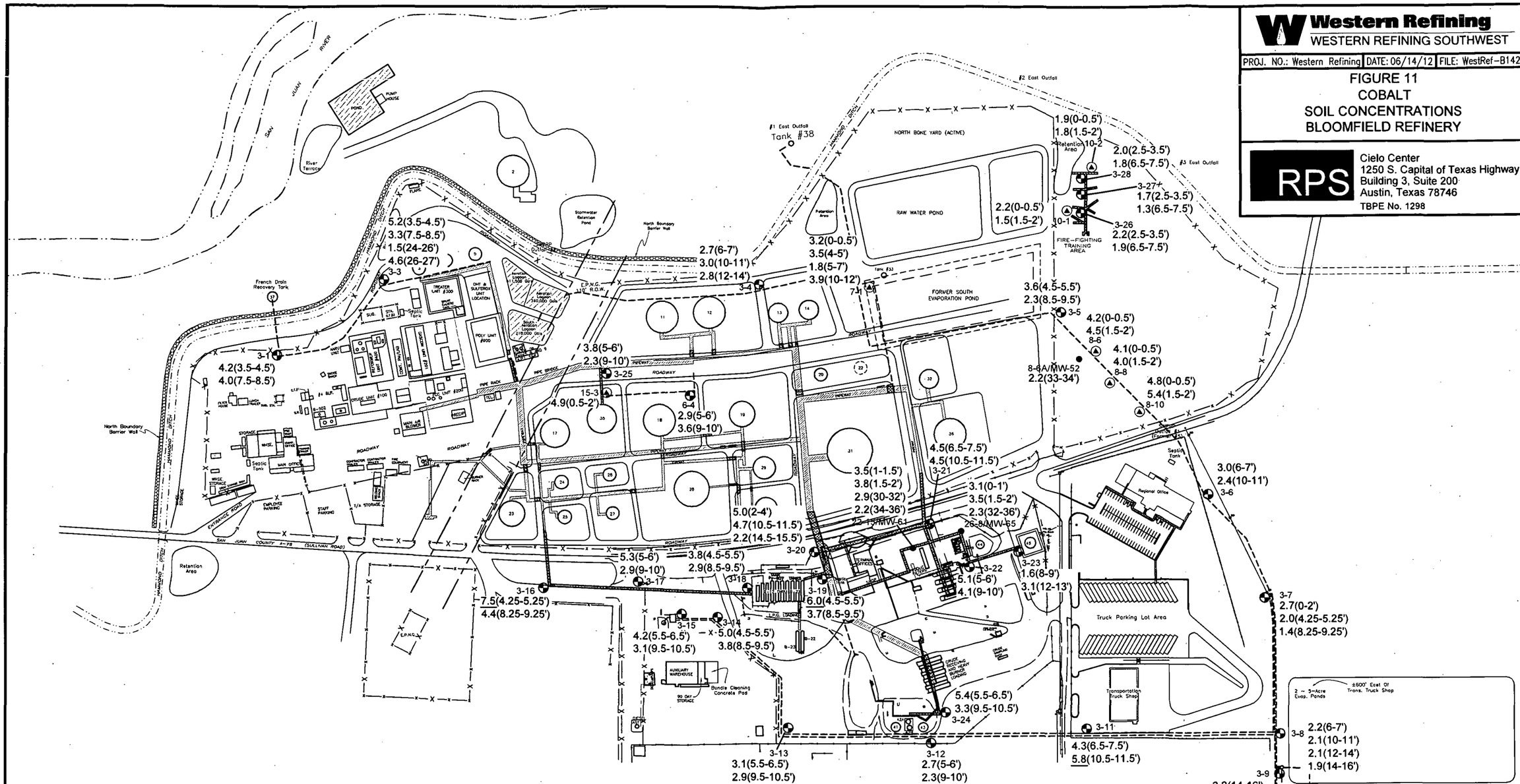
0 300
SCALE IN FEET

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/14/12 | FILE: WestRef-B142

FIGURE 11
COBALT
SOIL CONCENTRATIONS
BLOOMFIELD REFINERY

RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298



LEGEND

- MW-1 ● MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- 7-1 ▲ EXISTING SOIL BORING LOCATION AND IDENTIFICATION NUMBER
- 3-1 ◓ PROPOSED SOIL BORING LOCATION AND IDENTIFICATION NUMBER
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- — x — x — FENCE
- FORMER TANK LOCATION
- SWMU No. 6 ABANDONED UNDERGROUND PIPING
- SWMU No. 3 UNDERGROUND PIPING CURRENTLY IN USE:
- UNDERGROUND HYDROCARBON PIPING
- UNDERGROUND WASTEWATER PIPING
- 4.1(0-0.5') COBALT CONCENTRATION, mg/kg (SAMPLE DEPTH-FT)
- 5.51 UNDERLINED CONCENTRATION VALUE EXCEEDS DAF SCREENING LEVEL

NOTE: ALL CONCENTRATIONS LESS THAN RESIDENTIAL SCREENING LEVEL AT 23 mg/kg

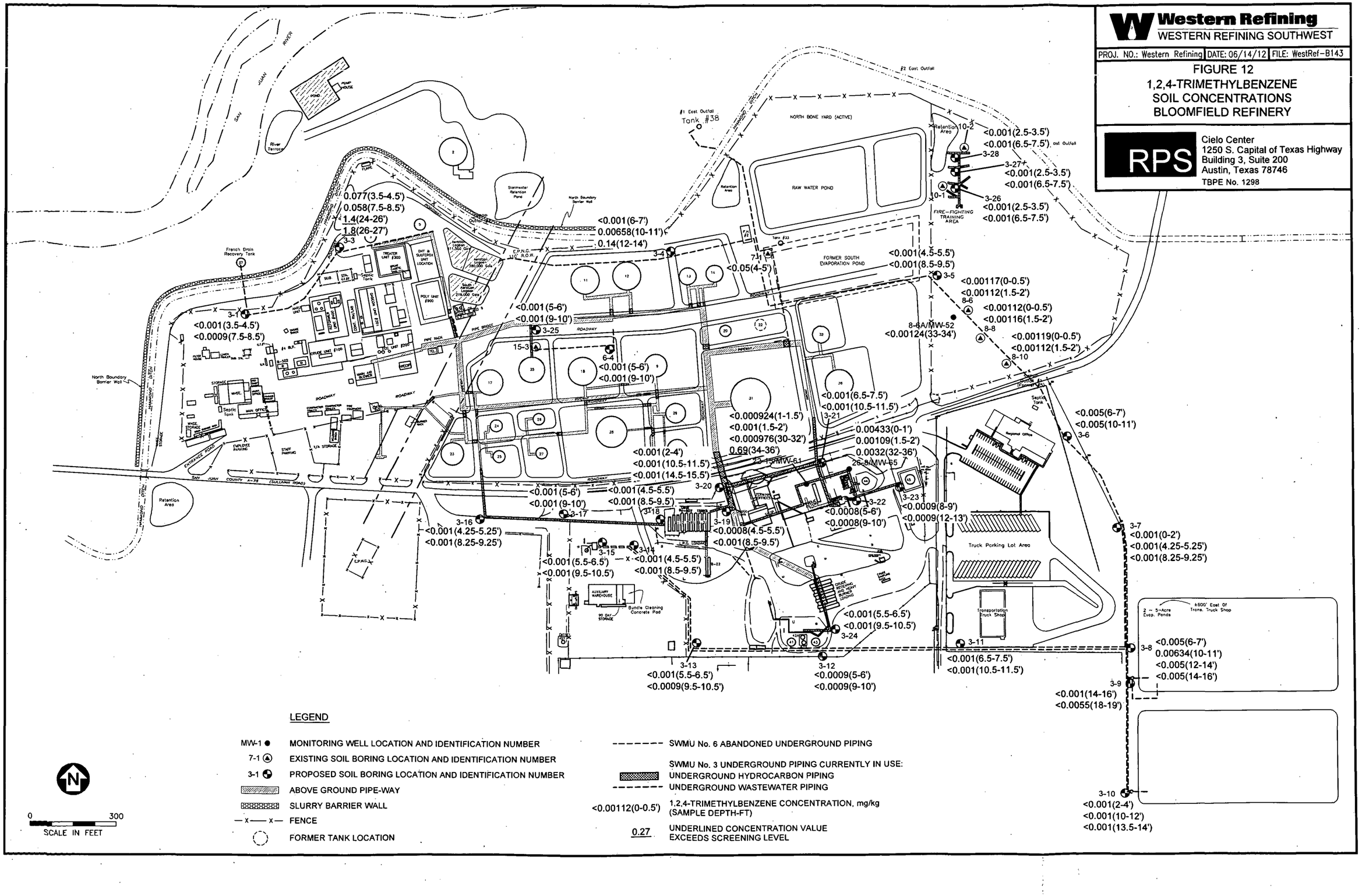
0 300
SCALE IN FEET

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/14/12 | FILE: WestRef-B143

FIGURE 12
1,2,4-TRIMETHYLBENZENE SOIL CONCENTRATIONS BLOOMFIELD REFINERY

RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298



LEGEND

- MW-1 ● MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- 7-1 ▲ EXISTING SOIL BORING LOCATION AND IDENTIFICATION NUMBER
- 3-1 ⊕ PROPOSED SOIL BORING LOCATION AND IDENTIFICATION NUMBER
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- — x — x — FENCE
- ◌ FORMER TANK LOCATION
- -------- SWMU No. 6 ABANDONED UNDERGROUND PIPING
- SWMU No. 3 UNDERGROUND PIPING CURRENTLY IN USE:
  - UNDERGROUND HYDROCARBON PIPING
  - UNDERGROUND WASTEWATER PIPING
- <0.00112(0-0.5') 1,2,4-TRIMETHYLBENZENE CONCENTRATION, mg/kg (SAMPLE DEPTH-FT)
- 0.27 UNDERLINED CONCENTRATION VALUE EXCEEDS SCREENING LEVEL

N

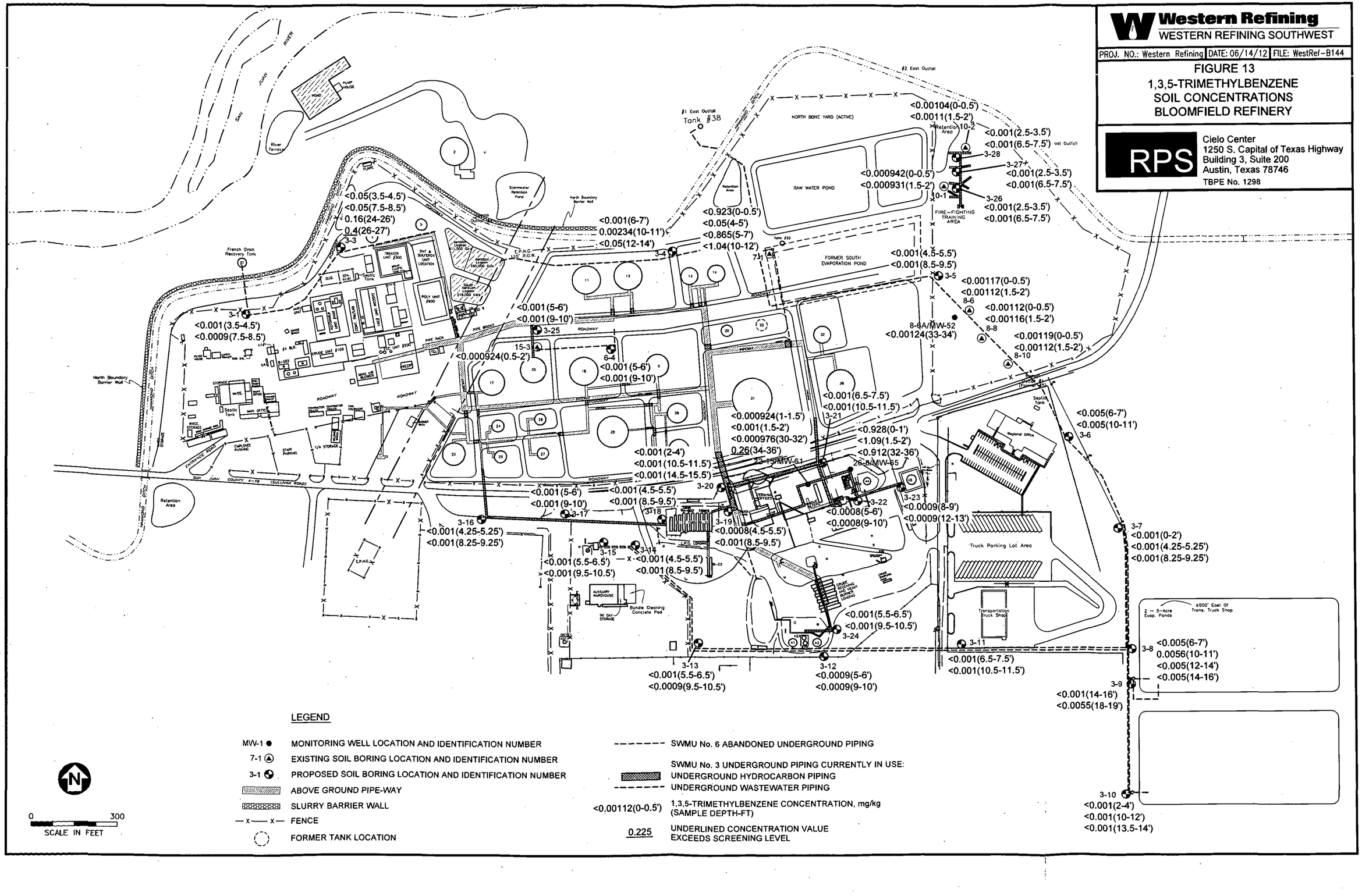
0 300
SCALE IN FEET

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/14/12 | FILE: WestRef-B144

FIGURE 13
1,3,5-TRIMETHYLBENZENE SOIL CONCENTRATIONS BLOOMFIELD REFINERY

RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298

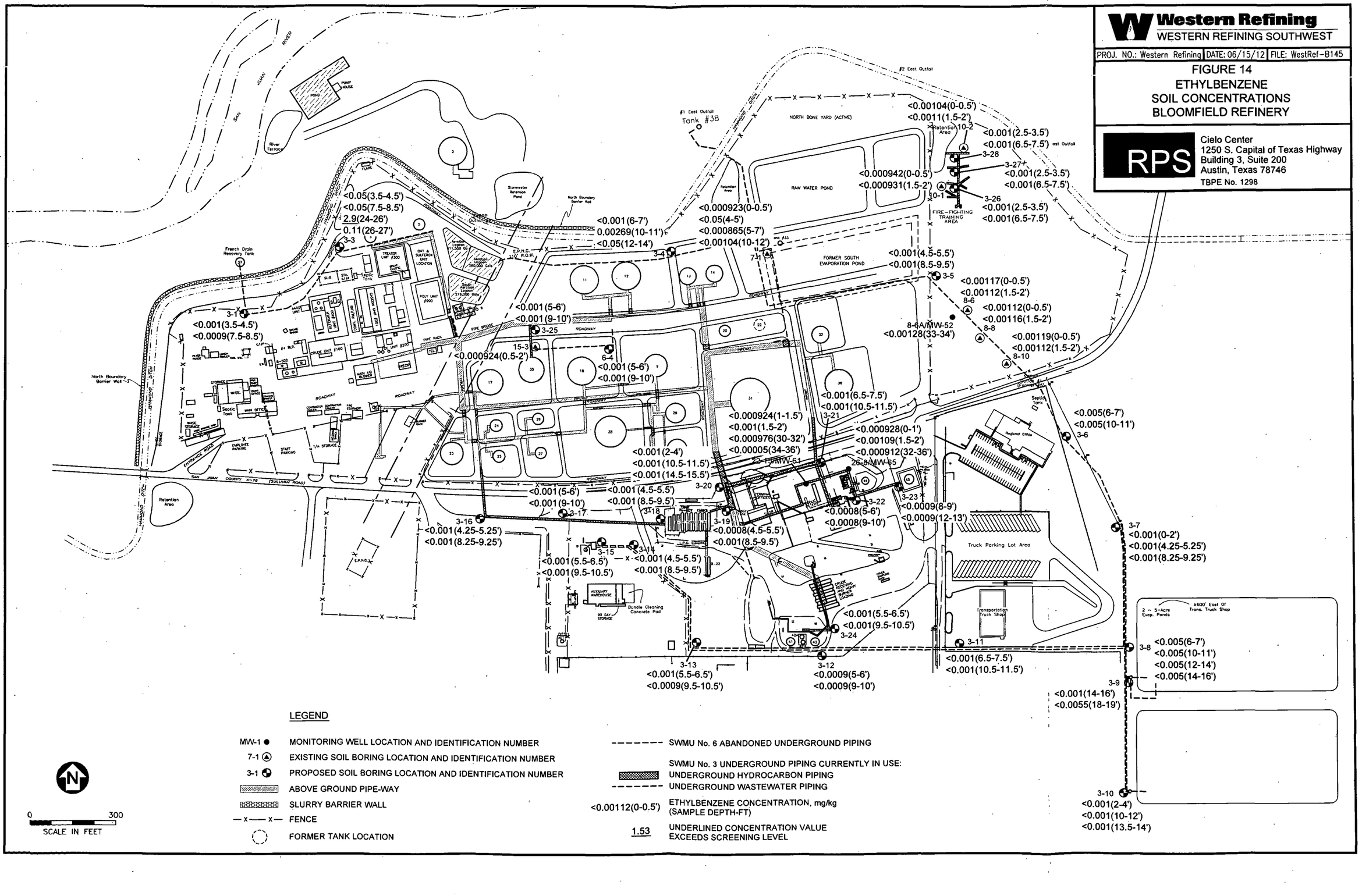


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/15/12 | FILE: WestRef-B145

FIGURE 14
ETHYLBENZENE SOIL CONCENTRATIONS BLOOMFIELD REFINERY

RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298

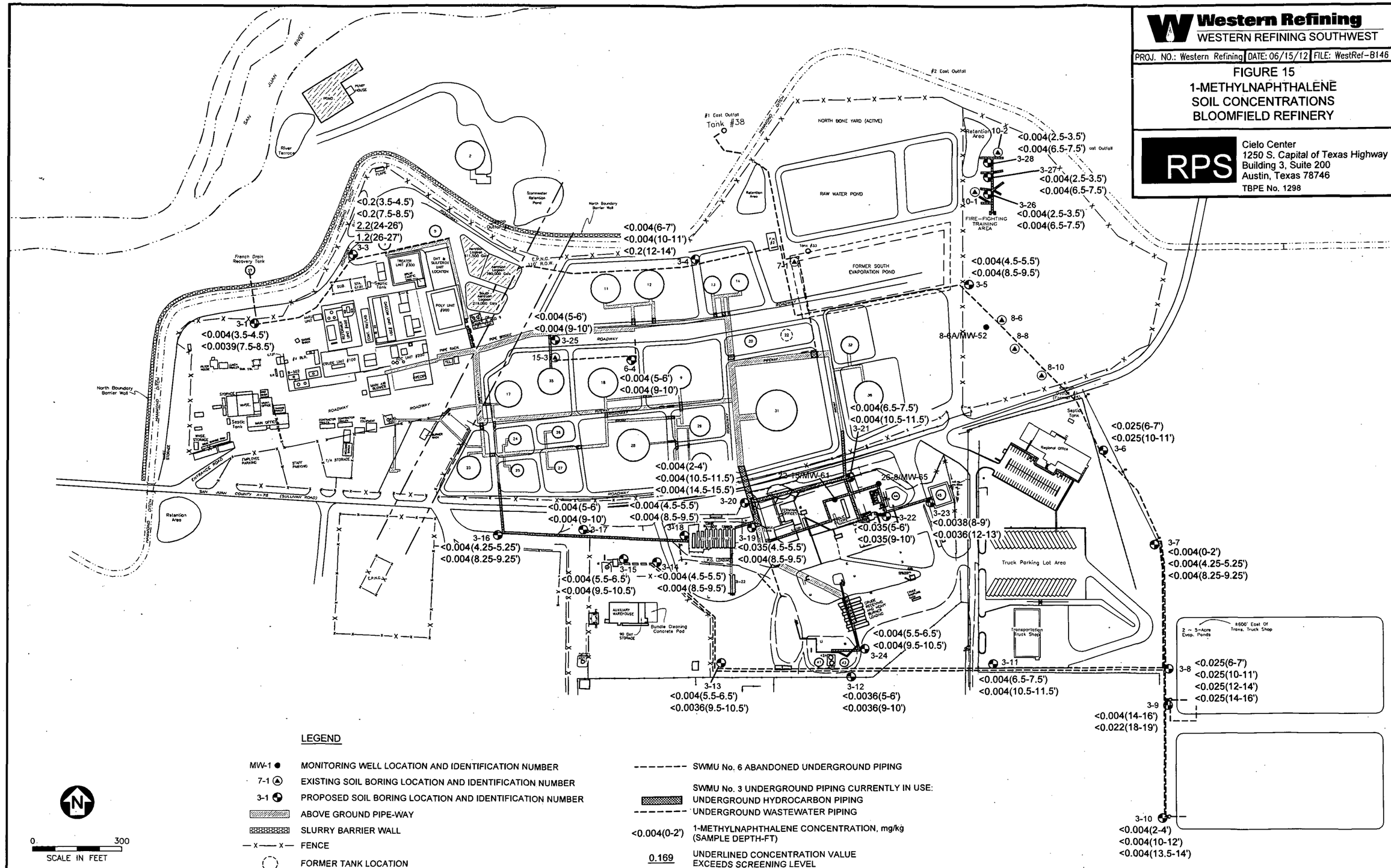


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/15/12 | FILE: WestRef-B146

FIGURE 15
1-METHYLNAPHTHALENE SOIL CONCENTRATIONS BLOOMFIELD REFINERY

RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298



LEGEND

- MW-1 ● MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- 7-1 ▲ EXISTING SOIL BORING LOCATION AND IDENTIFICATION NUMBER
- 3-1 ◒ PROPOSED SOIL BORING LOCATION AND IDENTIFICATION NUMBER
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- — x —— x — FENCE
- FORMER TANK LOCATION
- SWMU No. 6 ABANDONED UNDERGROUND PIPING
- SWMU No. 3 UNDERGROUND PIPING CURRENTLY IN USE:
- UNDERGROUND HYDROCARBON PIPING
- UNDERGROUND WASTEWATER PIPING
- <0.004(0-2') 1-METHYLNAPHTHALENE CONCENTRATION, mg/kg (SAMPLE DEPTH-FT)
- 0.169 UNDERLINED CONCENTRATION VALUE EXCEEDS SCREENING LEVEL

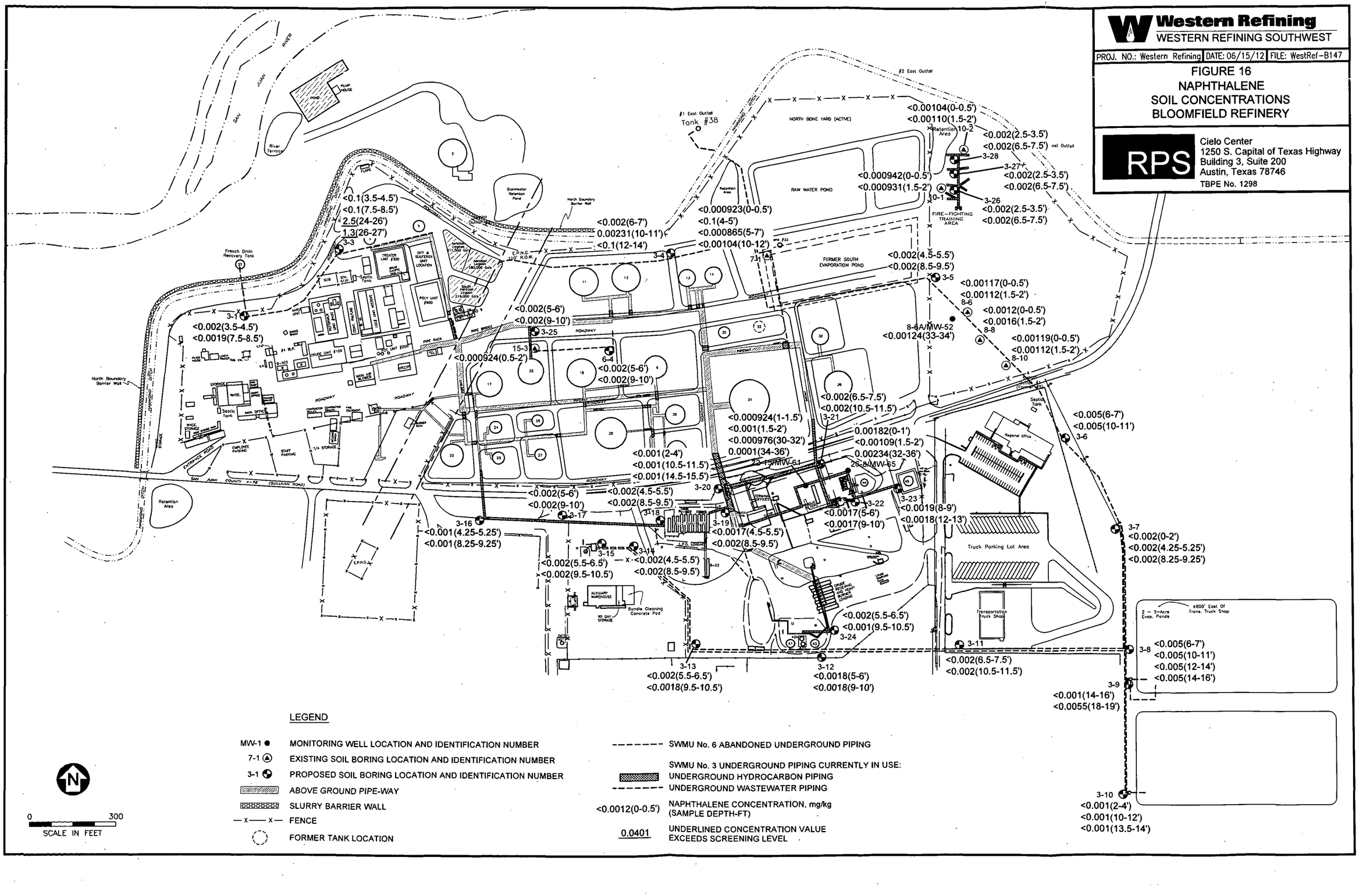
0 300
SCALE IN FEET

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 06/15/12	FILE: WestRef-B147

FIGURE 16
NAPHTHALENE SOIL CONCENTRATIONS BLOOMFIELD REFINERY

RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298

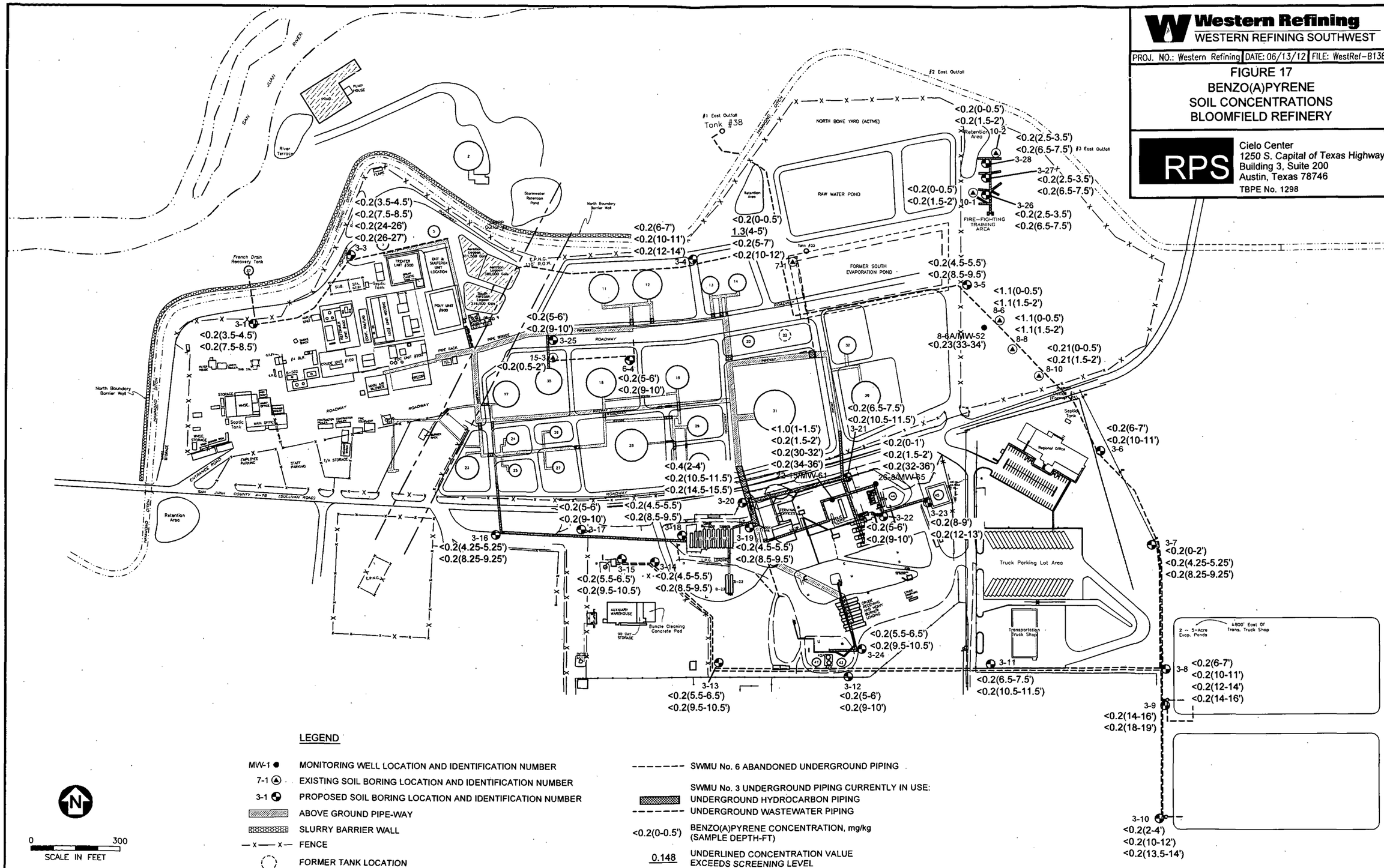


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 06/13/12	FILE: WestRef-B138

FIGURE 17
BENZO(A)PYRENE SOIL CONCENTRATIONS BLOOMFIELD REFINERY

RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298

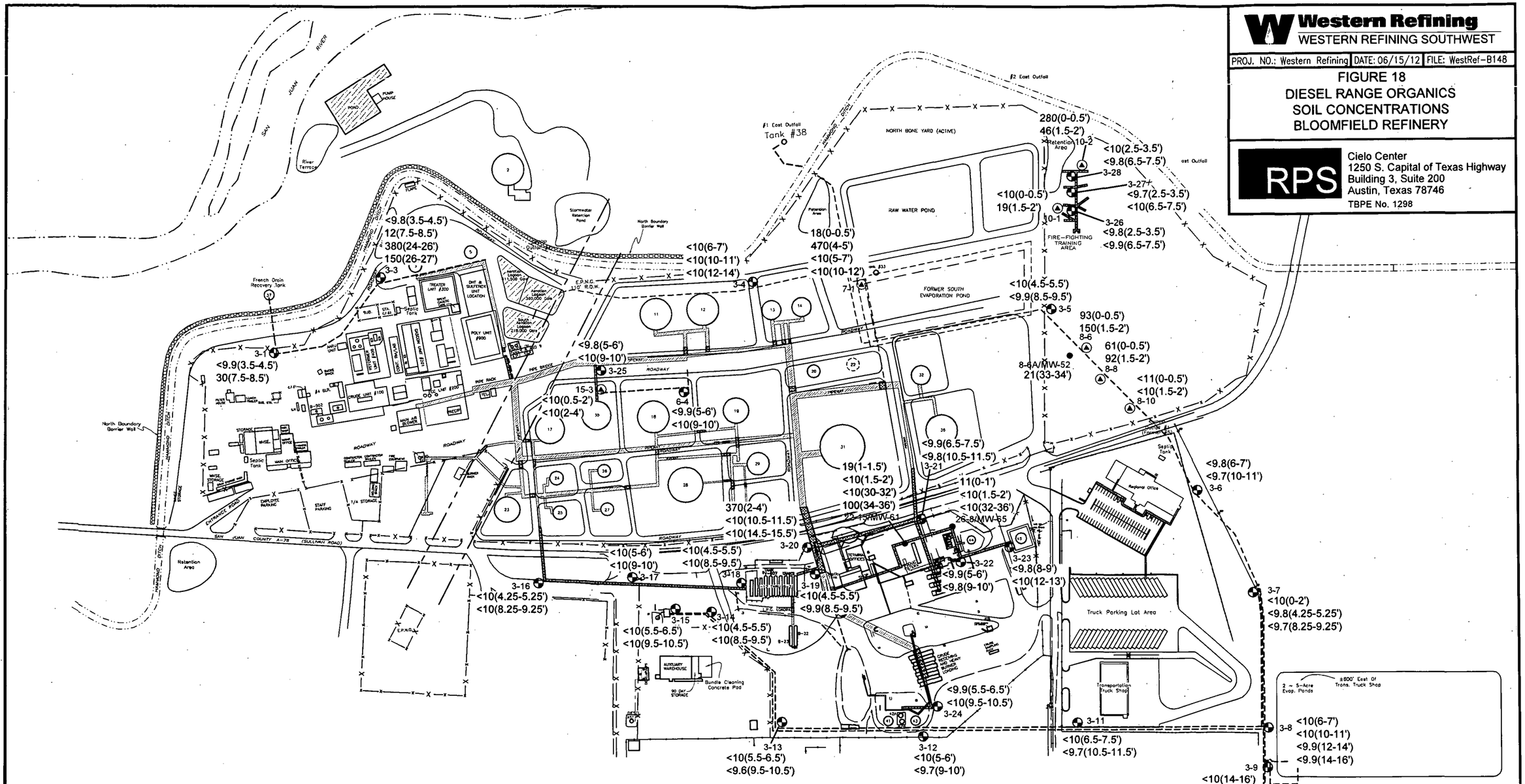


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/15/12 | FILE: WestRef-B148

FIGURE 18
DIESEL RANGE ORGANICS SOIL CONCENTRATIONS BLOOMFIELD REFINERY

RPS
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1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298



LEGEND

MW-1 ●	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 ▲	EXISTING SOIL BORING LOCATION AND IDENTIFICATION NUMBER
3-1 ◒	PROPOSED SOIL BORING LOCATION AND IDENTIFICATION NUMBER
	ABOVE GROUND PIPE-WAY
	SLURRY BARRIER WALL
— x — x —	FENCE
◌	FORMER TANK LOCATION
- - - - - - -	SWMU No. 6 ABANDONED UNDERGROUND PIPING
	SWMU No. 3 UNDERGROUND PIPING CURRENTLY IN USE: UNDERGROUND HYDROCARBON PIPING
- - - - - - -	UNDERGROUND WASTEWATER PIPING
<0.10(0-2')	DIESEL RANGE ORGANICS CONCENTRATION, mg/kg (SAMPLE DEPTH-FT)
1,000	UNDERLINED CONCENTRATION VALUE EXCEEDS SCREENING LEVEL

N

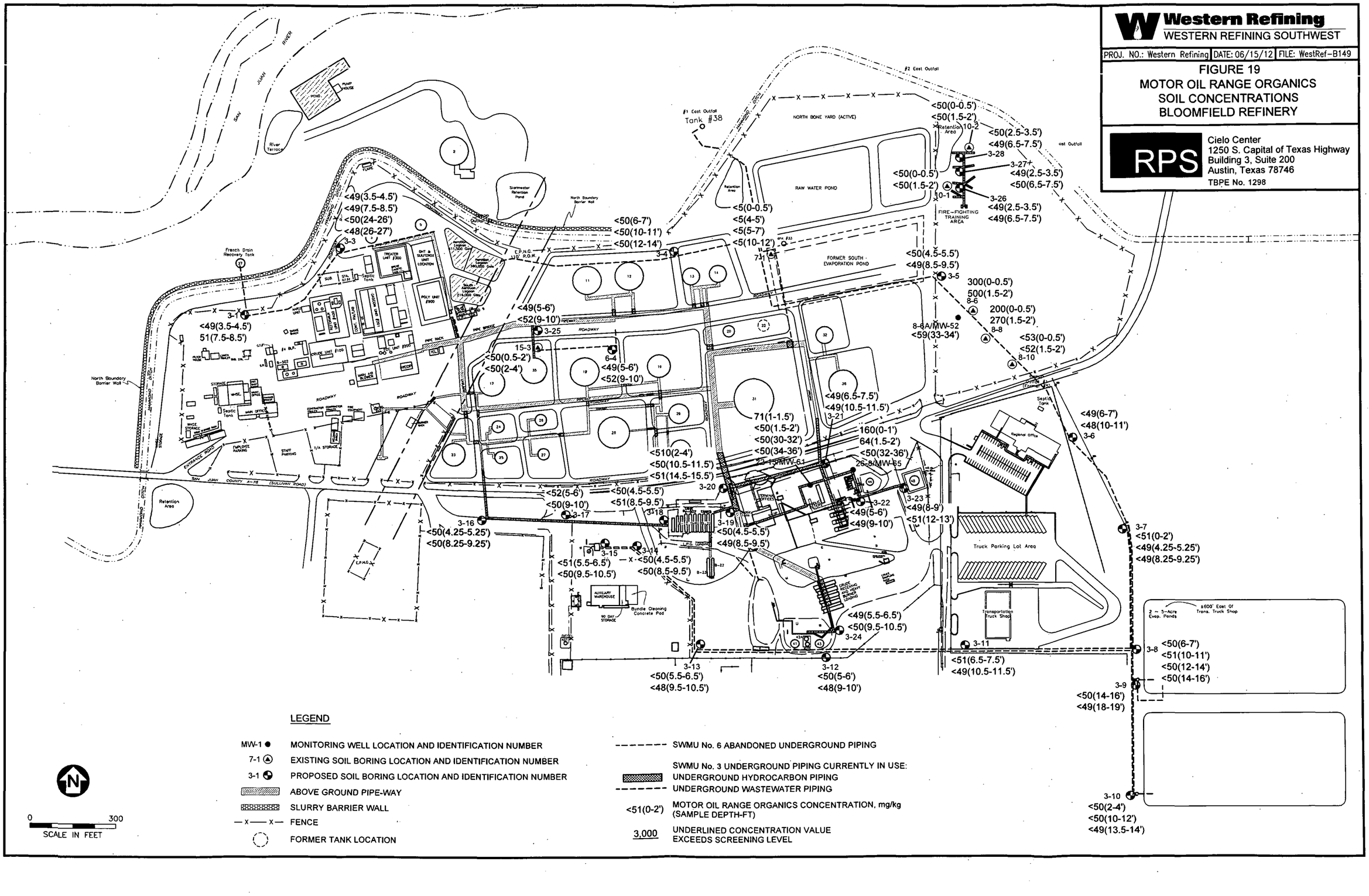
0 300
SCALE IN FEET

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 06/15/12 | FILE: WestRef-B149

FIGURE 19
MOTOR OIL RANGE ORGANICS SOIL CONCENTRATIONS BLOOMFIELD REFINERY

RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298



Appendix A

Photographs



Photograph taken from position northwest of Crude Loading Rack looking east. Transition point shown where aboveground line from Crude Loading Rack goes underground beneath asphalt road located west of Product Loading Rack.



Photograph of Product Loading Rack. Underground pipelines supply product to each truck loading station.

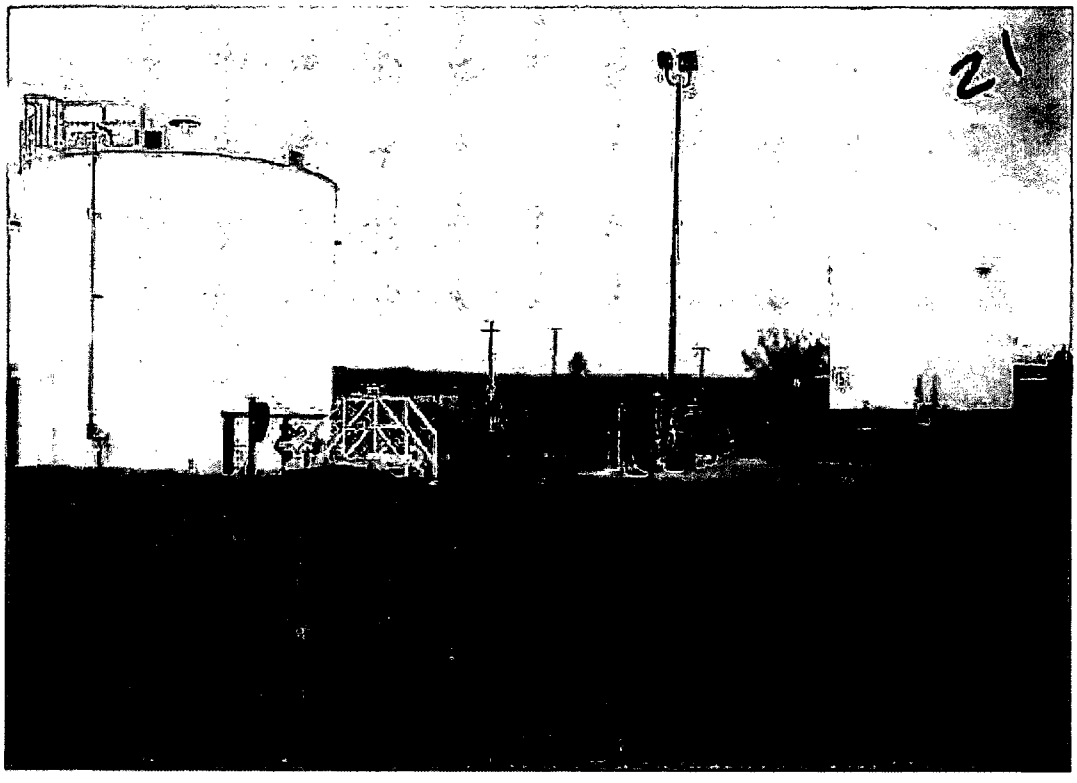


Photo shows location of underground piping running from Tank 45 in background to Tank 44 in foreground



Photo shows example of aboveground piping running beneath roadway in open cuvert.

Appendix B

NMED Correspondence

From: Cobrain, Dave, NMENV [dave.cobrain@state.nm.us]
Sent: Thursday, February 02, 2012 6:10 PM
To: Robinson, Kelly
Cc: Schmaltz, Randy; Scott T. Crouch; Tsinnajinnie, Leona, NMENV
Subject: RE: Group 8 Investigation Work Plan Considerations for Approval - Bloomfield Refinery

Kelly,

This all sounds like common occurrences associated with field work. The changes from the proposed work should be explained in the report so that the reader can understand the reasons for the changes or omissions. The only question I have is whether or not you're considering collecting any samples along the fire water line where the waste water line ran from the aeration lagoons to the old south evaporation ponds. That can also be addressed in the report. Thanks for giving us notice.

Dave

Main HWB Phone: 505-476-6000
Direct Office Phone: 505-476-6055
Fax: 505-476-6030 or 505-476-6060

From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]
Sent: Thursday, February 02, 2012 1:50 PM
To: Cobrain, Dave, NMENV; Tsinnajinnie, Leona, NMENV
Cc: Schmaltz, Randy; Scott T. Crouch; Tracy Payne; Hains, Allen
Subject: Group 8 Investigation Work Plan Considerations for Approval - Bloomfield Refinery

Good Morning!

As you both know, we commenced field drilling activities in compliance with the approved Group 8 Underground and Abandoned Piping Investigation Work Plan. In order to accomplish the sampling and drilling activities outlined in the Work Plan, Western contracted with Badger Daylighting, Inc. for the purpose of exposing the underground piping at the propose drilling locations prior to drilling at each location. In doing this, we have identified modifications that need to be made to our underground piping base map. These modification will reflect slight adjustments to the routing of underground piping in certain areas of the Bloomfield Refinery, and thus also have an impact on the current approved Group 8 Work Plan. Therefore, we would like to take this opportunity to alert the New Mexico Environment Department (NMED) of these field finding, and respectfully request NMED's consideration and approval of the following changes in field activities (refer to the attached sample location map as a reference to the following proposals):

Area #1: The piping from Tank 37 to the API separator is an underground PVC pipeline that conveys recovered water from Tank 37 (located north of the Hammond Ditch) to the API separator. The jog in the piping as reflected by proposed soil boring location identified as 3-2 on the attached map is found to be physically located under the concrete slab of one of the process units. In this same vicinity there exists an active high voltage power line that is known to be in PVC conduit and not protected by concrete, and there also exists a high-pressure fire water system manifold used to supply fire water to the adjacent process units.

> **Proposal for Modification to Area #1: Western requests that the drilling at location 3-2 be deferred until such time that either the high-voltage electrical line can be de-activated and/or the process unit equipment can be moved.**

Area #2: SWMU No. 6 includes an abandoned pipeline once used to transfer used water from the aeration lagoons to the former South Evaporation Pond. Hydro-excavation activities were not successful in locating this abandoned line. A 10-foot deep hydro-excavated trench extending from the piping manifold south of Tank 13 north approximately 20

feet did not reveal any underground piping in the area. Additional interviews with both on-site and former Western personnel gave reason to believe that this abandoned pipe was originally located in the same trench as the fire water ne, which runs west-east along the Tank Farm roadway (indicated by the purple highlighted line on the attached map). Western personnel also indicated that this line has since been removed. The line has not been in-service since the 1980's. Recent hydro-excavation along the current fire-water line confirmed that the abandoned pipeline could not be found.

> Proposal for Modification to Area #2: Therefore, Western requests permission to not collect soil samples from the proposed soil boring locations indicated as 6-1, 6-2, and 6-3 on the attached map since the pipeline cannot be located in the field.

Area #3: Western hydro-excavated at the location near boring 3-5 as identified on the attached map. Hydro-excavation activities did not locate the current active sour water line. Additional interviews recently conducted with current and prior Western personnel gave reason to believe that the sour water line does not run along the south side of the raw water ponds, but rather runs along the roadway towards the far eastern portion of the refinery property (refer to the revised piping route highlighted in orange on the attached map). Hydro-excavation activities along the fence just southeast of the former south evaporation pond indentified a 45 degree angle in the piping, thus confirming the information recently provided by Western personnel.

> Proposal for Modification to Area #3: Western would like to relocate the original soil boring indicated as 3-5 on the attached map to the revised location indicated as 3-5 (revised) on the attached map.

Area #4: Additional Western personnel interviews and hydro-excavation activities confirm that the underground piping from the Tank 41 and Tank43 area was incorrectly indicated on the original underground piping base map. The attached map shows the actual rout of the underground piping for this area.

> Proposal for Modification to Area #4: Western would like to relocate the original soil boring location indicated as 3-28 on the attached map to the revised location indicated as 3-28(revised) on the attached map.

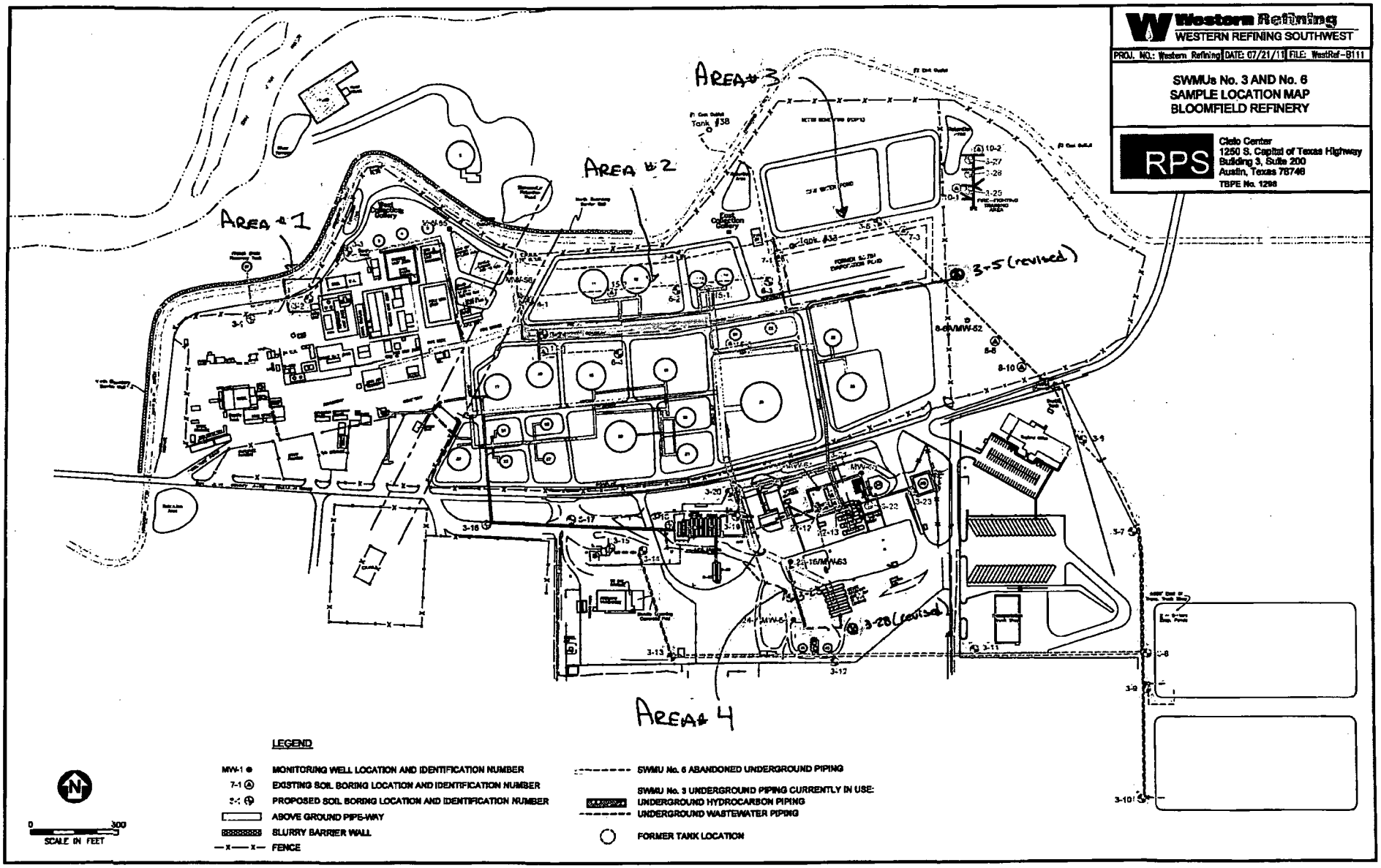
Western appreciate's NMED's time for consideration fo these proposed modification regarding the Group 8 field investitation work. If NMED would like to discuss these proposed modifications further, please do not hesitate to contact Randy and I at your convenience.

Sincerely,

Kelly R. Robinson
Environmental Supervisor

Western Refining Southwest, Inc.
111 County Road 4990
Bloomfield, NM87413

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


Western Refining
WESTERN REFINING SOUTHWEST
PROJ. NO.: Western Refining DATE: 07/21/11 FILE: WestRef-B111
SWMUs No. 3 AND No. 6
SAMPLE LOCATION MAP
BLOOMFIELD REFINERY
RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298
AREA #1
AREA #2
AREA #3
AREA #4
3-5 (revised)
3-20 (revised)
LEGEND
MW-1 MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 EXISTING SOIL BORING LOCATION AND IDENTIFICATION NUMBER
PROPOSED SOIL BORING LOCATION AND IDENTIFICATION NUMBER
ABOVE GROUND PIPE-WAY
SLURRY BARRIER WALL
FENCE
SWMU No. 6 ABANDONED UNDERGROUND PIPING
SWMU No. 3 UNDERGROUND PIPING CURRENTLY IN USE:
UNDERGROUND HYDROCARBON PIPING
UNDERGROUND WASTEWATER PIPING
FORMER TANK LOCATION
0
300
SCALE IN FEET

Appendix C

Field Methods

Field Methods

Pursuant to Section IV of the Order, an investigation of soils was conducted to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective, soil was collected from borings at SWMUs No. 3 and 6. The field methods are described below and individual discussions are presented for the following activities:

- Drilling procedures;
- Soil screening;
- Decontamination procedures;
- Sample collection and handling procedures;
- Equipment calibration; and
- Management of investigation derived waste.

Drilling Procedures

The soil borings were completed using HSA and ODEX methods. Soil samples were collected continuously and logged by a qualified geologist in accordance with the Unified Soil Classification System (USCS) nomenclature. As shown on the boring logs, the data recorded included the lithologic interval, symbol, percent recovery, field screening results, and a sample description of the cuttings and core samples.

Soil Screening

Samples obtained from the borings were screened in the field on 2-foot intervals for evidence of contaminants. Field screening results were recorded on the soil boring logs. Field screening results were used to aid in the selection of soil samples for laboratory analysis. The primary screening methods include: (1) visual examination, (2) olfactory examination, and (3) headspace vapor screening for volatile organic compounds.

Visual screening included examining the soil samples for evidence of staining caused by petroleum-related compounds or other substances that may have caused staining of soils such as elemental sulfur or cyanide compounds. Headspace vapor screening was conducted and involved placing a soil sample in a plastic sealable bag allowing space for ambient air. The bag was sealed, labeled and then shaken gently to expose the soil to the air trapped in the container. The sealed bag was allowed to rest for a minimum of 5 minutes while the vapors equilibrated. Vapors present within the sample bag's headspace were then measured by inserting the probe of a MiniRae 3000 portable volatile organic constituent (VOC) monitor PGM-7600 in a small opening in the bag. The maximum value and the ambient air temperature were recorded on the field boring log for each sample. The screening results are presented in Table

4. Field screening results and any conditions that were considered to be capable of influencing the results of the field screening were recorded on the field logs.

Decontamination Procedures

The sampling equipment coming in direct contact with the samples was decontaminated using a brush, as necessary, to remove larger particulate matter followed by a rinse with potable water, wash with nonphosphate detergent, rinse with potable water, and double rinse with deionized water. In the event that more than one SWMU was investigated during the day a new batch of wash water and rinse water was prepared prior to decontamination.

Sample Collection and Handling Procedures

Soil samples were collected using a stainless steel trowel or an Encore® Sampler.. The selected portion of the sample interval was placed in pre-cleaned, laboratory-prepared sample containers for laboratory chemical analysis. Three soil samples were collected for VOC analysis. An Encore® Sampler was used for collection of soil samples for low-level VOC analysis pursuant to EPA method 5035; the second sample aliquot (approximately 1 gram) was placed in a laboratory-prepared container with a methanol preservative; and the third sample aliquot was placed in an 8-ounce glass jar, which was filled to the top to minimize any head space.

Samples were immediately placed into an ice chest with ice. The samples were maintained in the custody of the sampler until the chain-of-custody form was completed and the ice chest was sealed for shipment to the laboratory.

Equipment Calibration

Soil vapor screening was conducted using a MiniRae 3000 portable VOC monitor PGM-7600. The instrument was calibrated at the beginning of each work day to a concentration of 100 ppm isobutylene.

Management of Investigation Derived Waste

The decontamination water from the drilling equipment was collected in open top 55-gallon drums, which were sealed at the end of each work day. The decontamination water generated from sampling equipment was collected in buckets and placed in open top 55-gallon drums, which were sealed at the end of each work day. The decon water was disposed in the Refinery's wastewater treatment system up-stream of the API Separator. Soil cuttings were also placed into an open-top 55-gallon drum, which was sealed when not in use. The drums of

soil were labeled and temporarily stored in a concrete curbed area pending waste characterization and disposal.

Appendix D

Survey Data

Souder, Miller & Associates • 2101 San Juan Boulevard • Farmington, NM 87401-2247
(505) 325-7535 • fax (505) 326-0045

June 25, 2012

Western Refining Southwest, Inc. - Bloomfield Refinery
P.O. Box 159
50 Road 4990
Bloomfield, NM 87413

5121139

ATTN: Kelly R. Robinson
Environmental Engineer

RE: Monitoring Well Locations
Soil Boring Locations

Dear Ms. Robinson,

I, Kurt R. Shepherd hereby state that I am a New Mexico Professional Surveyor (No. 11643) and that the license is in good standing with the State.

On March 6, 2012 I supervised the field surveys for the origin of the Horizontal and Vertical Control, derived from a NGS OPUS Solution supplied by US NGS/NOAA. The coordinate basis of the Horizontal Control is State Plane Coordinates New Mexico West Zone, (code 3003). The Vertical Ortho-metric height was computed in NAVD88 using Geoid09 datum.

The attached Exhibit "A" Monitoring Wells Data were field surveyed on March 6, 2012 and computed using the above mentioned control position. All Monitoring Well positions are inside a steel casing and located on the North side of the PVC riser. Horizontal positions are measured to the nearest 0.1-ft and vertical elevations are measured to the nearest 0.01-ft.

The attached Exhibit "B" Soil Boring Locations were field surveyed on March 6, 2012 and computed using the above mentioned control position. Elevations are at ground surface.

If you have any questions or need clarification, please contact me.

Respectfully,

SOUDER, MILLER & ASSOCIATES

Kurt R. Shepherd

Kurt R. Shepherd, P.L.S.
Senior Surveyor

Enclosures

KRS/sll
(Revised)

Western Refinery
Soil Boring Location
Surveyed on March 06, 2012
SPC NM West

Exhibit "B"

Point Number	Northing	Easting	Elevation	Descriptor
5106	2070966.402	2683615.628	5614.922	BK-4
5107	2071015.801	2683527.543	5612.432	BK-3
5108	2071150.441	2683367.214	5607.917	BK-2
5109	2071217.062	2683278.259	5606.110	BK-1
5110	2071062.706	2683207.278	5606.292	BK-8
5111	2070988.248	2683308.515	5611.983	BK-7
5112	2070912.500	2683421.432	5614.640	BK-6
5113	2070842.812	2683524.437	5617.175	BK-5
5114	2072425.083	2683081.565	5560.964	3-11
5115	2071897.657	2683739.859	5562.729	3-10
5116	2072310.152	2683744.750	5547.801	3-9
5117	2072417.960	2683735.525	5545.561	3-8 APPROX
5118	2072852.131	2683728.100	5536.475	3-7
5121	2073142.651	2683527.872	5543.408	3-6
5125	2073680.648	2683043.322	5534.518	3-5
5127	2074054.545	2683140.101	5526.477	3-26
5132	2074112.867	2683139.843	5525.539	3-27
5137	2074162.263	2683138.224	5524.698	3-28
5141	2073073.202	2682630.774	5538.805	3-21
5142	2073029.620	2682908.499	5542.550	3-23
5147	2072978.678	2682770.735	5541.845	3-22
5149	2072477.987	2682681.970	5554.045	3-24
5153	2072418.903	2682662.390	5551.741	3-12
5156	2072907.016	2682311.543	5538.456	3-19
5157	2072999.105	2682328.533	5538.291	3-20
5166	2072416.017	2682171.780	5553.305	3-13
5169	2072857.067	2682062.506	5537.287	3-18
5170	2072787.476	2681956.385	5537.936	3-14
5175	2072782.685	2681877.332	5537.478	3-15
5178	2072885.743	2681803.840	5534.936	3-17
5180	2072944.418	2681461.020	5531.205	3-16
5182	2073563.107	2681625.150	5523.124	3-25
5185	2073477.156	2681915.466	5522.104	6-4
5187	2073807.200	2682138.079	5515.218	3-4
5195	2073820.002	2681031.127	5526.278	3-3
5197	2073642.845	2680626.731	5525.122	3-1



Western Refinery
Monitoring Wells
Surveyed on March 06, 2012
SPC NM West

Exhibit "A"

Point Number	Northing	Easting	Elevation	Descriptor
5100	2073370.61	2684757.931	5517.800	BK-10 (MW-BCK2)
5101	2073370.88	2684757.863	5516.522	CONC
5102	2073372.58	2684757.867	5516.131	GS
5103	2070898.1	2683704.928	5620.140	BK-9 (MW-BCK1)
5104	2070898.28	2683705.031	5617.952	CONC
5105	2070899.74	2683705.705	5617.508	GS
5140	2074039.6	2683303.847	5527.96	MW-67
5139	2074039.91	2683304.31	5525.398	CONC
5138	2074041.14	2683305.488	5524.776	GS

Legend

BK-9, BK-10 & MW67 = Top of casing

Conc = Concrete collar at monitoring well

GS = Ground surface at monitoring well



Appendix E

Boring Logs

RPS

LOG OF BORING

Boring No.: SWMU3-1
Start Date: 1/30/2012 0730
Finish Date: 1/30/2012 0900

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 2.5'; N 36°41.917' W 107°58.692'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5525.122
Site Coordinates:
N 2073642.845 **E** 2680626.731

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0								Ground Surface	0
2					4.1 28°F		10	**Silt (ML)** Low plasticity, loose, damp, brown	2
4	3.5- 4.5'	0805	2E/2M/ 3J/4oz		0.5 28°F		80	**Sandy Clay (CL)** Low plasticity, firm, damp, brown, no odor	4
6					0.0 28°F		80	**Sandy Clay (CL)** Similar to above	6
8	7.5- 8.5'	0837	2E/2M/ 3J/4oz		0.0 27°F		100	**Sandy Clay (CL)** Similar to above	8
10					0.0 27°F		100	**Sandy Clay (CL)** Similar to above	10
12								Total Depth = 10' BGL	12
14									14
16									16
18									18
20									20
22									22

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

512/347-7588
512/347-8243 fax

RPS

LOG OF BORING

Boring No.: SWMU3-10
Start Date: 2/3/2012 0825
Finish Date: 2/3/2012 0940

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 11'; N 36°41.631' W 107°58.055'

Total Depth: 14' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5562.729
Site Coordinates:
N 2071897.657 **E** 2683739.859

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					3.0 47°F		50	**Fill (Gravel/Sand/Clay)** Damp, brown, no odor	0
2	2-4'	0834	2E/2M/ 3J/4oz		21.7 47°F		100	**Fill (Gravel/Sand/Clay)** Similar to above, no odor	2
4					0.0 47°F		20	**Fill (Gravel/Sand/Clay)** Similar to above, no odor	4
6					0.0 47°F		10	**Fill (Gravel/Sand/Clay)** Similar to above	6
8					0.0 45°F		10	**Fill (Gravel/Sand/Clay)** Similar to above	8
10	10-12'	0851	2E/2M/ 3J/4oz		0.0 45°F		50	**Sandy Gravel (GW)** Very fine grain, loose, dry to damp, light brown, no odor, 1/2" to 1" size gravel	10
12							10	**Sandy Gravel (GW)** Similar to above	12
14	13.5-14'	0923	2E/2M/ 3J/4oz				60	**Sandy Gravel (GW)** Similar to above	14
16								Total Depth = 14' BGL	16
18									18
20									20
22									22

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

512/347-7588
512/347-8243 fax

RPS

LOG OF BORING

Boring No.: SWMU3-11
Start Date: 2/2/2012 1505
Finish Date: 2/2/2012 0550

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 5.5'; N 36°41.718' W107°58.189'

Total Depth: 12' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5560.964
Site Coordinates:
N 2072425.083 **E** 2683081.565

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					0.0 45°F		20	**Fill (Gravel/Sand)** Damp, brown, no odor	0
2					0.0 45°F		20	**Fill (Gravel/Sand)** Similar to above	2
4					0.0 44°F		30	**Fill (Gravel)** Similar to above	4
6	6.5-7.5'	1520	2E/2MV 3J/4oz		0.0 44°F		40	**Sandy Gravel (SW)** Fine to medium grained sand in 1/2" to 1" size gravel, damp, no odor	6
8					0.0 44°F		50	**Sandy Gravel (SW)** Similar to above	8
10	10.5-11.5'	1535	2E/2MV 3J/4oz				50	**Sandy Gravel (SW)** Similar to above	10
12								Total Depth = 12' BGL	12
14									14
16									16
18									18
20									20
22									22

RPS
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LOG OF BORING

Boring No.: SWMU3-12
Start Date: 1/26/2012 1210
Finish Date: 1/26/2012 1250

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 4'; N 36°41.716' W 107°58.275'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5551.741
Site Coordinates:
N 2072418.903 **E** 2682662.390

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0								Ground Surface	0
2					19.6 55°F		50	**Silt (ML)** Low plasticity, soft, damp, brown, no odor	2
4					0.0 55°F		90	**Silt (ML)** Similar to above, no odor	4
6	5-6'	1216	2E/2M 3J/4oz		0.0 55°F		90	**Silt (ML)** Similar to above, no odor	6
8					0.0 55°F		60	**Silt (ML)** Similar to above, no odor	8
10	9- 10'	1225	2E/2M 3J/4oz		0.0 55°F		100	**Silt (ML)** Similar to above, no odor, trace sand	10
12								Total Depth = 10' BGL	12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-13
Start Date: 1/26/2012 1100
Finish Date: 1/26/2012 1200

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 4.5'; N 36°41.716' W 107°58.374'

Total Depth: 12' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5553.305
Site Coordinates:
N 2072416.017 **E** 2682171.780

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0								Ground Surface	0
0					0.0 46°F		70	**Silt (ML)** Low plasticity, soft, damp, brown, no odor	0
2					0.0 46°F		70	**Silt (ML)** Similar to above, no odor	2
4					0.0 46°F		60	**Silt (ML)** Similar to above, no odor	4
6	5.5-6.5' & Dup	1115	4E/4M/ 6J/4oz		0.0 46°F		100	**Silt (ML)** Similar to above, no odor	6
8					0.0 46°F		100	**Silt (ML)** Similar to above, no odor	8
10	9.5-10.5'	1130	2E/2M/ 3J/4oz		0.0 46°F		100	**Silt (ML)** Similar to above, no odor	10
12								Total Depth = 12' BGL	12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-14
Start Date: 1/30/2012 1615
Finish Date: 1/30/2012 1700

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 3.5'; N 36°41.776' W 107°58.418'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5537.936
Site Coordinates:
N 2072787.476 **E** 2681956.385

Depth (ft.)	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					9.7 54°F		100	**Silty Clay (CL)** Low plasticity, firm, damp, brown, no odor	0
2					0.0 54°F		80	**Clayey Silt (ML)** Low plasticity, soft, damp, brown, no odor	2
4	4.5-5.5'	1632	2E/2M/ 3J/4oz		0.0 54°F		80	**Clayey Silt (ML)** Similar to above	4
6					0.0 54°F		100	**Clayey Silt (ML)** Similar to above	6
8	8.5-9.5'	1637	2E/2M/ 3J/4oz		1.4 54°F		100	**Clayey Silt (ML)** Similar to above	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-15
Start Date: 1/26/2012 0745
Finish Date: 1/26/2012 0840

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 4.5'; N 36°41.776' W 107°58.435'

Total Depth: 12' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5537.478
Site Coordinates:
N 2072782.685 **E** 2681877.332

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					0.0 28°F		80	**Clayey Silt (ML)** Low plasticity, firm to soft, damp, brown, no odor	0
2					0.0 28°F		90	**Clayey Silt (ML)** Similar to above, no odor	2
4					0.0 28°F		80	**Clayey Silt (ML)** Similar to above, no odor	4
6	5.5-6.5'	0753	2E/2MV 3J/4oz		0.0 28°F		60	**Clayey Silt/Silt (ML)** Low plasticity, soft, crumbly, damp, brown, no odor	6
8					0.0 28°F		90	**Silt (ML)** Low plasticity, soft/crumbly, damp, brown, no odor	8
10	9.5-10.5'	0800	2E/2MV 3J/4oz		0.0 28°F		100	**Silt/Silty Sand (ML/SM)** Similar to above with very fine grain sand, loose, damp, brown, no odor	10
12								Total Depth = 12' BGL	12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-16
Start Date: 2/2/2012 1155
Finish Date: 2/2/2012 1240

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 3.25'; N 36°41.804' W 107°58.521'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5531.205
Site Coordinates:
N 2072944.418 **E** 2681461.020

Depth (ft.)	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description
								Ground Surface
0					1.7 54°F		100	**Fill (Silty Clay)** Low plasticity, firm, damp, brown, no odor
2					0.0 50°F		90	**Fill (Silty Clay)** Similar to above
4	4.25-5.25' &Dup	1207	4E/4M/ 6J/4oz		0.0 50°F		90	**Clayey Silt (ML)** Low plasticity, soft, damp, brown, no odor
6					0.0 50°F		80	**Clayey Silt (ML)** Similar to above, no odor
8	8.25' 9.25'	1214	2E/2M/ 3J/4oz		0.0 54°F		90	**Silty Sand (SM)** Very fine grain, loose to compact, damp, brown
10								Total Depth = 10' BGL
12								
14								
16								
18								
20								
22								

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LOG OF BORING

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 4'; N 36°41.793' W 107°58.451'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5534.936
Site Coordinates:
N 2072885.743 **E** 2681803.840

Boring No.: SWMU3-17
Start Date: 1/25/2012 1630
Finish Date: 1/25/2012 1730

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0								Ground Surface	0
0–2					0.0 39°F		60	**Gravelly Clay (CL)** Low plasticity, firm, damp, brown, no odor	0–2
2–4					0.0 39°F		10	**Gravelly Clay (CL)** Similar to above, no odor	2–4
4–6	5-6'	1655	2E/2MV 3J/4oz		0.0 39°F		70	**Silty Sand (SM)** Very fine grain, compact, damp, brown, no odor	4–6
6–8					0.0 39°F		90	**Clayey Silt/Sand (SC)** Very fine grain, compact, damp, brown, no odor	6–8
8–10	9-10'	1700	2E/2MV 3J/4oz		0.0 37°F		90	**Clayey Silt/Sand (SC)** Similar to above	8–10
10								Total Depth = 10' BGL	10
12–22									12–22

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LOG OF BORING

Boring No.: SWMU3-18
Start Date: 1/26/2012 0920
Finish Date: 1/26/2012 1010

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 3.5'; N 36°41.789' W 107°58.398'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5537.287
Site Coordinates:
N 2072857.067 **E** 2682062.506

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					0.6 36°F		100	**Clayey Silt (ML)** Low plasticity, firm, damp, brown, no odor	0
2					7.8 36°F		100	**Clayey Silt (ML)** Similar to above, no odor	2
4	4.5-5.5'	0934	2E/2M/3J/4oz		0.0 36°F		80	**Clayey Silt (ML)** Similar to above, no odor	4
6					0.0 36°F		80	**Silty Sand (SM)** Very fine grain, loose to compact, damp, brown, no odor	6
8	8.5-9.5'	0938	2E/2M/3J/4oz		0.0 36°F		90	**Silty Sand (SM)** Similar to above, no odor	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-19
Start Date: 1/26/2012 1620
Finish Date: 1/26/2012 1650

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 3.5'; N 36°41.797' W 107°58.347'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5538.456
Site Coordinates:
N 2072907.016 **E** 2682311.543

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					0.0 48°F		70	**Fill (Clay)** Damp, brown, no odor	0
2					0.0 48°F		70	**Silty Clay (CL)** Low plasticity, firm, damp, brown, no odor	2
4	4.5-5.5'	1630	2E/2M/ 3J/4oz		0.0 48°F		70	**Silty Clay (CL)** Similar to above, no odor	4
6					0.0 48°F		70	**Clayey Silt (ML)** Very fine grain, compact, damp, brown, no odor	6
8	8.5-9.5'	1635	2E/2M/ 3J/4oz		0.0 48°F		100	**Clayey Silt (ML)** Similar to above	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-20
Start Date: 2/2/2012 1105
Finish Date: 2/2/2012 1150

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 9.5'; N 36°41.813' W 107°58.342'

Total Depth: 16' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5538.291
Site Coordinates:
N 2072999.105 **E** 2682328.533

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					7.4 43°F		60	**Fill (Clay/Sand/Gravel)** Damp, brown and gray, no odor	0
2	2-4'	1109	2E/2M/ 3J/4oz		56 42°F		80	**Fill (Silty Clay)** Low plasticity, soft, damp, brown, odor	2
4					40.8 43°F		60	**Fill (Clayey Silt)** Low plasticity, soft, damp, brown, faint odor	4
6					13.3 43°F		90	**Fill (Clayey Silt)** Similar to above, dark brown, no odor	6
8					3.9 43°F		100	**Fill (Clayey Silt)** Similar to above, brown, no odor	8
10	10.5-11.5'	1122	2E/2M/ 3J/4oz		2.3 43°F		100	**Clayey Silt (ML)** Low plasticity, soft, damp, brown, no odor	10
12					2.8 44°F		80	**Clayey Silt (ML)** Similar to above	12
14	14.5-15.5'	1127	2E/2M/ 3J/4oz		1.4 45°F		100	**Silty Sand (SM)** Very fine grain, loose, damp, light brown, no odor	14
16								Total Depth = 16' BGL	16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-21
Start Date: 2/2/2012 0955
Finish Date: 2/2/2012 1055

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 5.5'; N 36°41.824' W 107°58.281'

Total Depth: 12' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5538.805
Site Coordinates:
N 2073073.202 **E** 2682630.774

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					1.1 45°F		60	**Fill (Silty Clay)** Low plasticity, firm, damp, brown, no odor	0
2					0.0 45°F		90	**Fill (Silty Clay)** Similar to above, no odor	2
4					0.0 45°F		60	**Fill (Silty Clay/Clayey Silt)** Low plasticity, firm to soft, damp, brown, no odor	4
6	6.5-7.5'	1027	2E/2M/ 3J/4oz		0.0 45°F		90	**Clayey Silt (ML)** Similar to above, no odor	6
8					0.0 45°F		100	**Clayey Silt (ML)** Similar to above, no odor	8
10	10.5-11.5'	1034	2E/2M/ 3J/4oz		0.0 45°F		90	**Clayey Silt (ML)** Similar to above, trace sand at base, no odor	10
12								Total Depth = 12' BGL	12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-22
Start Date: 1/26/2012 1525
Finish Date: 1/26/2012 1600

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 4'; N 36°41.808' W 107°58.263'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5541.845
Site Coordinates:
N 2072978.678 **E** 2682770.735

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					0.0 54°F		60	**Fill (Clay/Gravel)** Damp, brown, no odor	0
2					0.0 54°F		90	**Clayey Silt (ML)** Low plasticity, firm to soft, damp, brown, no odor	2
4									4
6	5-6'	1535	2E/2M/ 3J/4oz		0.0 54°F		70	**Clayey Silt (ML)** Similar to above, no odor	6
8					0.0 54°F		70	**Clayey Silt (ML)** Similar to above, no odor	8
10	9-10'	1540	2E/2M/ 3J/4oz		0.0 53°F		80	**Clayey Silt (ML)** Similar to above, no odor	10
12								Total Depth = 10' BGL	12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-23
Start Date: 1/26/2012 1305
Finish Date: 1/26/2012 1400

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 7'; N 36°41.816' W 107°58.224'

Total Depth: 14' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5542.550
Site Coordinates:
N 2073029.620 **E** 2682908.499

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					6.3 51°F		60	**Fill** Wood chips, clay, gravel, sand	0
2					0.0 51°F		50	**Clayey Silt (ML)** Low plasticity, soft, damp, brown, no odor	2
4					1.6 51°F		30	**Clayey Silt (ML)** Similar to above, no odor	4
6					0.0 51°F		90	**Clayey Silt (ML)** Similar to above, no odor	6
8	8-9'	1322	2E/2M/ 3J/4oz		0.0 51°F		60	**Silty Sand (SM)** Very fine grain, compact, damp, brown, no odor **Silty Sand (SM)** Similar to above, no odor	8
10					0.0 51°F		80	**Silty Clayey Sand (SC/SM)** Very fine to fine grain, loose to compact, damp, brown, no odor	10
12	12- 13'	1330	2E/2M/ 3J/4oz		0.0 51°F		90	**Clayey Sand (SC)** Similar to above, no odor	12
14								Total Depth = 14' BGL	14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-24
Start Date: 2/2/2012 1250
Finish Date: 2/2/2012 1430

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 4.5'; N 36°41.725' W 107°58.271'

Total Depth: 12' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5554.045
Site Coordinates:
N 2072477.987 **E** 2682681.970

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					0.0 49°F		70	**Fill (Silty Sand/Gravel)** Brown, no odor	0
2					0.0 48°F		90	**Fill (Silty Sand/Gravel)** Similar to above	2
4					0.0 46°F		100	**Fill (Silty Sand/Gravel)** Similar to above	4
6	5.5-6.5'	1355	2E/2M/ 3J/4oz		0.0 46°F		100	**Silty Sand (SM)** Very fine grain, loose to compact, damp, brown, no odor	6
8					0.0 43°F		90	**Silty Sand (SM)** Similar to above, no odor	8
10	9.5-10.5'	1410	2E/2M/ 3J/4oz		0.0 43°F		90	**Silty Sand (SM)** Similar to above, no odor	10
12								Total Depth = 12' BGL	12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 4'; N 36°41.903' W 107°58.490'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5523.124
Site Coordinates:
N 2073563.107 **E** 2681625.150

Boring No.: SWMU3-25
Start Date: 1/25/2012 1500
Finish Date: 1/25/2012 1630

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0								Ground Surface	0
0					0.0 43°F		50	**Clayey Sand (SC)** Fine grain, compact, damp, brown, no odor	0
2							0	**Clayey Sand (SC)** No recovery	2
4					0.0 43°F		90	**Clayey Sand (SC)** Similar to above	4
6	5-6'	1535	2E/2M/ 3J/4oz						6
6					0.0 43°F		80	**Sandy Clay (CL)** Low plasticity, firm, damp, brown	6
8									8
8					0.0 43°F		90	**Sandy Clay (CL)** Similar to above	8
10	9-10'	1550	2E/2M/ 3J/4oz						10
10								Total Depth = 10' BGL	10
12									12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-26
Start Date: 1/30/2012 0930
Finish Date: 1/30/2012 1000

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: N 36°41.987' W 107°58.178'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5526.477
Site Coordinates:
N 2074054.545 **E** 2683140.101

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0								Ground Surface	0
2					0.0 36°F		100	**Silt (ML)** Low plasticity, compact, damp, brown, no odor	2
4	2.5-3.5'	0933	2E/2M/ 3J/4oz		0.0 36°F		100	**Silt (ML)** Similar to above	4
6					0.0 36°F		90	**Silt (ML)** Similar to above	6
8	6.5-7.5'	0940	2E/2M/ 3J/4oz		0.0 36°F		90	**Silt (ML)** Similar to above	8
10					0.0 36°F		100	**Silt (ML)** Similar to above	10
12								Total Depth = 10' BGL	12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: N 36°41.996' W 107°58.179'

Total Depth: 8' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5525.539
Site Coordinates:
N 2074112.867 **E** 2683139.843

Boring No.: SWMU3-27
Start Date: 1/30/2012 1005
Finish Date: 1/30/2012 1055

Depth (ft.)	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					0.1 36°F		100	**Silt (ML)** Low plasticity, compact, damp, brown, no odor	0
2	2.5-3.5' &Dup	1021	4E/4M/ 6J/4oz				100	**Silt (ML)** Similar to above	2
4					0.0 36°F		90	**Silty Sand (SM)** Very fine grain, loose, damp, brown, no odor	4
6	6.5-7.5'	1026	2E/2M/ 3J/4oz		0.0 36°F		100	**Silty Sand (SM)** Similar to above	6
8								Total Depth = 8' BGL	8
10									10
12									12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-28
Start Date: 1/30/2012 1100
Finish Date: 1/30/2012 1130

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: N 36°42.005' W 107°58.178'

Total Depth: 8' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5524.698
Site Coordinates:
N 2074162.263 **E** 2683138.224

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					0.0 41°F		100	**Silt (ML)** Low plasticity, compact, damp, brown, no odor	0
2	2.5-3.5'	1105	2E/2M/ 3J/4oz		0.0 41°F		100	**Silt (ML)** Similar to above	2
4					0.0 41°F		80	**Silt (ML)** Similar to above	4
6	6.5-7.5'	1110	2E/2M/ 3J/4oz		0.0 41°F		100	**Silt (ML)** Similar to above	6
8								Total Depth = 8' BGL	8
10									10
12									12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-3
Start Date: 1/27/2012 0915
Finish Date: 1/27/2012 1200

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 2.5'; N 36°41.944' W 107°58.608'

Total Depth: 30' bgl
Ground Water: Saturated @ 28' bgl
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5526.278
Site Coordinates:
N 2073820.002 **E** 2681031.127

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					29 39°F		100	**Clayey Silt (ML)** Very fine grain, compact, damp, brown, no odor	0
2					71.2 39°F		80	**Silty Clay (CL)** Low plasticity, stiff, damp, gray, strong odor	2
4	3.5-4.5'	0922	2E/2MV 3J/4oz		21.7 39°F		60	**Silty Clay (CL)** Similar to above, odor	4
6					123 39°F		80	**Silty Sand (SM)** Very fine grain, loose to compact, damp, gray, odor	6
8	7.5-8.5'	0935	2E/2MV 3J/4oz		81.4 39°F		60	**Silty Sand (SM)** Similar to above, odor	8
10					73 39°F		100	**Clayey Silt (ML)** Very fine grain, compact, damp, gray, odor	10
12					91.9 38°F		90	**Clayey Silt (ML)** Similar to above, gray, odor	12
14					81 38°F		90	**Silty Sand (SM)** Fine grain, loose, damp, gray, odor	14
16					103 38°F		90	**Silty Sand (SM)** Fine grain, loose, damp, gray, odor, becomes gravelly at base	16
18					93.8 38°F		90	**Gravelly Sand (SW)** Very fine to medium grain, loose to compact, damp, odor	18
20					10.7 39°F		10	**Gravelly Sand (SW)** Similar to above, odor	20
22									22

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LOG OF BORING

Boring No.: SWMU3-3
Start Date: 1/27/2012 0915
Finish Date: 1/27/2012 1200

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 2.5'; N 36°41.944' W 107°58.608'

Total Depth: 30' bgl
Ground Water: Saturated @ 28' bgl
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5526.278
Site Coordinates:
N 2073820.002 **E** 2681031.127

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
24	24-26'	1115	2E/2M/ 3J/4oz		112.9 39°F		90	**Gravelly Sand (SW)** Very fine to medium grain, loose to compact, damp, odor	24
26	26-27'	1126	2E/2M/ 3J/4oz	▼ 28' bgl	1379 39°F		60	**Gravelly Sand (SW)** Similar to above, odor	26
					1055 39°F		10	**Gravelly Sand (SW)** Similar to above, odor	
28							--	**Gravelly Sand (SW)** No recovery	28
30							50	**Gravelly Sand (SW)** Fine to medium grain, compact, moist to saturated, gray to black, very strong odor	30
								Total Depth = 30' BGL	
32									32
34									34
36									36
38									38
40									40
42									42
44									44

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LOG OF BORING

Boring No.: SWMU3-4
Start Date: 1/25/2012 1250
Finish Date: 1/25/2012 1445

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 5'; N 36°41.943' W 107°58.383'

Total Depth: 16' bgl
Ground Water: Saturated @ 14' bgl
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5515.218
Site Coordinates:
N 2073807.200 **E** 2682138.079

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0							0	**Silty Sand/Gravel**	0
2					0.0 41°F		90	**Clayey Sand (SC)** Very fine grain, compact, damp, reddish brown, no odor	2
4					0.0 41°F		90	**Clayey Sand (SC)** Similar to above, no odor	4
6	6-7'	1303	2E/2M 3J/4oz		8.6 41°F		90	**Gravelly Sand (SW)** Fine to large grain, loose, damp, dark brown, 1/2" to 1/4" size gravel	6
8					38.6 41°F		100	**Gravelly Sand (SW)** Similar to above, gray, faint odor	8
10	10-11'	1325	2E/2M 3J/4oz		50.6 40°F		--	**Gravelly Sand (SW)** Similar to above, faint odor, refusal at 9' bgl	10
12	12-14'	1336	2E/2M 3J/4oz	14' bgl	238 39°F		90	**Gravelly Sand (SW)** No recovery	12
14							20	**Gravelly Sand (SW)** Similar to above, gray to brown, no odor	14
16							30	**Gravelly Sand (SW)** Similar to above, gray to black, odor	16
18								**Gravelly Sand/Sandy Gravel (SW)** Similar to above, saturated, black, odor	18
20								Total Depth = 16' BGL	20
22									22

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LOG OF BORING

Boring No.: SWMU3-5
Start Date: 1/30/2012 1200
Finish Date: 1/30/2012 1245

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: N 36°41.925' W 107°58.197'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5534.518
Site Coordinates:
N 2073680.648 **E** 2683043.322

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					0.0 48°F		50	**Silty Clay (CL)** Low plasticity, stiff, dry to damp, brown, no odor	0
2					0.0 48°F		60	**Clayey Silt (ML)** Low plasticity, soft, damp, brown, no odor	2
4	4.5-5.5'	1215	2E/2M/ 3J/4oz		0.0 48°F		60	**Clayey Silt (ML)** Similar to above	4
6					0.0 48°F		80	**Sandy Silt (ML)** Low plasticity, soft, damp, brown, no odor	6
8	8.5-9.5'	1220	2E/2M/ 3J/4oz		0.0 48°F		100	**Sandy Silt (ML)** Similar to above	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-6
Start Date: 2/6/2012 1330
Finish Date: 2/6/2012 1430

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 5'; N 36°41.837' W 107°58.098'

Total Depth: 12' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5543.408
Site Coordinates:
N 2073142.651 **E** 2683527.872

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					4.9 50°F		90	**Silt (ML)** Low plasticity, soft, damp, brown, no odor	0
2					0.0 50°F		90	**Silt (ML)** Similar to above, no odor	2
4					0.0 50°F		90	**Silt (ML)** Similar to above, no odor	4
6	6-7'	1351	2E/2M/ 3J/4oz		0.0 50°F		90	**Clayey Silt (ML)** Low plasticity, firm to soft, damp, brown, no odor	6
8					0.0 50°F		80	**Clayey Silt (ML)** Similar to above	8
10	10-11'	1401	2E/2M/ 3J/4oz		0.0 50°F		90	**Sandy Silt (ML)** Low plasticity, loose, damp, light brown	10
12								Total Depth = 12' BGL	12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-7
Start Date: 2/2/2012 1610
Finish Date: 2/2/2012 1700

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 3.25'; N 36°41.786' W 107°58.059'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5536.475
Site Coordinates:
N 2072852.131 **E** 2683728.100

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0	0-2 &Dup	1611	4E/4M/ 6J/4oz		126.7 48°F		20	**Fill (Silty Clay)** Low plasticity, soft, damp, tan, no odor	0
2					6.9 48°F		10	**Fill (Silty Clay)** Similar to above, no odor	2
4	4.25- 5.25'	1616	2E/2M/ 3J/4oz		7.0 48°F		20	**Silty Sand (SM)** Very fine grain, loose, damp, brown, no odor	4
6					0.2 48°F		20	**Silty Sand (SM)** Similar to above	6
8	8.25- 9.25'	1622	2E/2M/ 3J/4oz		0.0 47°F		100	**Silty Sand (SM)** Similar to above, no odor	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-8
Start Date: 2/6/2012 1200
Finish Date: 2/6/2012 1300

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: N 36°41.716' W 107°58.055'

Total Depth: 16.25' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5545.561
Site Coordinates:
N 2072417.960 **E** 2683735.525

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					0.0 48°F		100	**Fill (Silt)** Low plasticity, soft, damp, tan, no odor	0
2					0.0 48°F		100	**Fill (Silt)** Similar to above, no odor	2
4					0.0 48°F		100	**Fill (Silt)** Similar to above, no odor	4
6	6-7'	1211	2E/2M/ 3J/4oz		0.0 48°F		80	**Fill (Silt)** Similar to above, no odor	6
8					0.0 48°F		10	**Fill (Clayey Sand)** Fine grain, loose, damp, brown, no odor	8
10	10-11'	1220	2E/2M/ 3J/4oz		0.0 48°F		50	**Sand/Sandstone (SP/SS)** Fine grain, compact, poorly cemented, damp, gray, no odor	10
12	12-14'	1227	2E/2M/ 3J/4oz		0.0 48°F		90	**Sand/Sandstone (SP/SS)** Similar to above	12
14	14-16'	1239	2E/2M/ 3J/4oz		0.0 48°F 0.0 48°F		50	**Sand/Sandstone (SP/SS)** Similar to above, dense	14
16							40	**Sand/Sandstone (SP/SS)** Similar to above, dense	16
								Total Depth = 16.25' BGL	
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU3-9
Start Date: 2/3/2012 0950
Finish Date: 2/3/2012 1100

Client: Western Refining Southwest, Inc.
Site: SWMU Group #8, Bloomfield Refinery
Job No.: UEC01120 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: Bottom of pipeline - 13'; N 36°41.698' W 107°58.055'

Total Depth: 20' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5547.801
Site Coordinates:
N 2072310.152 **E** 2683744.750

Depth (ft.)	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0					0.0 50°F		90	**Fill (Silty Sand)** Very fine grain, loose, damp, brown, no odor	0
2					0.0 50°F		90	**Fill (Sandy Clay)** Low plasticity, firm, damp, brown, no odor	2
4					0.0 50°F		90	**Fill (Sandy Clay)** Similar to above, yellowish brown	4
6					0.0 48°F		90	**Fill (Sandy Clay)** Similar to above	6
8					0.0 48°F		80	**Fill (Sandy Clay)** Similar to above, yellowish brown and greenish gray	8
10					0.0 48°F		70	**Fill (Sandy Clay)** Similar to above	10
12					0.0 48°F		70	**Clay/Silty Clay (CL)** Low plasticity, soft, damp, gray, no odor, grading to gray sand/clayey sand	12
14	14-16'	1025	2E/2M/3J/4oz		0.0 44°F		100	**Sand/Clayey Sand (SC)** Fine grain, compact, damp, yellowish brown to gray, no odor	14
16					0.0 44°F		60	**Clayey Sand (SC)** Fine grain, compact, damp, gray, no odor	16
18	18-19'	1045	2E/2M/3J/4oz				70	**Clayey Sand (SC)** Similar to above, no odor	18
20								Total Depth = 20' BGL	20
22									22

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LOG OF BORING

Boring No.: SWMU 7-1
Start Date: 8/17/2010 0800
Finish Date: 8/17/2010 1045

Client: Western Refining Southwest, Inc.
Site: SWMU Group #4, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: N 36º41.944' W107º58.305'

Total Depth: 16' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5524.242
Site Coordinates: N 36º41'56.62962"
W 107º58'18.34100"

Depth (ft.)	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0	0-0.5'	0920	G/2V/2E/3J		2.2 75ºF		50	**Silty Sand (SM)** Fine grain, loose, brown, damp, no odor, gravelly	0
2					3.0 75ºF		80	**Clayey Sand (SC)** Fine grain, compact, brown, damp, no odor	2
4	4-5'	0940	G/2V/2E/3J		9.5 75ºF		80	**Clayey Sand (SC)** Similar to above, stained black, hydrocarbon odor	4
6	5-7'	0950	G/2V/2E/3J		3.6 75ºF		80	**Clayey Sand (SC)** Similar to above, no staining, dark brown, faint odor	6
					3.1 75ºF		80	**Silty Sand (SM)** Fine grain, loose, brown, damp, trace silty clay, no odor	
8					3.4 75ºF		80	**Silty Sand (SM)** Similar to above, clay lense approximately 2 inches thick at 9.5 feet, high plasticity, firm, light brown,damp, no odor	8
10	10-12'	1015	G/2V/2E/3J		2.0 75ºF		80	**Silty Sand (SM)** Fine grain, loose, light brown, damp, no odor, native soil	10
12					2.1 75ºF		80	**Silty Sand (SM)** Similar to above	12
14					2.0 75ºF		80	**Gravelly Sand (SW)** Fine to medium grain sand, loose, damp to moist, brown, 1/4-inch to 1/2-inch gravel, well rounded	14
16								Total Depth = 16' BGL	16

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LOG OF BORING

Boring No.: SWMU8-6
Start Date: 9/23/2008
Finish Date: 9/23/2008

Client: Western Refining Southwest, Inc.
Site: SWMU Group #2, Bloomfield Refinery
Job No.: 354 - *Bloomfield, NM*
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): –
Elev., PAD (ft. msl): –
Elev., GL (ft. msl): 5535.908
Site Coordinates: N 49828.227
E 52839.886

Comments: 0-10 Interval (9/23/08, 80°F). SWMU8-6A is 42' W 10° of SWMU 8-6

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0	0-0.5' &Dup	1145	G/2V/2E/2J		0.7		90	**Silt (ML)** Fine grain, loose, dry, brown, trace gravel	0
2	1.5-2'	1215	G/2V/2E/2J		0.6		60	**Silt (ML)** Similar to above	2
4					0.3		40	**Silt (ML)** Similar to above	4
6					0.5		80	**Silt (ML)** Similar to above	6
8					0.5		90	**Silt (ML)** Fine grain, compact, dry, brown	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16
18									18
20									20
22									22

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WELL CONSTRUCTION

Well No.: MW-52 (SWMU8-6A)
Start Date: 10/13/2008
Finish Date: 10/14/2008

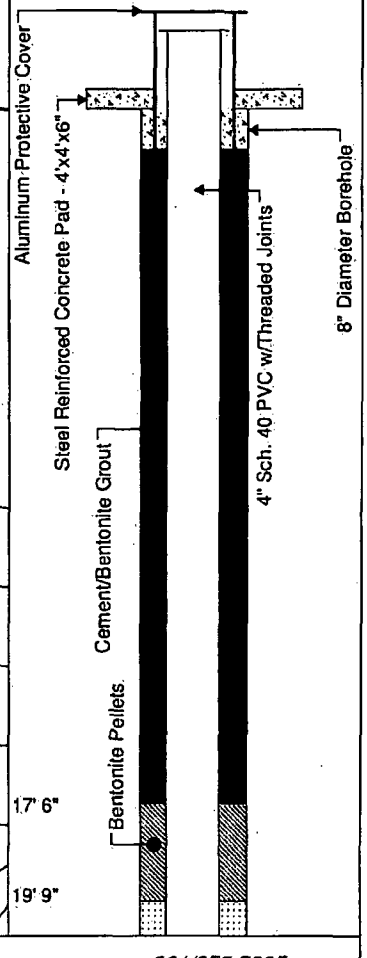
Client: Western Refining Southwest, Inc.
Site: SWMU Group #2, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger/ODEX
Sampling Method: Split Spoon

Total Depth: 41' bgl
Ground Water: 36.03' BTOC 10/28/08
Elev., TOC (ft. msl): 5538.626
Elev., PAD (ft. msl): 5536.148
Elev., GL (ft. msl): 5535.908
Site Coordinates:
N 49828.227 E 52839.886

Comments: 0-10 Interval (10/13/08, 40ºF); 10-41 Interval (10/14/08, 40ºF-42ºF). SWMU8-6A is 42'W 10ºS of SWMU8-6.

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/Container/No	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description
								Ground Surface
0							--	**Silt (ML)** Fine grain, loose, dry, brown
10					0.3		80	**Silt (ML)** Fine grain, loose, dry to damp, brown
12					0.4		100	**Silt (ML)** Similar to above
14					0.5		100	**Silt (ML)** Similar to above
16					0.4		100	**Silt (ML)** Similar to above
18					0.5		100	**Silt (ML)** Similar to above
20								**Clayey Silt/Silty Clay (ML/CL)** Low plasticity, soft, damp, brown

Completion Results



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WELL CONSTRUCTION

Well No.: MW-52 (SWMU8-6A)

Client: Western Refining Southwest, Inc.
Site: SWMU Group #2, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger/ODEX
Sampling Method: Split Spoon

Total Depth: 41' bgl
Ground Water: 36.03' BTOC 10/28/08
Elev., TOC (ft. msl): 5538.626
Elev., PAD (ft. msl): 5536.148
Elev., GL (ft. msl): 5535.908
Site Coordinates:
N 49828.227 E 52839.886

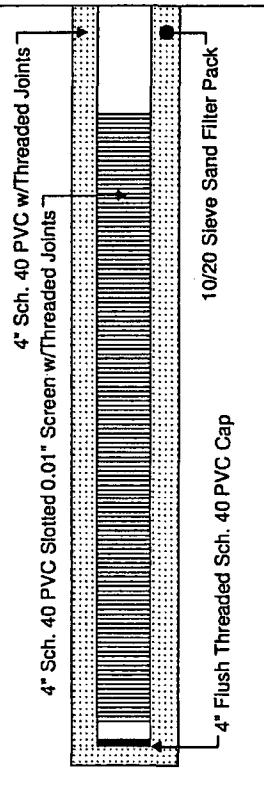
Start Date: 10/13/2008
Finish Date: 10/14/2008

Comments: 0-10 Interval (10/13/08, 40ºF); 10-41 Interval (10/14/08, 40ºF-42ºF). SWMU8-6A is 42'W 10ºS of SWMU8-6.

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/Container/No	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description
22					0.4		100	**Clayey Silt/Silty Clay (ML)** Similar to above
24					0.5		100	**Clayey Silt/Silt (ML)** Similar to above, except decrease in clay content
26					0.4		60	**Clayey Silt/Silt (ML)** Similar to above
28					0.5		70	**Gravelly Sand (SW)** Fine grain, loose, damp, brown, gravel throughout
30					0.4		70	**Gravelly Sand (SW)** Similar to above
32					0.5		70	**Gravelly Sand (SW)** Similar to above
34	33'-34'	0915	G/2V/2E/3J	34'	0.5		60	**Gravelly Sand (SW)** Similar to above, moist to saturated at base
36							60	**Gravelly Sand (SW)** Fine to medium grain, loose to compact, saturated, brown
38							60	**Gravelly Sand (SW)** Similar to above, trace sandstone at base, very light reddish brown to tan
40							--	**Sand/Sandstone (SP/SS)** Fine grain, compact, moist to saturated at base, yellowish brown Nacimiento Formation
42							--	**Sand/Sandstone (SP/SS)** Similar to above

Total Depth = 41' BGL

Completion Results



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LOG OF BORING

Boring No.: SWMU8-8
Start Date: 9/23/2008
Finish Date: 9/23/2008

Client: Western Refining Southwest, Inc.
Site: SWMU Group #2, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: 0-10 Interval (9/23/08, 80°F)

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5536.768
Site Coordinates: N 49742.785
E 52978.830

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0	0-0.5'	1400	G/2V/2E/2J		0.3		60	**Silt (ML)** Fine grain, loose, dry, brown	0
2	1.5-2'	1415	G/2V/2E/2J		0.5		50	**Silt (ML)** Similar to above	2
4					0.5		50	**Silt (ML)** Similar to above	4
6					0.5		60	**Silt (ML)** Similar to above	6
8					0.3		80	**Sandy Silt (ML)** Fine grain, compact, dry, brown, very fine grain sand	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16
18	EB092308	1430							18
20	FB092308	1445							20
22									22

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LOG OF BORING

Boring No.: SWMU8-10
Start Date: 9/23/2008
Finish Date: 9/23/2008

Client: Western Refining Southwest, Inc.
Site: SWMU Group #2, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: 0-10 Interval (9/23/08, 80°F)

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5538.615
Site Coordinates: N 49661.599
E 53076.420

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0	0-0.5'	1545	G/2V/2E/2J		0.5		90	**Silt (ML)** Very fine grain, compact, dry, brown	0
2	1.5-2'	1600	G/2V/2E/2J		0.5		90	**Silt (ML)** Similar to above, trace fine grain sand at base	2
4					0.5		90	**Silt (ML)** Similar to above	4
6					0.5		90	**Silt (ML)** Similar to above, damp	6
8					0.6		90	**Silt (ML)** Similar to above, trace calcareous	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16
18									18
20									20
22									22

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LOG OF BORING

Boring No.: SWMU 10-1
Start Date: 8/17/2010 1500
Finish Date: 8/17/2010 1600

Client: Western Refining Southwest, Inc.
Site: SWMU Group #4, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: N 36º41.986' W107º58.186'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5524.990
Site Coordinates: N 36º41'59.13477"
W 107º58'11.03927"

Depth (ft.)	Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0	0-0.5'	1540	G/2V/2E/3J		0.5 91ºF		70	**Silty Sand (SM)** Fine grain, loose, brown, damp, no odor	0
2	1.5-2'	1545	G/2V/2E/3J		4 91ºF		80	**Silty Sand (SM)** Similar to above, no odor	2
4					0.6 91ºF		80	**Silty Sand (SM)** Similar to above, no odor	4
6					0.5 91ºF		80	**Silty Sand (SM)** Similar to above, no odor	6
8					0.5 91ºF		80	**Silty Sand (SM)** Similar to above, no odor	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16

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LOG OF BORING

Boring No.: SWMU 10-2
Start Date: 8/17/2010 1600
Finish Date: 8/17/2010 1700

Client: Western Refining Southwest, Inc.
Site: SWMU Group #4, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: N 36º42.006' W107º58.171'

Total Depth: 10' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5524.865
Site Coordinates: N 36º42'00.30540"
W 107º58'10.20673"

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0	0-0.5'	1630	G/2V/2E/3J		0.4 93ºF		80	**Silty Sand (SM)** Fine grain, loose, brown, damp, no odor	0
2	1.5-2'	1640	G/2V/2E/3J		0.5 93ºF		80	**Silty Sand (SM)** Similar to above, no odor	2
4					0.5 93ºF		80	**Silty Sand (SM)** Similar to above, no odor	4
6					0.4 93ºF		90	**Silty Sand (SM)** Similar to above, no odor	6
8					0.3 93ºF		90	**Silty Sand (SM)** Similar to above, no odor	8
10								Total Depth = 10' BGL	10
12									12
14									14
16									16

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LOG OF BORING

Client: Western Refining Southwest, Inc.
Site: SWMU Group #5, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: N 36º41.886' W107º58.477'

Total Depth: 6' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5521.158
Site Coordinates: N 36º41'53.40282"
W 107º58'28.91692"

Boring No.: SWMU 15-3
Start Date: 8/19/2010 1300
Finish Date: 8/19/2010 1340

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0					2.4 83ºF			Ground Surface	0
	0.5-2'	8/19 1325	G/2V/ 2E/3J		4.9 83ºF		90	**Sandy Silt (ML)** Very fine grain, compact, damp, brown, no odor	
2									2
	2-4'	8/24 1350	G/1J		1.4 83ºF		90	**Sandy Silt (ML)** Similar to above, no odor	
4									4
					1.4 83ºF		90	**Silty Clay (CL)** Low plasticity, firm, damp, brown, no odor	
6								Total Depth = 6' BGL	6
8									8
10									10
12									12
14									14
16									16

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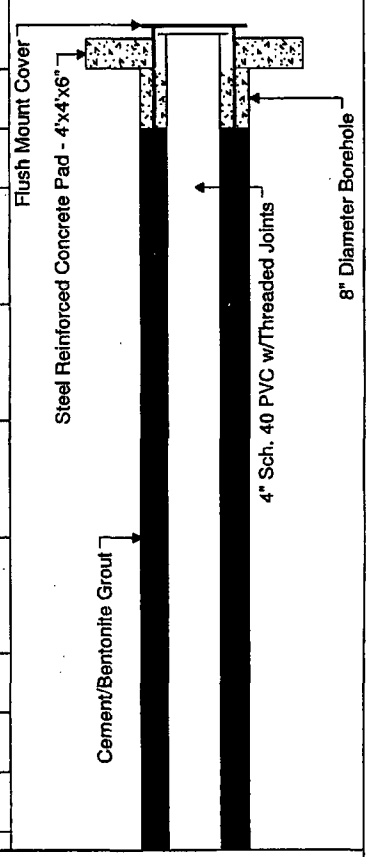
WELL CONSTRUCTION

Well No.: MW-61 (AOC 22 -15)
Start Date: 4/15/2009
Finish Date: 4/15/2009

Client: Western Refining Southwest, Inc.
Site: SWMU Group #3, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: N36º41.813' W107º58.287'

Total Depth: 40.25' bgl
Ground Water: Saturated @ 36' bgl
Elev., TOC (ft. msl): 5539.411
Elev., PAD (ft. msl): 5539.613
Elev., GL (ft. msl): 5539.588
Site Coordinates:
N 36º41'48.82131" W 107º58'17.15514"

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/Container/No	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Completion Results
0								Ground Surface	
0								**Asphalt/Base**	
0	1-1.5'	1135	G/2V/2E/3J		2.8 63ºF		100	**Clayey Silt (ML)** Low plasticity, stiff, damp, brown	
2	1.5-2' &Dup	1155	G/2V/2E/3J		29.5 63ºF				
2					23.4 68ºF		60	**Clayey Silt (ML)** Similar to above, soft	
4					5.5 68ºF		50	**Clayey Silt (ML)** Similar to above	
6							0	**Clayey Silt (ML)** Similar to above - no recovery	
8					13.1 68ºF		10	**Clayey Silt (ML)** Similar to above	
10					18.1 68ºF		80	**Clayey Silt (ML)** Similar to above, trace very fine grain sand	
10								**Silty Sand (SM)** Very fine grain, loose, damp, brown	
12							70	**Silty Sand (SM)** Similar to above	



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WELL CONSTRUCTION

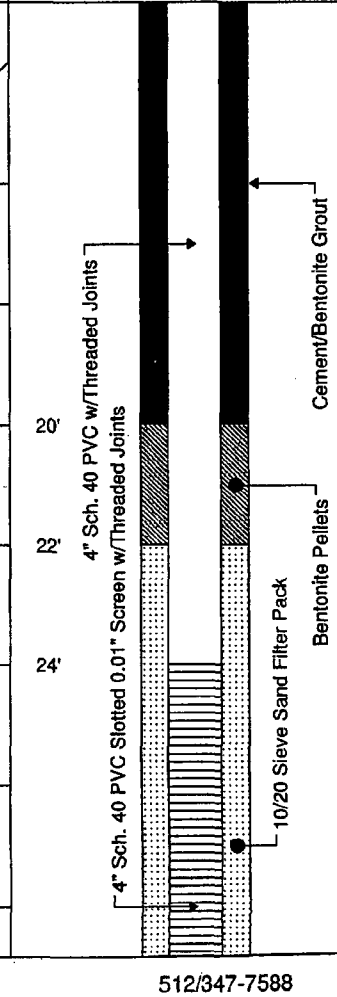
Well No.: MW-61 (AOC 22 -15)
Start Date: 4/15/2009
Finish Date: 4/15/2009

Client: Western Refining Southwest, Inc.
Site: SWMU Group #3, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: N36°41.813' W107°58.287'

Total Depth: 40.25' bgl
Ground Water: Saturated @ 36' bgl
Elev., TOC (ft. msl): 5539.411
Elev., PAD (ft. msl): 5539.613
Elev., GL (ft. msl): 5539.588
Site Coordinates:
N 36°41'48.82131" W 107°58'17.15514"

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description
					16.6 68°F			**Clayey Silt (ML)** Low plasticity, very fine grain, compact, damp, brown
15					11.2 68°F		70	**Clayey Silt (ML)** Similar to above
17					6.5 68°F		80	**Clayey/Silty Sand (SC/SM)** Very fine grain, compact, damp, brown
19					13.2 68°F		90	**Silty Sand (SM)** Similar to above, less clay
21					13.2 68°F		80	**Silty Sand (SM)** Similar to above
23					21.5 67°F		60	**Silty Sand (SM)** Very fine grain, loose to compact, damp, brown to light brown
25					12.9 67°F		60	**Clayey Silty Sand (SC/SM)** Similar to above, increase in clay content
27					16.0 67°F		90	**Clayey Silty Sand (SC/SM)** Similar to above

Completion Results



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WELL CONSTRUCTION

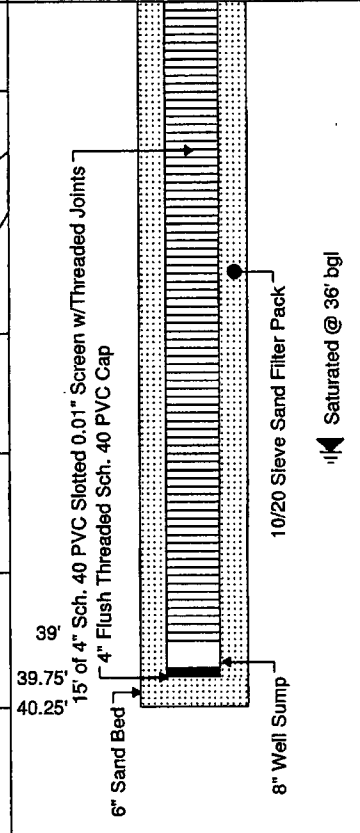
Well No.: MW-61 (AOC 22 -15)
Start Date: 4/15/2009
Finish Date: 4/15/2009

Client: Western Refining Southwest, Inc.
Site: SWMU Group #3, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger
Sampling Method: Split Spoon
Comments: N36º41.813' W107º58.287'

Total Depth: 40.25' bgl
Ground Water: Saturated @ 36' bgl
Elev., TOC (ft. msl): 5539.411
Elev., PAD (ft. msl): 5539.613
Elev., GL (ft. msl): 5539.588
Site Coordinates:
N 36º41'48.82131" **W** 107º58'17.15514"

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/Container/No	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description
30					17.1 67ºF		90	**Clayey Silty Sand (SC/SM)** Similar to above, trace tan sand seams present
	30- 32'	1245	G/2V/ 2E/3J		22 67ºF		80	**Silty Sand (SM)** Very fine grain sand, compact, brown to gray, moist, odor
32								**Gravelly Sand (SW)** Very fine to medium grain, compact to loose, brown to gray, odor, coarse gravel
					165 67ºF		60	**Gravelly Sand (SW)** Similar to above, fine to coarse sand, odor, stained
34								**Gravelly Sand (SW)** Similar to above, odor
	34- 36'	1340	G/2V/ 2E/3J	36'	510 67ºF		70	
36								**Gravelly Sand (SW)** Similar to above
							10	
38								**Nacimiento Formation Silty Sandy Clay (CL)** Low plasticity, firm, dry to damp, yellow brown to greenish gray, no odor
							10	
40								Total Depth = 40.25' BGL
42								
44								

Completion Results



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WELL CONSTRUCTION

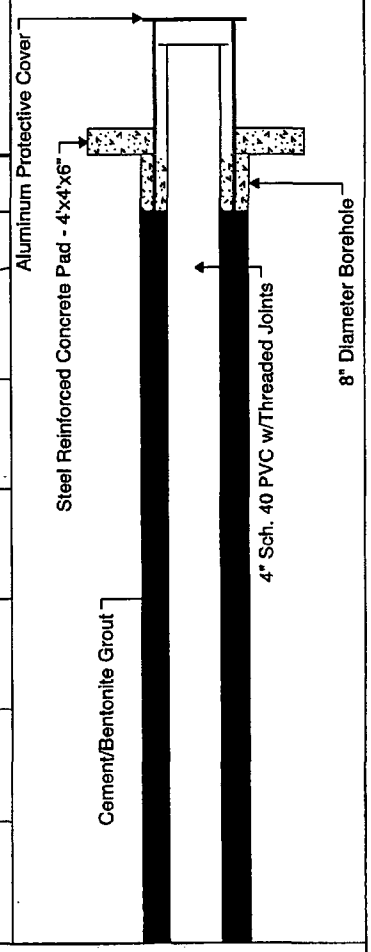
Well No.: MW-65 (AOC 26-8)
Start Date: 4/16/2009
Finish Date: 4/16/2009

Client: Western Refining Southwest, Inc.
Site: SWMU Group #3, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger/ODEX
Sampling Method: Split Spoon
Comments: N36º41.826' W107º58.244'

Total Depth: 44.25' bgl
Ground Water: Saturated @ 36' bgl
Elev., TOC (ft. msl): 5539.517
Elev., PAD (ft. msl): 5539.941
Elev., GL (ft. msl): 5539.902
Site Coordinates:
N 36º41'49.18120" W 107º58'15.39107"

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/Container/No	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description
0								Ground Surface
0	0-1' &Dup 1.5-2'	0900	G/2V/2E/4J		1.8 50ºF		100	**Silt/Gravel** *Six inches of asphalt*
2		0920	G/2V/2E/4J		1.0 50ºF			**Clayey Silt (ML)** Low plasticity, soft, damp, brown
					2.3 50ºF		100	**Clayey Silt (ML)** Similar to above
4					2.0 50ºF		100	**Clayey Silt (ML)** Similar to above
6					1.2 50ºF		100	**Clayey Silt (ML)** Similar to above
8					1.0 50ºF		100	**Clayey Silt (ML)** Similar to above
10					1.9 46ºF		80	**Sandy Silt (ML)** Very fine grain, compact to loose, damp, brown, trace clay
12					2.5 46ºF		70	**Sandy Silt (ML)** Similar to above
14								

Completion Results



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WELL CONSTRUCTION

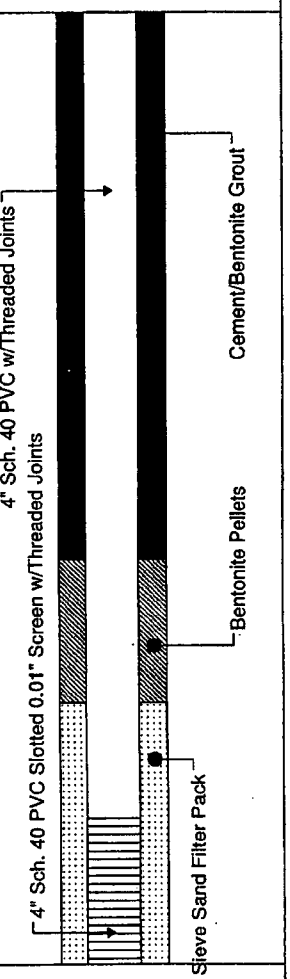
Well No.: MW-65 (AOC 26-8)
Start Date: 4/16/2009
Finish Date: 4/16/2009

Client: Western Refining Southwest, Inc.
Site: SWMU Group #3, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger/ODEX
Sampling Method: Split Spoon
Comments: N36º41.826' W107º58.244'

Total Depth: 44.25' bgl
Ground Water: Saturated @ 36' bgl
Elev., TOC (ft. msl): 5539.517
Elev., PAD (ft. msl): 5539.941
Elev., GL (ft. msl): 5539.902
Site Coordinates:
N 36º41'49.18120" W 107º58'15.39107"

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description
15					2.1 46ºF		70	**Sandy Silt (ML)** Very fine grain, compact to loose, damp, brown, trace clay
17					2.1 46ºF		80	**Sandy Silt (ML)** Similar to above
19					1.8 45ºF		90	**Silty Sand (SM)** Very fine grain, loose, damp, light brown
21					1.2 44ºF		80	**Silty Sand (SM)** Similar to above, tan sand in seams, calcareous
23					1.1 44ºF		80	**Silty Sand (SM)** Similar to above
25					1.3 44ºF		80	**Silty Sand (SM)** Similar to above
27					2.4 45ºF		80	**Clayey Silty Sand (SC/SM)** Very fine grain, compact, damp, brown, calcareous
29					11 46ºF		80	**Clayey Silty Sand (SC/SM)** Similar to above, faint odor **Sand (SW)** Fine to medium grain, loose, damp, brown, faint odor

Completion Results



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WELL CONSTRUCTION

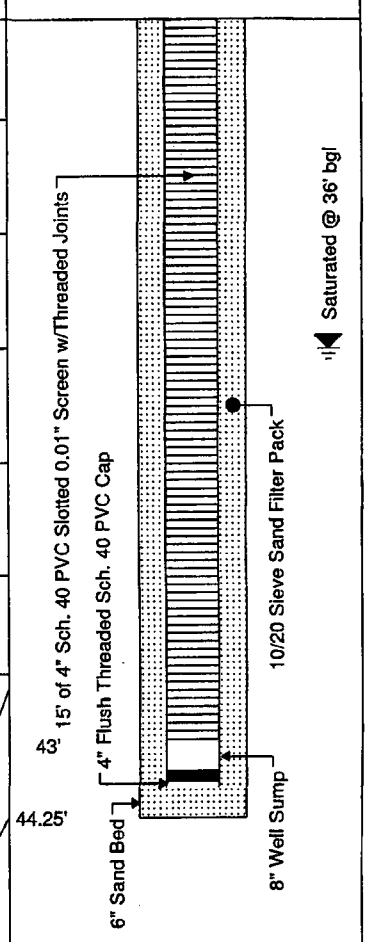
Well No.: MW-65 (AOC 26-8)
Start Date: 4/16/2009
Finish Date: 4/16/2009

Client: Western Refining Southwest, Inc.
Site: SWMU Group #3, Bloomfield Refinery
Job No.: 354 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow-Stem Auger/ODEX
Sampling Method: Split Spoon
Comments: N36º41.826' W107º58.244'

Total Depth: 44.25' bgl
Ground Water: Saturated @ 36' bgl
Elev., TOC (ft. msl): 5539.517
Elev., PAD (ft. msl): 5539.941
Elev., GL (ft. msl): 5539.902
Site Coordinates:
N 36º41'49.18120" W 107º58'15.39107"

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/Container/No	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description
32					20.8 44ºF		80	**Gravelly Sand (SW)** Fine to coarse grain, gravelly at base, damp to moist, odor, gray
34	32-36'	1430	G/2V/2E/4J		58.7 48ºF		60	**Gravelly Sand (SW)** Fine to coarse grain, damp, gravelly, gray, strong odor, trace dark to black clay
36				36'	145 47ºF		80	**Gravelly Sand (SW)** Similar to above, odor
38							10	**Gravelly Sand (SW)** Similar to above, moist to saturated, strong hydrocarbon odor
40							10	**Gravelly Sand (SW)** Similar to above, saturated, black
42							70	**Sand (SW)** Fine to coarse grain, compact, saturated, dark gray, odor
44							--	**Sandy Clay/Clayey Sand (CL/SC)** Fine grain, very stiff, damp, yellowish brown **Nacimiento Formation Sandy Clay/Clayey Sand (CL/SC)** Similar to above, becomes very dense, greenish gray
46								Total Depth = 44.25' BGL

Completion Results



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Sheet: **3 of 3**

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Appendix F

Site-Specific Dilution/Attenuation Factor Calculations

Calculation of Site-Specific Dilution/Attenuation Factor (DAF)

The DAF value was calculated using equation 19 from NMED's *Technical Background Document for Development of Soil Screening Levels (Revision 5.0, August 2009).*

$$DAF = 1 + \left(\frac{K * i * D}{I * L} \right) \qquad DAF = 1 + \left(\frac{4{,}893 * 0.0023 * 1}{0.01 * 100} \right) = 11.25$$

Where:

$$D = \left(0.0112 * L^2\right)^{0.5} + D_a \left(1 - \exp\left[\frac{-L * I}{K * i * D_a} \right] \right)$$

K = Aquifer hydraulic conductivity (m/yr)
i = Hydraulic gradient (m/m)
D = Mixing zone depth (m)
I = Infiltration rate (m/yr)
L= Source length parallel to ground water flow (m)
D_a= Aquifer thickness (m)

Derivation of site-specific values:

K = 4,893 m/yr as determined from pumping test at well RW-22 (lowest of three values determined during 1994 RCRA Facility Investigation)
i = 0.0023 m/m as measured during August 2008 ground water sampling event
D = 1 m (lower of aquifer thickness (1m) or calculated mixing zone depth (10.58m))
I = 0.01 m derivation using EPA's HELP model as described below
L = 100 m – conservative average of SWMU/AOC source area length
D_a= 1 m - average saturated thickness measured during August 2008 ground water sampling event

Calculation of Infiltration Rate

Pursuant to *EPA's Soil Screening Guidance: User's Guide (Second Edition, July 1996)*, infiltration rates can be calculated either of two ways: (1) assume that infiltration rate is equivalent to recharge, or (2) use the EPA HELP model to estimate infiltration. Because the Bloomfield site is located in an area with low annual rainfall rates and high potential evapotranspiration rates, method 1 is not representative of site conditions. That is to say that it is unreasonable to assume that infiltration is equal to recharge.

EPA's HELP model was used to calculate the site-specific infiltration rate. Site-specific meteorological data was obtained from the Western Regional Climate Center and New Mexico State University, which operates a nearby weather station (Bloomfield 3 SE) as part of the NWS Cooperator Climate Stations. The weather station is located 1.7 miles south of Bloomfield on HWY 44 and then two miles east on Industrial Blvd, thus being approximately two miles southeast of the Western Bloomfield Refinery.

Data obtained from the Bloomfield 3 SE station includes mean monthly temperature and average monthly precipitation. The average wind speed (13.5 km/hr) was obtained from

the Western Regional Climate Center, as measured at the Farmington, NM airport. Daily solar radiation and quarterly relative humidity values were based on measurements from Albuquerque, NM. This data was obtained from the National Oceanic and Atmospheric Administration (NOAA) and is included in the HELP model's Weather Generator module. A review of the monthly average weather conditions (temperature and precipitation) at Bloomfield and Albuquerque as shown in the table below indicates very similar conditions such that use of quarterly relative humidity and solar radiation from Albuquerque should be sufficient to estimate conditions at Bloomfield. The quarterly relative humidity values used are 48%, 30%, 45%, and 50% for the first, second, third, and fourth quarters, respectively.

The vadose zone physical properties were based on the predominant lithology as observed during on-site monitoring well installation. The soil type chosen in the model was loamy sand with an average thickness of 5 meters. The land surface was assumed to be bare soil with a slope of 0%. This should be a conservative estimate, as there is a slight slope across most of the refinery with the exception of areas within tank dikes. There are structures (e.g., parking lots, building pads, concrete foundations, etc.) that could limit infiltration but the model assumes only bare soil without any obstructions to infiltration. Based on the selected soil type (loamy sand), the model default value for porosity is 0.437, field capacity is 0.105, wilting point is 0.047, and saturated hydraulic conductivity is 0.0017 cm/day. These model default vales are taken from the US Department of Agriculture.

Using the model's synthetic weather generator and the aforementioned inputs, the model was run for a 40 year period to simulate potential infiltration (percolation or leakage through Layer 1). The model output is enclosed, showing the annual values. Over the modeled 40 year period, the average annual infiltration was 0.01 meters. This average annual infiltration was used in the aforementioned calculation of the site-specific DAF value.

Bloomfield 3 SE, New Mexico Weather Station Data

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Annual
Average Max Temp (F)	41	48.6	57.4	67.2	77.4	88	92	89	81.8	69.4	54.4	43.4	67.5
Average Min. Temp (F)	16.2	22.4	27.8	35	43.8	52.1	59.6	57.7	49.5	37.7	25.7	18	37.1
Mean Monthly Temp (F)	28.6	35.5	42.6	51.1	60.6	70.1	75.8	73.4	65.7	53.6	40.1	30.7	52.3
Mean Monthly Temp (C)	-1.89	1.94	5.89	10.61	15.89	21.14	24.33	22.97	18.69	11.97	4.47	-0.72	
Average total Prec. (in)	0.55	0.56	0.63	0.6	0.52	0.38	0.99	1.27	0.95	0.95	0.63	0.57	8.60
Average total Prec. (mm)	13.97	14.224	16.002	15.24	13.208	9.652	25.146	32.258	24.13	24.13	16.002	14.478	

Data collected from 1/1/1914 to 12/31/2005 at the Bloomfield 3 SE (#291063) weather monitoring station; obtained from Western Regional Climate Center, National Oceanic & Atmospheric Administration

Albuquerque, New Mexico Weather Station Data

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Annual
Average Max Temp (F)	49.9	53.6	60.8	72.4	80.1	91.1	93.2	92	84.8	74.4	59.5	49.8	71.8
Average Min. Temp (F)	20.9	23.7	30.2	38.7	46.8	56.3	62	60.5	52.5	40.3	26.4	21.6	40
Mean Monthly Temp (F)	35.4	38.65	45.5	55.55	63.45	73.7	77.6	76.25	68.65	57.35	42.95	35.7	55.9
Mean Monthly Temp (C)	1.89	3.69	7.50	13.08	17.47	23.17	25.33	24.58	20.36	14.08	6.08	2.06	
Average total Prec. (in)	0.32	0.29	0.46	0.61	0.7	0.87	1.3	1.57	1.03	0.63	0.43	0.46	8.67
Average total Prec. (mm)	8.128	7.366	11.684	15.494	17.78	22.098	33.02	39.878	26.162	16.002	10.922	11.684	

Data collected from 1/1/1932 to 1/31/1954 at the Albuquerque (#290222) weather monitoring station; obtained from Western Regional Climate Center, National Oceanic & Atmospheric Administration

F - Fahrenheit
C- Celsius

in - inch
mm- millimeter

Project : Western Refining Bloomfield, New Mexico

Estimation of infiltration at Bloomfield Refinery

Model : HELP

An US EPA model for predicting landfill hydrologic processes and testing of effectiveness of landfill designs

Author : Scott Crouch

Client : Western Refining - Randy Schmaltz

Location : Bloomfield, NM

3/11/2010

Profile 1

Model Settings

[HELP] Case Settings

Parameter	Value	Units
Runoff Method	Model calculated	(-)
Initial Moisture Settings	Model calculated	(-)

[HELP] Surface Water Settings

Parameter	Value	Units
Runoff Area	100	(%%)
Vegetation Class	Bare soil	(-)

Profile Structure

Layer	Top (m)	Bottom (m)	Thickness (m)
Loamy Sand	100.0000	95.0000	5.0000

1.1. Layer. Loamy Sand

Top Slope Length: 0.0000
Bottom Slope Length: 0.0000
Top Slope: 0.0000
Bottom Slope : 0.0000

[HELP] Vertical Perc. Layer Parameters

Parameter	Value	Units
total porosity	0.437	(vol/vol)
field capacity	0.105	(vol/vol)
wilting point	0.047	(vol/vol)
sat.hydr.conductivity	0.0017	(cm/sec)
subsurface inflow	0	(mm/year)

Annual Totals rate (m)

	Precipitation (m)	Runoff (m)	Evapotranspiration (m)	Percolation or leakance through Layer 1 (m)
Year-1 (m)	1.9660E-01	0.0000E+00	1.8579E-01	5.2109E-05
Year-2 (m)	3.0180E-01	0.0000E+00	2.6922E-01	1.0255E-04
Year-3 (m)	2.3510E-01	0.0000E+00	2.3452E-01	1.9650E-04
Year-4 (m)	2.3000E-01	0.0000E+00	2.1004E-01	2.4626E-04
Year-5 (m)	2.5270E-01	0.0000E+00	2.3977E-01	4.1142E-04
Year-6 (m)	1.5870E-01	0.0000E+00	1.4899E-01	3.6109E-04
Year-7 (m)	1.8420E-01	0.0000E+00	1.7010E-01	5.0670E-04
Year-8 (m)	2.5770E-01	0.0000E+00	2.3978E-01	5.9778E-04
Year-9 (m)	1.9170E-01	0.0000E+00	1.7956E-01	7.2288E-04
Year-10 (m)	2.2820E-01	0.0000E+00	1.9825E-01	9.4104E-04
Year-11 (m)	2.3680E-01	0.0000E+00	2.2456E-01	1.6311E-03
Year-12 (m)	2.5940E-01	0.0000E+00	2.4152E-01	3.7601E-03
Year-13 (m)	1.8440E-01	0.0000E+00	1.7107E-01	5.6153E-03
Year-14 (m)	1.5860E-01	0.0000E+00	1.5145E-01	1.0341E-02
Year-15 (m)	2.4990E-01	0.0000E+00	2.3436E-01	1.4166E-02
Year-16 (m)	1.6700E-01	0.0000E+00	1.5633E-01	1.4482E-02
Year-17 (m)	1.3040E-01	0.0000E+00	1.1372E-01	1.2954E-02
Year-18 (m)	1.5020E-01	0.0000E+00	1.4066E-01	1.3977E-02
Year-19 (m)	2.0530E-01	0.0000E+00	1.9662E-01	1.3219E-02
Year-20 (m)	1.8180E-01	0.0000E+00	1.6946E-01	1.0024E-02
Year-21 (m)	2.3550E-01	0.0000E+00	2.1477E-01	1.0887E-02
Year-22 (m)	1.3750E-01	0.0000E+00	1.3022E-01	1.0618E-02
Year-23 (m)	2.3340E-01	0.0000E+00	2.2529E-01	1.4634E-02
Year-24 (m)	2.2170E-01	0.0000E+00	2.0414E-01	1.0021E-02
Year-25 (m)	1.4510E-01	0.0000E+00	1.3452E-01	1.3558E-02
Year-26 (m)	2.0130E-01	1.2902E-06	1.7333E-01	1.3059E-02
Year-27 (m)	2.3200E-01	0.0000E+00	2.1409E-01	1.5689E-02
Year-28 (m)	1.9260E-01	0.0000E+00	1.8730E-01	9.9471E-03
Year-29 (m)	2.3390E-01	0.0000E+00	2.1475E-01	1.1847E-02
Year-30 (m)	1.8890E-01	0.0000E+00	1.7801E-01	1.8487E-02
Year-31 (m)	2.4520E-01	0.0000E+00	2.2175E-01	1.6094E-02
Year-32 (m)	2.2790E-01	0.0000E+00	2.0877E-01	1.2385E-02
Year-33 (m)	3.1730E-01	4.0020E-04	2.9335E-01	1.3069E-02
Year-34 (m)	2.1170E-01	0.0000E+00	1.8598E-01	1.4984E-02
Year-35 (m)	2.7430E-01	0.0000E+00	2.6796E-01	1.6877E-02
Year-36 (m)	1.5090E-01	0.0000E+00	1.2899E-01	2.4361E-02
Year-37 (m)	2.1680E-01	0.0000E+00	2.1801E-01	1.6731E-02
Year-38 (m)	1.7490E-01	0.0000E+00	1.5227E-01	1.8959E-02
Year-39 (m)	2.1190E-01	0.0000E+00	1.6801E-01	1.5479E-02
Year-40 (m)	1.7540E-01	0.0000E+00	1.8233E-01	1.7584E-02
Total (m)	8.3887E+00	4.0149E-04	7.7796E+00	3.9958E-01

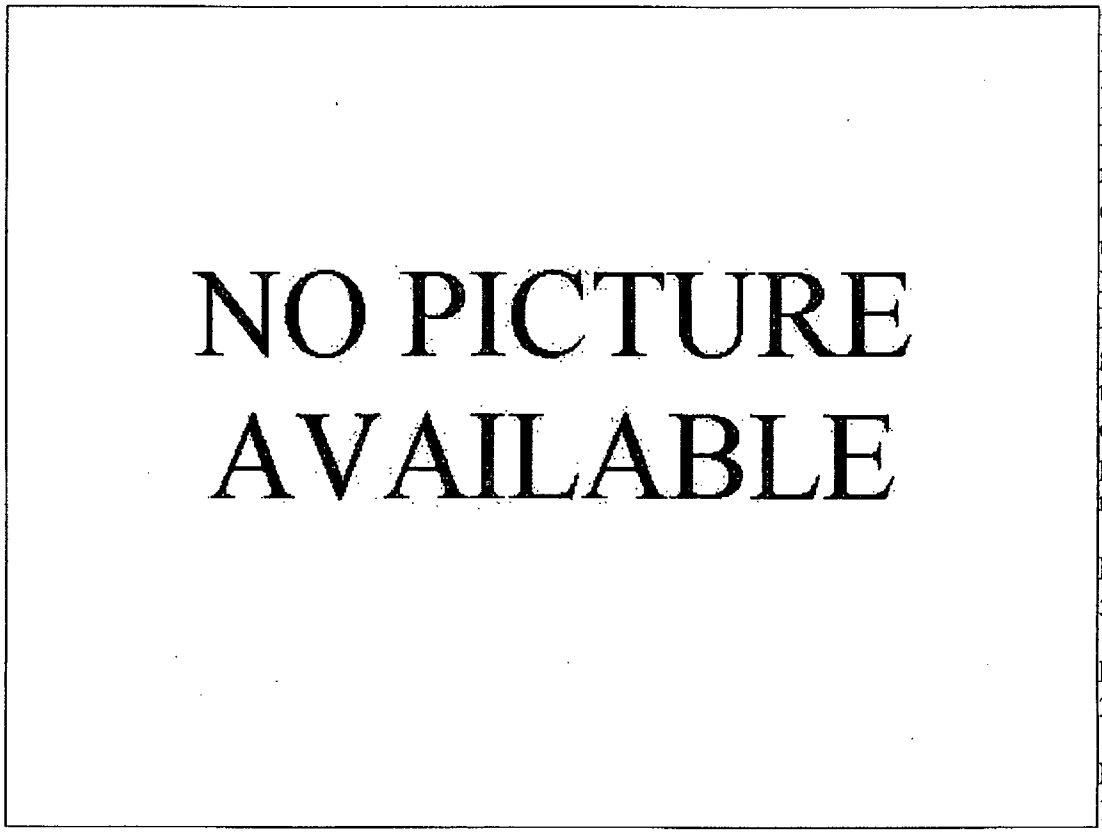
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= 0.01/m

NWS Cooperator Climate Stations

Weather Data from Individual Stations Around New Mexico

Bloomfield 3-SE-Bloomfield, NM

Climate Data



Location: From Bloomfield, NM go 1.7 miles south on HWY 44, turn east on Industrial BLVD and go 2.0 miles to gas compressor plant on right.

Elevation: 5806 feet

Latitude: 36°40'

Longitude: 107°58'

Ground Cover: Flat sandy plateau cut by broken terrain of sandstone hills and arroyos.

Cooperator Number: 29-1063-1

Questions or comments about this page can be directed to:

webmaster@weather.nmsu.edu
NMSU Weather BBS
Dept. of Agronomy and Horticulture
BOX 30003, Dept. 3Q
LAS CRUCES, NM 88003-0003

NMSU MONITORED CLIMATE STATIONS
NMSU Weather Homepage

Western Regional Climate Center

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The Regional Climate Centers (RCC) deliver climate services at national, regional and state levels working with NOAA partners in the National Climatic Data Center, National Weather Service, the American Association of State Climatologists, and NOAA Research Institutes. This successful effort resulted in jointly developed products, services, and capabilities that enhance the delivery of climate information to the American public, and builds a solid foundation for a National Climate Service. As NOAA and Congress work to help society adapt to climate change, these collaborative efforts form a framework for the service, data stewardship, and applied research components of the National Climate Service.

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- DRI LDM Logs (ldmd, netcheck and syscheck)

Division of Atmospheric Sciences



NEW MEXICO

AVERAGE WIND SPEED - MPH

STATION	ID	Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
ALAMOGORDO AIRPORT ASOS	KALM	1996-2006	5.1	6.3	7.1	7.9	7.1	6.9	6.1	5.3	5.2	5.2	5.0	5.0	6.0
ALAMOGORDO-HOLLOMAN AFB	KHMN	1996-2006	8.5	9.7	10.6	11.8	10.8	10.6	9.8	9.1	8.8	8.5	8.1	8.3	9.6
ALBUQUERQUE AP ASOS	KABQ	1996-2006	7.0	8.2	9.3	11.1	10.0	10.0	8.7	8.3	8.0	7.9	7.2	6.9	8.5
ALBUQUERQUE-DBLE EAGLE	KAEG	1999-2006	7.1	7.9	9.0	10.6	9.5	8.6	7.0	6.2	7.0	6.5	6.5	6.1	7.7
ARTESIA AIRPORT ASOS	KATS	1997-2006	7.8	9.1	10.1	10.9	10.2	9.9	7.8	6.9	7.6	7.8	7.6	7.4	8.5
CARLSBAD AIRPORT ASOS	KCNM	1996-2006	9.2	9.8	10.9	11.4	10.4	9.9	8.5	7.7	8.2	8.5	8.4	8.8	9.3
CLAYTON MUNI AP ASOS	KCAO	1996-2006	11.9	12.7	13.4	14.6	13.4	13.0	11.7	10.8	11.8	12.1	12.1	12.0	12.4
CLINES CORNERS	KCQC	1998-2006	16.2	16.1	15.7	16.9	14.6	13.5	10.6	10.1	11.8	13.3	15.0	16.0	14.1
CLOVIS AIRPORT AWOS	KCVN	1996-2006	12.3	12.3	13.4	13.8	12.4	11.9	9.7	8.9	9.7	10.9	11.6	12.2	11.6
CLOVIS-CANNON AFB	KCVS	1996-2006	12.5	12.6	13.6	13.8	12.2	12.5	10.7	10.0	10.2	11.3	11.7	12.4	12.0
DEMING AIRPORT ASOS	KDMN	1996-2006	8.7	9.7	10.9	12.0	10.6	10.1	8.9	8.1	8.4	8.2	8.5	8.1	9.3
FARMINGTON AIRPORT ASOS	KFMN	1996-2006	7.3	8.3	9.0	9.8	9.4	9.4	8.7	8.2	8.0	7.8	7.6	7.3	8.4
GALLUP AIRPORT ASOS	KGUP	1996-2006	5.7	6.9	7.8	10.0	9.0	8.8	6.9	6.0	6.5	6.1	5.6	5.3	7.0
GRANTS-MILAN AP ASOS	KGNT	1997-2006	7.8	8.8	9.6	10.9	10.0	9.8	8.1	7.2	7.9	8.4	8.0	7.6	8.7
HOBBS AIRPORT AWOS	KHOB	1996-2006	11.3	11.9	12.6	13.4	12.5	12.3	11.0	10.0	10.2	10.6	10.7	11.1	11.4
LAS CRUCES AIRPORT AWOS	KLRU	2000-2006	6.4	7.5	8.8	10.1	8.7	8.2	6.8	6.0	6.2	6.1	6.4	6.0	7.3
LAS VEGAS AIRPORT ASOS	KLVS	1996-2006	10.9	12.2	12.5	14.3	12.4	11.8	10.0	9.2	10.9	10.8	11.0	10.9	11.4
LOS ALAMOS AP AWOS	KLAM	2005-2006	3.9	5.7	7.5	8.1	7.1	7.3	5.3	4.8	5.7	5.1	4.4	3.2	5.4
RATON AIRPORT ASOS	KRTN	1998-2006	8.9	9.4	10.4	12.2	10.8	10.2	8.4	8.1	8.6	9.0	8.6	8.5	9.4
ROSWELL AIRPORT ASOS	KROW	1996-2006	7.4	8.9	9.9	11.1	10.3	10.2	8.8	7.9	8.3	8.0	7.5	7.3	8.8
RUIDOSO AIRPORT AWOS	KSRR	1996-2006	8.8	9.6	10.0	11.6	10.0	8.4	5.9	5.3	6.4	7.4	7.9	8.7	8.3
SANTA FE AIRPORT ASOS	KSAF	1996-2006	8.9	9.5	9.9	11.2	10.6	10.5	9.2	8.8	8.8	9.1	8.7	8.5	9.5
SILVER CITY AP AWOS	KSVC	1999-2006	8.1	8.7	9.9	10.8	10.2	9.9	8.5	7.2	6.9	7.6	7.9	7.7	8.5
TAOS AIRPORT AWOS	KSKX	1996-2006	5.8	6.5	7.7	9.1	8.6	8.5	7.1	6.6	6.7	6.6	6.0	5.7	7.0
TRUTH OR CONSEQ AP ASOS	KTCS	1996-2006	7.4	8.7	9.9	11.1	10.4	9.8	8.1	7.4	7.7	8.0	7.7	7.3	8.6
TUCUMCARI AIRPORT ASOS	KTCC	1999-2006	10.0	11.2	11.9	13.6	11.9	11.6	9.9	9.3	10.0	10.0	10.4	10.2	10.8

8.4 miles/hr × 1 kilo / .62 miles = 13.5 km/hr

NEVADA

AVERAGE WIND SPEED - MPH

STATION	ID	Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
DESERT ROCK AP-MERCURY	KDRA	1996-2006	8.0	8.8	9.2	10.7	10.5	10.5	9.6	9.1	8.8	8.2	7.7	8.4	9.1
ELKO AIRPORT ASOS	KEKO	1996-2006	4.6	5.3	5.9	6.7	6.4	6.3	5.7	5.3	5.0	4.6	4.6	4.8	5.4
ELY AIRPORT ASOS	KELY	1996-2006	9.0	9.0	9.6	10.3	9.8	10.2	9.8	9.9	9.6	9.5	8.8	9.2	9.5

BLOOMFIELD 3 SE, NEW MEXICO (291063)

Period of Record Monthly Climate Summary

Period of Record : 1/ 1/1914 to 12/31/2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	41.0	48.6	57.4	67.2	77.4	88.0	92.0	89.0	81.8	69.4	54.4	43.4	67.5
Average Min. Temperature (F)	16.2	22.4	27.8	35.0	43.8	52.1	59.6	57.7	49.5	37.7	25.7	18.0	37.1
Average Total Precipitation (in.)	0.55	0.56	0.63	0.60	0.52	0.38	0.99	1.27	0.95	0.95	0.63	0.57	8.61
Average Total SnowFall (in.)	3.8	2.2	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.6	3.4	11.4
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 92.9% Min. Temp.: 93.2% Precipitation: 95.4% Snowfall: 79% Snow Depth: 70.2%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

Back to:

State Map | Western U.S. map | Home Page

NOTE:
To print data frame (right side), click on right frame before printing.

1971 - 2000

- Daily Temp. & Precip.
- Daily Tabular data (~23 KB)
- Monthly Tabular data (~1 KB)
- NCDC 1971-2000 Normals (~3 KB)

1961 - 1990

- Daily Temp. & Precip.
- Daily Tabular data (~23 KB)
- Monthly Tabular data (~1 KB)
- NCDC 1961-1990 Normals (~3 KB)

Period of Record

- Station Metadata
- Station Metadata Graphics

General Climate Summary Tables

- Temperature
- Precipitation
- Heating Degree Days
- Cooling Degree Days
- Growing Degree Days

ALBUQUERQUE, NEW MEXICO (290222)

Period of Record Monthly Climate Summary

Period of Record : 1/ 1/1932 to 1/31/1954

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	49.9	53.6	60.8	72.4	80.1	91.1	93.2	92.0	84.8	74.4	59.5	49.8	71.8
Average Min. Temperature (F)	20.9	23.7	30.2	38.7	46.8	56.3	62.0	60.5	52.5	40.3	26.4	21.6	40.0
Average Total Precipitation (in.)	0.32	0.29	0.46	0.61	0.70	0.87	1.30	1.57	1.03	0.63	0.43	0.46	8.67
Average Total SnowFall (in.)	2.3	1.5	1.0	0.9	0.2	0.0	0.0	0.0	0.0	0.0	1.2	2.0	9.3
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 26.1% Min. Temp.: 26.1% Precipitation: 72.2% Snowfall: 26.1% Snow Depth: 26.1%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

Appendix G

Analytical Data Reports

1 of 5

Chain-of-Custody Record

Client: Western Refining Southwest, Inc. Bloomfield Refinery

Mailing Address: 50 Road 4990 Bloomfield, NM 87401

Phone #: 505-632-4166

email or Fax#: Kelly.Robinson@cwr.com

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

Accreditation
☐ NELAP ☐ Other

☒ EDD (Type) EXCEL

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: RCRA Group 8 Investigation

Project #:

Project Manager: Kelly Robinson

Sampler: Kelly R. & Tracy P.

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		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,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA)+TPH-GRO	8270 (Semi-VOA)	Metals (See Attached)	Cyanide	TPH-DRO GRO, MRO		Air Bubbles (Y or N)
1/25/12	13:03	Soil	SWMU 3-4 (6-7')	2 encore	None	-1										X						
				2 vials	MeOH											X						
				3 jars	None											X	X	X	X	X		
1/25/12	1325	Soil	SWMU 3-4 (10-11')	2 encore	None	-2										X						
				2 vials	MeOH											X						
				3 jars	None											X	X	X	X	X		
1/25/12	1336	Soil	SWMU 3-4 (12-14')	2 jars	None	-3										X	X	X	X	X		

Date: 1/26/12 Time: 1500 Relinquished by: Kelly Robinson

Date: Time: Relinquished by:

Received by: To UPS Date Time

Received by: Date Time 1/27/12 1012

Remarks: See attached analyte list.

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.

Chain-of-Custody Record

Client: Western Refining Southwest, Inc. Bloomfield Refinery
Mailing Address: 50 Road 4990 Bloomfield NM 87401
Phone #: 505-632-4166
email or Fax#: Kelly.Robinson@wnr.com
QA/QC Package: ☐ Standard ☒ Level 4 (Full Validation)
Accreditation: ☐ NELAP ☐ Other
☒ EDD (Type) Excel

Turn-Around Time: ☒ Standard ☐ Rush
Project Name: RCRA Group 8 Investigation
Project #:
Project Manager: Kelly Robinson
Sampler: Kelly R. & Tracy P.

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		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) + TPH-GRO	8270 (Semi-VOA)	TPH- DRO, MRO	Metals (See attached)	Cyanide		Air Bubbles (Y or N)
1/25/12	1535	Soil	SWMU 3-25 (5-6')	2 encore	None	-4										X						
				2 vials	MeOH											X						
				Jars	None											X	X	X	X	X		
1/25/12	1550		SWMU 3-25 (9-10')	2 encore		-5										X						
				2 vials	MeOH											X						
				Jars	None											X	X	X	X	X		
1/25/12	16:55		SWMU 3-17 (5-6')	2 encore		-6										X						
				2 vials	MeOH											X						
				Jars	None											X	X	X	X	X		
1/25/12	17:00		SWMU 3-17 (9-10')	2 encore		-7										X						
				2 vials	MeOH											X						
				Jars	None											X	X	X	X	X		

Date:	Time:	Relinquished by:	Received by:	Date	Time
1/26/12	1500	Kelly Robinson	TO UPS		
Date:	Time:	Relinquished by:	Received by:	Date	Time
				1/27/12	1012

Remarks: See attachment for analyte list.

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.

3 of 5

Chain-of-Custody Record

Client: Western Refining Southwest, Inc.
Bloomfield Refinery
Mailing Address: 50 Road 4990
Bloomfield, NM 87401
Phone #: ~~505-80~~ 505-632-4166
email or Fax#: Kelly.Robinson@wnr.com
QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other
☒ EDD (Type) EXCEL

Turn-Around Time:
☒ Standard ☐ Rush
Project Name: RCRA Group 8 Investigation
Project #:
Project Manager: Kelly Robinson
Sampler: Kelly R. + Tracy P.
On Ice:
Sample Temperature:

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

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	
1/26/12	753	Soil	SWMU 3-15 (5.5-6.5')	2 encores	None	-8
				2 vials	MeOH	
				Jars	None	
1/26/12	800		SWMU 3-15 (9.5-10.5')	2 encores		-9
				2 vials	MeOH	
				Jars	None	
1/26/12	9:34		SWMU 3-18 (4.5-5.5')	2 encores		-10
				2 vials	MeOH	
				Jars	None	
1/26/12	9:38		SWMU 3-18 (8.5-9.5')	2 encores		-11
				2 vials	MeOH	
				Jars	None	

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,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA) + TPH-GRO	8270 (Semi-VOA)	TPH-DRO, MRO	Metals (See attached)	Cyanide		Air Bubbles (Y or N)
										X						
										X						
										X	X	X	X	X		
										X						
										X						
										X	X	X	X	X		
										X						
										X						
										X	X	X	X	X		
										X						
										X						
										X	X	X	X	X		

Date: 1/26/12 Time: 1500 Relinquished by: Kelly Robinson
Received by: TO UPS Date Time
Date: Time: Relinquished by:
Received by: Date Time 1-27-12 1012

Remarks: See attached analyte list

...essary, 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.

4 of 5

Chain-of-Custody Record

Client: Western Refining Southwest, Inc. Bloomfield Refinery

Mailing Address: 50 Road 4990 Bloomfield, NM 87401

Phone #: 505-632-4166

email or Fax#: Kelly.Robinson@wnr.com

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

Accreditation: ☐ NELAP ☐ Other

☒ EDD (Type) Excel

Turn-Around Time: ☒ Standard ☐ Rush

Project Name: RCRA Group 8 Investigation

Project #:

Project Manager: Kelly Robinson

Sampler: Kelly R. & Tracy P.

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		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,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA) + TPH - GRO	8270 (Semi-VOA)	TPH - DRO GRO, MRO	Metals (See attached)	Cyanide		Air Bubbles (Y or N)
1/26/12	11:15	Soil	SWMU 3-13(5.5-6.5')	2 encore	None	-12										X						
				2 VIALS	MeOH											X						
				Jars	None											X	X	X	X	X		
1/26/12	11:15		SWMU 3-13(5.5-6.5')	2 encore	None	-13										X						
				2 VIALS	MeOH											X						
				Jars	None											X	X	X	X	X		
1/26/12	11:30		SWMU 3-13(9.5-10.5')	2 encore	None	-14										X						
				2 vials	MeOH											X						
				Jars	None											X	X	X	X	X		
1/26/12	12:16		SWMU 3-12(5-6')	2 encore	None	-15										X						
				2 vials	MeOH											X						
				Jars	None											X	X	X	X	X		

Date: 1/26/12 Time: 1500 Relinquished by: Kelly Robinson

Received by: TO UPS Date Time

Date: Time: Relinquished by:

Received by: Date Time 1/27/2012

Remarks: See attachment for analyte list

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.

Chain-of-Custody Record

525

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

Client: Western Refining Southwest, Inc. Bloomfield Refinery
Mailing Address: 50 Road 4990 Bloomfield, NM 87401
Phone #: 505-632-4166
email or Fax#: Kelly.Robinson@wnr.com
QA/QC Package: ☐ Standard ☒ Level 4 (Full Validation)
Accreditation: ☐ NELAP ☐ Other
☒ EDD (Type) EXCEL

Turn-Around Time: ☒ Standard ☐ Rush
Project Name: RCRA GROUP B INVESTIGATION
Project #:
Project Manager: Kelly Robinson
Sampler: Kelly R. & Tracy P.

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type		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) +TPH-GRO	8270 (Semi-VOA)	TPH - DRO, MRO	Metals (see attached)	Cyanide		Air Bubbles (Y or N)
1/26/12	12:25	Soil	SWMU 3-12 (9-10')	2 encores		-16										X						
				2 vials												X						
				Jars												X	X	X	X	X		
1/26/12	13:22		SWMU 3-23 (8-9')	2 encores		-17										X						
				2 vials												X						
				Jars												X	X	X	X	X		
1/26/12	13:30		SWMU 3-23 (12-13')	2 encore		-18										X						
				2 vials												X						
				Jars												X	X	X	X	X		
—	—		MeOH BLANK	~~2 vials~~		-19										X						
				~~2 vials~~												X						
				~~Jars~~												X	X	X	X	X		

Date: 1/26/12 Time: 1500 Relinquished by: Kelly Robinson
Received by: TO UPS Date Time

Date: Time: Relinquished by:
Received by: Date Time 1/27/12 1012

Remarks: See attached for analyte list.

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.

METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Group 8

1 of 2

Chain-of-Custody Record

Client: Western Refining Southwest, Inc
Bloomfield Refinery
Mailing Address: 50 Road 4990
Bloomfield, NM 87401
Phone #: 505-632-4166
email or Fax#: Kelly.Robinson@wnr.com
QA/QC Package: ☐ Standard ☒ Level 4 (Full Validation)
Accreditation: ☐ NELAP ☐ Other
☒ EDD (Type) Excel

Turn-Around Time: ☒ Standard ☐ Rush
Project Name: RCRA Group 8 Investigation
Project #:
Project Manager: Kelly Robinson
Sampler: Kelly R. & Tracy P.
Sample Temperature:

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type		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) + TPH - GRO	8270 (Semi-VOA)	TPH - GRO - MRO - DRO	Metals (See attached)	Cyanide		Air Bubbles (Y or N)
1/26/12	1535	Soil	SWMU 3-22 (5-6')	2 encore	None	1										X						
				2 vials	MeOH											X						
				Jars	None											X	X	X	X	X		
1/26/12	1540		SWMU 3-22 (9-10')	2 encore		2										X						
				2 vials	MeOH											X						
				Jars	None											X	X	X	X	X		
1/26/12	1630		SWMU 3-19 (4.5-5.5')	2 encore		3										X						
				2 vials	MeOH											X						
				Jars	None											X	X	X	X	X		
1/26/12	1635		SWMU 3-19 (8.5-9.5')	2 encore		4										X						
				2 vials	MeOH											X						
				Jars	None											X	X	X	X	X		

Date:	Time:	Relinquished by:	Received by:	Date	Time
1/27/12	1300	Kelly Robinson		1/27/12	1300
Date:	Time:	Relinquished by:	Received by:	Date	Time
1/27/12	1855	Dave Tanner	Dave Tanner	1/27/12	1855

Remarks: See attachment for analytical list.

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.

Chain-of-Custody Record

2 of 2

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Client: Western Refining Southwest, Inc. Bloomfield Refinery

Mailing Address: 50 Road 4990 Bloomfield, NM 87401

Phone #: 505-632-4166

email or Fax#: Kelly.Robinson

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

Accreditation: ☐ NELAP ☐ Other

☒ EDD (Type) EXCEL

Turn-Around Time: ☒ Standard ☐ Rush

Project Name: RCRA Group 8 Investigation

Project #:

Project Manager: Kelly Robinson

Sampler: Kelly R. & Tracy P.

On Ice: ☐ Yes ☐ No

Sample Temperature:

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type		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) + TPH -GRO	8270 (Semi-VOA)	TPH - DRO, MRO	Metals (See Attached)	Cyanide		Air Bubbles (Y or N)
1/27/12	922	Soil	SWMU 3-3 (3.5-4.5')	2 encore	None	5										X						
				2 VIALS	MeOH											X						
				Jars	None												X	X	X	X		
1/27/12	935		SWMU 3-3 (7.5-8.5')	2 encore		6										X						
				2 vials	MeOH											X						
				Jars	None												X	X	X	X		
1/27/12	1115		SWMU 3-3 (24-26')	2 encore		7										X						
				2 vials	MeOH											X						
				Jars	None												X	X	X	X		
1/27/12	1126		SWMU 3-3 (26-27')	~~3~~ 4 Jars encore		8										X						
				~~2 vials~~	~~MeOH~~											X						
				~~Jars~~	~~None~~												X	X	X	X		

Date:	Time:	Relinquished by:	Received by:	Date	Time
1/27/12	1300	Kelly Robinson	Dave Tamez	1/27/12	1300
1/27/12	1855	Dave Tamez	Michelle Garcia	1/27/12	1555

Remarks: See attachment for analyte list

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 rep

METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Group 8

1 of 1

Chain-of-Custody Record

Client: Western Refining Southwest Inc. Bloomfield Refinery

Mailing Address: 50 Road 4990 Bloomfield, NM 87401

Phone #: 505-801-5616

email or Fax#: Kelly.Robinson@wnr.com

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

Accreditation
☐ NELAP ☐ Other

☒ EDD (Type) Excel

Turn-Around Time:
☑ Standard ☐ Rush

Project Name: RCRA Group B Investigation

Project #:

Project Manager: Kelly Robinson

Sampler: Kelly R. & Tracy P.

On Ice: ☐ Yes ☐ No

Sample Temperature:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type		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,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA) + TPH-GRO	8270 (Semi-VOA)	TPH - DRO MRO	Metals (See attached)	Reactivity Cyanide		Air Bubbles (Y or N)
1/23/12	805	Soil	Swmu 6-4 (5-6')	2 encore	None	-1										X						
				2 vials	MeOH	-1										X						
				1 jar	None	-1											X	X	X	X		
1/27/12	812		Swmu 6-4 (9-10')	2 encore		-2										X						
				2 vials	MeOH	-2										X						
				1 jar	None	-2											X	X	X	X		
			MeOH	~~2 encore~~ 2 vial		-3										X						
				2 vials	MeOH											X						
				1 jar	None												X	X	X	X		
				~~2 encore~~												X						
				~~2 vials~~	~~MeOH~~											X						
				1 jar	None												X	X	X	X		

Date:	Time:	Relinquished by:	Received by:	Date	Time
1/27/12	1300	Kelly Robinson	Dave Kramer	1/27/12	1300
1/27/12	1555	Dave Kramer	Mitchell Penn	1/27/12	1555

Remarks: See attached for analyte list.

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.

METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Group 8

Chain-of-Custody Record

Client: Western Refining Southwest, Inc. Bloomfield Refinery

Mailing Address: 50 Road 4990 Bloomfield, NM 87401

Phone #: 505-632-4166

email or Fax#: Kelly.Robinson@wnr.com

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

Accreditation
☐ NELAP ☐ Other _____

☒ EDD (Type) EXCEL

Turn-Around Time:
☒ Standard ☐ Rush _____

Project Name: RCRA Grap 8 INVESTIGATION

Project #: _____

Project Manager: Kelly Robinson

Sampler: Kelly R. + Tracy P.

Sample Temperature: _____

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type		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) + TPH-GRO	8270 (Semi-VOA)	TPH-DRO, MRO	Metals (see attached)	Cyanide		Air Bubbles (Y or N)
1/30/12	805	Soil	SWMU 3-1 (3.5-4.5')	2 encore	None	-1										X						
				2 vials	MeOH											X						
				3 jars	None											X	X	X	X	X		
1/30/12	837		SWMU 3-1 (7.5-8.5')	2 encore		-2										X						
				2 vials	MeOH											X						
				3 jars	None											X	X	X	X	X		
1/30/12	933		SWMU 3-26 (2.5-3.5')	2 encore		-3										X						
				2 vials	MeOH											X						
				3 jars	None											X	X	X	X	X		
1/30/12	940		SWMU 3-26 (6.5-7.5')	2 encore		-4										X						
				2 vials	MeOH											X						
				3 jars	None											X	X	X	X	X		

Date:	Time:	Relinquished by:	Received by:	Date	Time
1/30/12	1500	Kelly Robinson	TO UPS		
Date:	Time:	Relinquished by:	Received by:	Date	Time
				1/31/2012	

Remarks: See attachment for Analyte list.

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

Chain-of-Custody Record

Client: Western Refining Southwest, Inc.
Bloomfield Refinery
Mailing Address: 50 Road 4990
Bloomfield, NM 87401
Phone #: 505-632-4166
email or Fax#: Kelly.Robinson@wnr.com
QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other
☒ EDD (Type) EXCEL

Turn-Around Time:
☒ Standard ☐ Rush
Project Name:
Project #:
Project Manager: Kelly Robinson
Sampler: Kelly R. + Tracy P.
On Ice:
Sample Temperature:

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type		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) + TPH-GRO	8270 (Semi-VOA)	TPH-MRO, DRO	Metals (see attached)	Cyanide		Air Bubbles (Y or N)
1/30/12	1021	Soil	SWMU 3-27 (2.5-3.5')	2 encore	None	-5										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X	X		
			SWMU 3-27 (2.5-3.5')	Dup 2 encore	None	-6										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X	X		
1/30/12	1026	Soil	SWMU 3-27 (6.5-7.5')	2 encore		-7										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X	X		
1/30/12	1105	Soil	SWMU 3-28 (2.5-3.5')	2 encore		-8																
				2 vials	MeOH																	
				3 Jars	None																	

Date: 1/30/12 Time: 1500 Relinquished by: Kelly Robinson
Received by: TO UPS Date Time

Date: Time: Relinquished by:
Received by: Date 1/31/12 Time 0930

Remarks: See attachment for analyte list.

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.

3 of 3

Chain-of-Custody Record

Client: Western Refining Southwest, Inc.
Bloomfield Refinery
Mailing Address: 50 Road 4990
Bloomfield, NM 87401
Phone #: 505-632-4166
email or Fax#: Kelly.Robinson@wnr.com
QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other
☒ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush
Project Name:
Project #:
Project Manager: Kelly Robinson
Sampler: Kelly R. + Tracy P.
On Ice: ☒ Yes ☐ No
Sample Temperature: 4

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	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) + TPH-GRO	8270 (Semi-VOA)	TPH-DRO, MRO	Metals (See Attached)	Cyanide		Air Bubbles (Y or N)
1/30/12	11:10	Soil	SWMW 3-28 (6.5-7.5')	2 encore	None	-9										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X	X		
	12:15	Soil	SWMW 3-5 (4.5-5.5')	2 encore	None	-10										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X	X		
	12:20	Soil	SWMW 3-5 (8.5-9.5)	2 encore	None	-11										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X	X		
			MeOH Blank	1 Vial	MeOH	-12										X						

Date: 1/30/12 Time: 1500 Relinquished by: Kelly Robinson
Received by: TO UPS Date Time
Date: Time: Relinquished by:
Received by: Date Time 1/31/2012 0930

Remarks: See attachment for analyte list

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.

METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Group 8

1 of 1

Chain-of-Custody Record

Client: Western Refining Southwest Inc. - Bloomfield Refinery

Mailing Address: 50 Road 4990 Bloomfield, NM 87413

Phone #: 505-632-4166

email or Fax#: Kelly.Robinson@wnr.com

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

Accreditation: ☐ NELAP ☐ Other ____

☒ EDD (Type) EXCEL

Turn-Around Time: ☒ Standard ☐ Rush ____

Project Name: GROUP 8 RCRA INVESTIGATION

Project #: ____

Project Manager: Kelly Robinson

Sampler: Tracy Payne

On Ice: ☒ Yes ☐ No

Sample Temperature: 2.3

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. 1202011	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) +TPH-GRO	8270 (Semi-VOA)	TPH-DRO MRO	Metals * (See Attached)			Air Bubbles (Y or N)
1/30/12	16:32	Soil	SWMU 3-14 (4.5-5.5')	2 encore	None	-1										X						
↓	↓	↓	↓	2 vials	MeOH											X						
↓	↓	↓	↓	3 jars	None											X	X	X	X			
1/30/12	16:37	Soil	SWMU ~~3-14~~ 3-14 (8.5-9.5)	2 encore	None	-2										X						
↓	↓	↓	↓	2 Vials	MeOH											X						
↓	↓	↓	↓	3 jars	None											X	X	X	X			
—	—	Water	MeOH Blank	1 vial	MeOH	-3										X						

Date:	Time:	Relinquished by:	Received by:	Date	Time
1/31/12	1500	Kelly Robinson	TO UPS		
Date:	Time:	Relinquished by:	Received by:	Date	Time
				2/1/12	940

Remarks: See attached for metals analyte list

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.

METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Group 8

1 of 3

Chain-of-Custody Record

Client: Western Refining Southwest, Inc. Bloomfield Refinery

Mailing Address: 50 Road 4990 Bloomfield, NM 87413

Phone #: (505) 801-5616

email or Fax#: Kelly.Robinson@wnr.com

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

Accreditation
☐ NELAP ☐ Other

☒ EDD (Type) EXCEL

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Group B RCRA Investigation

Project #:

Project Manager: Kelly Robinson

Sampler: Kelly R. & Tracy P.

On Ice:

Sample Temperature:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	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,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA) + TPH-GRO	8270 (Semi-VOA)	TPH - MRO, DRO	Metals *			Air Bubbles (Y or N)
2/2/12	1355	Soil	SWMU 3-24 (5.5-6.5)	2 encore	None	1										X						
				2 vials	MeOH											X						
				3 jars	None											X	X	X	X			
	14:10		SWMU 3-24 (9.5-10.5)	2 encore		2										X						
				2 vials	MeOH											X						
				3 jars	None											X	X	X	X			
	15:10		SWMU 3-11 (6.5-7.5)	2 encore		3										X						
				2 vial	MeOH											X						
				3 jars	None											X	X	X	X			
	15:25		SWMU 3-11 (10.5-11.5)	2 encore		4										X						
				2 vials	MeOH											X						
				3 jars	None											X	X	X	X			

Date:	Time:	Relinquished by:	Received by:	Date	Time
2/3/12	11:20	Kelly Robinson	Dave Tamez	2/3/12	11:20
2/3/12	3:25	Dave Tamez		2/3/12	1525

Remarks: See attachment for analyte list.

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.

Chain-of-Custody Record

Client: Western Refining Southwest, Inc.
Bloomfield Refinery
Mailing Address: 50 Road 4990
Bloomfield, NM 87413
Phone #: (505) 801-5616
email or Fax#: Kelly.Robinson@wnr
QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other
☒ EDD (Type) EXCEL

Turn-Around Time:
☒ Standard ☐ Rush
Project Name: Group 3 RCRA Investigation
Project #:
Project Manager: Kelly Robinson
Sampler: Kelly R. + Tracy P.

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		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,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA)+TPH-GRO	8270 (Semi-VOA)	TPH-MRO, DRO	Metals			Air Bubbles (Y or N)
2/2/12	16:16		SWMW 3-7 (4.25-5.25)	2 encore	None	5										X						
				2 vials	MeOH											X						
	↓			3 jars	None											X	X	X	X			
	16:22		SWMW 3-7 (8.25-9.25')	2 encore	↓	4										X						
	↓			2 vials	MeOH											X						
	↓			3 jars	None											X	X	X	X			
	16:11		SWMW 3-7 (0-2')	2 encore	↓	7										X						
	↓			2 vials	MeOH											X						
	↓			3 jars	None											X	X	X	X			
	16:11		SWMW 3-7 (0-2') DUP	2 encore	↓	8										X						
	↓			2 vials	MeOH											X						
↓	↓			3 jars	None											X	X	X	X			

Date:	Time:	Relinquished by:	Received by:	Date	Time
2/3/12	11:20	Kelly Robinson	Dave Cameron	2/3/12	11:20
2/3/12	3:25	Dave Cameron		2/3/12	1523

Remarks: See attachment for analyte list.

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.

3 of 3

Chain-of-Custody Record

Client: Western Refining Bloomfield Refinery

Mailing Address: 50 Road 4990 Bloomfield, NM

Phone #: 505-801-5016

email or Fax#: Kelly.Robinson@wnr.com

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

Accreditation
☐ NELAP ☐ Other _____

☒ EDD (Type) EXCEL

Turn-Around Time:
☒ Standard ☐ Rush _____

Project Name: GROUP B RCRA INVESTIGATION

Project #: —

Project Manager: Kelly Robinson

Sampler: —

On Ice: ☒ Yes ☐ No

Sample Temperature: —

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	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) +TPH-GRO	8270 (Semi-VOA)					Air Bubbles (Y or N)
—	—	Water	MeOH Blank	1 Vial	MeOH	9										X						

Date:	Time:	Relinquished by:	Received by:	Date	Time
2/3/12	11:20	Kelly Robinson	Dave Sanders	2/3/12	11:20
2/3/12	3:25	Dave Sanders		2/3/12	1525

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.

METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Group 8

Chain-of-Custody Record

Client: Western Refining Southwest, Inc. Bloomfield Refinery

Mailing Address: 50 Road 4990 Bloomfield NM 87413

Phone #: (505) 801-5616

email or Fax#:

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

Accreditation
☐ NELAP ☐ Other

☒ EDD (Type) EDD - EXCEL

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Group 8 RCRA Investigation

Project #:

Project Manager: Kelly Robinson

Sampler: Kelly Robinson + Tracy

Sample Temperature:

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type		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) + TPH-GRO	8270 (Semi-VOA)	TPH-MRO, DRO	Metals (See attached)			Air Bubbles (Y or N)
2/2/12	10:27	Soil	SWMU 3-21 (6.5-7.5')	2 encore	N2AC	1										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X			
	10:34	Soil	SWMU 3-21 (10.5-11.5')	2 encore		2										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X			
	11:09	Soil	SWMU 3-20 (2-4')	2 encore		3										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X			
	11:22	Soil	SWMU 3-20 (10.5-11.5')	2 encore		4										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X			

Date:	Time:	Relinquished by:	Received by:	Date	Time
2/3/12	11:20	Kelly Robinson	Dave Tamez	2/3/12	11:20
Date:	Time:	Relinquished by:	Received by:	Date	Time
				2/3/12	1525

Remarks: See attached analyte list.

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.

Chain-of-Custody Record

2 of 3

Client: Western Refining Southwest, Inc. Bloomfield Refinery

Mailing Address: 50 Road 4990 Bloomfield, NM 87413

Phone #: (505) 801-5616

email or Fax#: Kelly.Robinson@conr.

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

Accreditation
☐ NELAP ☐ Other

☒ EDD (Type) EXCEL

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: GROUP 8 RCRA INVESTIGATION

Project #:

Project Manager: Kelly Robinson

Sampler: Kelly R. or Tracy P.

On Ice: [redacted]

Sample Temperature: [redacted]

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	[redacted]	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	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) + TPH-GRO	8270 (Semi-VOA)	TPH - MRO & DRO	Metals *			Air Bubbles (Y or N)
2/2/12	11:27	Soil	SWNW 3-20 (14.5-15.5)	2 encore		5										X						
				2 vials												X						
				3 jars												X	X	X	X			
	12:07		SWNW 3-16 (4.25-5.25)	2 encore		6										X						
				2 vials												X						
				3 jars												X	X	X	X			
	12:07		SWNW 3-16 (4.25-5.25) DUP	2 encore		7										X						
				2 vials												X						
				3 jars												X	X	X	X			
	12:14		SWNW 3-16 (8.25-9.25)	2 encore		8										X						
				2 vials												X						
				3 jars												X	X	X	X			

Date:	Time:	Relinquished by:	Received by:	Date	Time
2/3/12	11:20	Kelly Robinson	Dave Tanner	2/3/12	11:20
Date:	Time:	Relinquished by:	Received by:	Date	Time
				2/3/12	1525

Remarks: See attached for ~~the~~ analyte list.

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.

Chain-of-Custody Record

323

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Client: Western Refining Bloomfield Refinery

Mailing Address: 50 Road 4990

Phone #: 505-801-5616

email or Fax#: Kelly.Robinson@wnr.com

QA/QC Package:

☐ Standard ☒ Level 4 (Full Validation)

Accreditation

☐ NELAP ☐ Other

☒ EDD (Type) Excel

Turn-Around Time:

☐ Standard ☐ Rush

Project Name: Group 8 RCRA Investigation

Project #:

Project Manager: Kelly Robinson

Sampler:

On Ice: ☒ Yes ☐ No

Sample Temperature: 2.1/18

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1202118
—	—	Water	MeOH Blank	1 Vial		9

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) + TPH-GRO	8270 (Semi-VOA)					Air Bubbles (Y or N)
									X						

Date:	Time:	Relinquished by:	Received by:	Date	Time
2/3/12	1120	Kelly Robinson	Dave Cameron	2/3/12	11:20
Date:	Time:	Relinquished by:	Received by:	Date	Time
				2/3/12	1525

Remarks: Sa Atkeiner

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.

METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Group 8

Chain-of-Custody Record

Client: Western Refining Bloomfield Refinery

Mailing Address: 50 Road 4990 Bloomfield, NM 87413

Phone #: 505-801-5616

email or Fax#: Kelly.Robinson

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

Accreditation
☐ NELAP ☐ Other

☒ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Group 8 RCRA Investigation

Project #:

Project Manager: Kelly Robinson

Sampler: Tracy P + Kelly R

On Ice: ☒ Yes ☐ No

Sample Temperature: 2.2/5.1

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. 1202151	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) + TPH-GRO	8270 (Semi-VOA)	Metals (see attached)	TPH - GRO, DRO, MRO			Air Bubbles (Y or N)
2/3/12	834	Soil	SWMU 3-10 (2-4')	2 encor	None	1										X						
				2 Vials	MeOH											X						
	↓	↓	↓	3 Jars	None											X	X	X	X			
	851	Soil	SWMU 3-10 (10-12')	2 encor	↓	2										X						
				2 Vials	MeOH											X						
	↓	↓	↓	3 Jars	None											X	X	X	X			
	923	Soil	SWMU 3-10 (13.5-14')	2 encor	↓	3										X						
				2 Vials	MeOH											X						
	↓	↓	↓	3 Jars	None											X	X	X	X			
	1025	Soil	SWMU 3-9 (14-16')	2 encor	↓	4										X						
				2 Vials	MeOH											X						
↓	↓	↓	↓	3 Jars	None											X	X	X	X			

Date:	Time:	Relinquished by:	Received by:	Date	Time
2/3/12	1200	Kelly Robinson	Dave Tanner	2/3/12	11:20
Date:	Time:	Relinquished by:	Received by:	Date	Time
				2/3/12	1525

Remarks: See attached analyte list for metals.

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.

Chain-of-Custody Record

Client: Western Refining
Bloomfield Refinery
Mailing Address: 50 Road 4990
Bloomfield, NM 87413
Phone #: 505-801-5616
email or Fax#: Kelly.Robinson@wnr.com
QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other
☒ EDD (Type) EXCEL

Turn-Around Time:
☒ Standard ☐ Rush
Project Name: GROUP 8 RCRA INVESTIGATION
Project #:
Project Manager: Kelly Robinson
Sampler: Tracy P. + Kelly R.
On Ice: [illegible]
Sample Temperature: [illegible]

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	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) + TPH-GRO	8270 (Semi-VOA)	Metals	TPH- DRO, MRO			Air Bubbles (Y or N)
2/3/12	1045	Soil	SWNW 3-9 (18-19')			5										X						
↓	↓	↓	↓													X						
		Water	MeOH Blank		2/3/12											X	X	X	X			

Date: 2/3/12 Time: 1120 Relinquished by: Kelly Robinson
Received by: Dave Tanner Date: 2/3/12 Time: 11:20

Date: Time: Relinquished by:
Received by: Date: 2/3/12 Time: 1525

Remarks: See attachment
Did not Rec MeOH Blk @ 2/3/12

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.

METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Group 8

Chain-of-Custody Record

Client: Western Refining Bloomfield Refinery
Mailing Address: 50 Road 4990 Bloomfield, NM 87413
Phone #: 505-801-5616
email or Fax#: Kelly.Robinson@wnr.com
QA/QC Package: ☐ Standard ☒ Level 4 (Full Validation)
Accreditation: ☐ NELAP ☐ Other
☒ EDD (Type) EXCEL

Turn-Around Time: ☒ Standard ☐ Rush
Project Name: GROUP B RCRA INVESTIGATION
Project #: —
Project Manager: Kelly Robinson
Sampler: Trace P. & Kelly R
On Ice:
Sample Temperature:

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type		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) +TPH-GRO	8270 (Semi-VOA)	Metals (see attached)	TPH-MRO, DRO			Air Bubbles (Y or N)
2/6/12	12:11	Soil	SWMU 3-8 (6-7')	2 encore	None	-1										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X			
2/6/12	12:20	Soil	SWMU 3-8 (10-11')	2 encore	↓	-2										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X			
2/6/12	12:27	Soil	SWMU 3-8 (12-14')	2 encore	↓	-3										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X			
2/6/12	12:39	Soil	SWMU 3-8 (14-16')	2 encore	↓	-4										X						
				2 vials	MeOH											X						
				3 Jars	None											X	X	X	X			

Date: 2/6/12 Time: 1500 Relinquished by: Kelly Robinson
Received by: TO UPS Date Time
Date: Time: Relinquished by:
Received by: Date Time 2/7/12 0745

Remarks: See attached for analyte list.
HOLD Sample SWMU 3-8 (10-11')

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.

Chain-of-Custody Record

2 of 2

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Client: Western Refining Bloomfield Refinery

Mailing Address: 50 Road 4990 Bloomfield, NM 87413

Phone #: (505) 801-5616

email or Fax#: Kelly.Robinson@wnr.com

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

Accreditation
☐ NELAP ☐ Other

☒ EDD (Type) EXCEL

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: GROUP B RCRA INVESTIGATION

Project #:

Project Manager: Kelly Robinson

Sampler: Tracy P. + Kelly R.

On Ice:

Sample Temperature:

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.
2/6/12	1351	Soil	SWMU 3-16 (6.7')	2 encore	None	-5
				2 vials	MeOH	
				3 Jars	None	-8
	14:01	Soil	SWMU 3-16 (10-11')	2 encore	↓	-6
				2 vials	MeOH	
				3 Jars	None	
—	—	Water	MeOH Blank	1 VOA	MeOH	-7

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) + TPH-GRO	8270 (Semi-VOA)	Metals (see attached)	TPH - DRO, MRO			Air Bubbles (Y or N)
									X						
									X	X	X	X			
									X						
									X	X	X	X			
									X						

Date:	Time:	Relinquished by:	Received by:	Date	Time
2/6/12	1500	Kelly Robinson	TO UPS		
Date:	Time:	Relinquished by:	Received by:	Date	Time
				2/7/12	0945

Remarks: See attachment for analyte list

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.

METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Group 8

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

June 05, 2012

Bob Krakow
Western Refining Southwest, Inc.
#50 CR 4990
Bloomfield, NM 87413
TEL: (505) 632-4135
FAX (505) 632-3911

RE: Drill Cuttings 5-16-12 OrderNo.: 1205797

Dear Bob Krakow:

Hall Environmental Analysis Laboratory received 1 sample(s) on 5/17/2012 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1205797**
Date Reported: **6/5/2012**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Drill Cuttings 5-16-12
Lab ID: 1205797-001 **Matrix:** SOIL

Client Sample ID: Group 6+8
Collection Date: 5/16/2012 1:15:00 PM
Received Date: 5/17/2012 10:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	ND	0.049		mg/Kg	1	5/23/2012 2:59:18 AM
Toluene	ND	0.049		mg/Kg	1	5/23/2012 2:59:18 AM
Ethylbenzene	ND	0.049		mg/Kg	1	5/23/2012 2:59:18 AM
Xylenes, Total	ND	0.098		mg/Kg	1	5/23/2012 2:59:18 AM
Surr: 4-Bromofluorobenzene	84.1	80-120		%REC	1	5/23/2012 2:59:18 AM
MERCURY, TCLP						Analyst: **IDC**
Mercury	ND	0.020		mg/L	1	5/22/2012 3:32:25 PM
EPA METHOD 6010B: TCLP METALS						Analyst: **JLF**
Arsenic	ND	5.0		mg/L	1	5/23/2012 11:12:54 AM
Barium	ND	100		mg/L	1	5/23/2012 11:12:54 AM
Cadmium	ND	1.0		mg/L	1	5/23/2012 11:12:54 AM
Chromium	ND	5.0		mg/L	1	5/23/2012 11:12:54 AM
Lead	ND	5.0		mg/L	1	5/23/2012 11:12:54 AM
Selenium	ND	1.0		mg/L	1	5/23/2012 11:12:54 AM
Silver	ND	5.0		mg/L	1	5/23/2012 11:12:54 AM

Qualifiers:

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

Anatek Labs, Inc.

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

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120522049
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1205797
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120522049-001	**Sampling Date**	5/16/2012	**Date/Time Received**	5/22/2012 1:00 PM
Client Sample ID	1205797-001B / GROUP 6+8	**Sampling Time**	1:15 PM		
Matrix	Soil	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide (reactive)	ND	mg/Kg	1	6/4/2012	CRW	SW846 CH7	
Ignitability	Negative			5/24/2012	JWC	EPA 1030	
pH	7.55	ph Units		5/30/2012	ETL	EPA 9045	
Reactive sulfide	524	mg/kg	200	6/4/2012	JTT	SW846 CH7	
%moisture	8.5	Percent		5/31/2012	CRW	%moisture	

Authorized Signature

John Coddington, Lab Manager

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

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

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C586; MT:Cert0095

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1205797

05-Jun-12

Client: Western Refining Southwest, Inc.

Project: Drill Cuttings 5-16-12

Sample ID MB-2011	SampType: MBLK	TestCode: EPA Method 8021B: Volatiles
Client ID: PBS	Batch ID: 2011	RunNo: 2921
Prep Date: 5/18/2012	Analysis Date: 5/21/2012	SeqNo: 81658 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.050								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.85		1.000		84.9	80	120			

Sample ID LCS-2011	SampType: LCS	TestCode: EPA Method 8021B: Volatiles
Client ID: LCSS	Batch ID: 2011	RunNo: 2921
Prep Date: 5/18/2012	Analysis Date: 5/22/2012	SeqNo: 81659 Units: mg/Kg

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.83	0.050	1.000	0	82.6	83.3	107			S
Toluene	0.87	0.050	1.000	0	86.6	74.3	115			
Ethylbenzene	0.85	0.050	1.000	0	85.2	80.9	122			
Xylenes, Total	2.6	0.10	3.000	0	85.4	85.2	123			
Surr: 4-Bromofluorobenzene	0.88		1.000		88.0	80	120			

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1205797**

Hall Environmental Analysis Laboratory, Inc.

05-Jun-12

Client: Western Refining Southwest, Inc.
Project: Drill Cuttings 5-16-12

Sample ID	MB-2065	SampType:	mblk	TestCode:	MERCURY, TCLP				
Client ID:	PBW	Batch ID:	2065	RunNo:	2954				
Prep Date:	5/22/2012	Analysis Date:	5/22/2012	SeqNo:	82002	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020								

Sample ID	LCS-2065	SampType:	lcs	TestCode:	MERCURY, TCLP				
Client ID:	LCSW	Batch ID:	2065	RunNo:	2954				
Prep Date:	5/22/2012	Analysis Date:	5/22/2012	SeqNo:	82003	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.020	0.005000	0	101	80	120			

Qualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1205797**

05-Jun-12

Client: Western Refining Southwest, Inc.

Project: Drill Cuttings 5-16-12

Sample ID	MB-2061	SampType:	MBLK	TestCode:	EPA Method 6010B: TCLP Metals				
Client ID:	PBW	Batch ID:	2061	RunNo:	2973				
Prep Date:	5/22/2012	Analysis Date:	5/23/2012	SeqNo:	82596	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0								
Barium	ND	100								
Cadmium	ND	1.0								
Chromium	ND	5.0								
Lead	ND	5.0								
Selenium	ND	1.0								
Silver	ND	5.0								

Sample ID	LCS-2061	SampType:	LCS	TestCode:	EPA Method 6010B: TCLP Metals				
Client ID:	LCSW	Batch ID:	2061	RunNo:	2973				
Prep Date:	5/22/2012	Analysis Date:	5/23/2012	SeqNo:	82597	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	5.0	0.5000	0	96.0	80	120			
Barium	ND	100	0.5000	0	83.9	80	120			
Cadmium	ND	1.0	0.5000	0	87.2	80	120			
hromium	ND	5.0	0.5000	0.001050	84.9	80	120			
Lead	ND	5.0	0.5000	0.002200	82.4	80	120			
Selenium	ND	1.0	0.5000	0	81.6	80	120			
Silver	ND	5.0	0.1000	0.0004000	88.0	80	120			

ualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: Western Refining Southwest, Inc Bloomfield Work Order Number: 1205797

Received by/date: 05/17/12

Logged By: Lindsay Mangin 5/17/2012 10:15:00 AM

Completed By: Lindsay Mangin 5/18/2012 9:26:23 AM

Reviewed By: MG 05/18/12

Chain of Custody

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

Log In

4. Coolers are present? (see 19. for cooler specific information)	Yes ☑	No ☐	NA ☐
5. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
6. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
7. Sample(s) in proper container(s)?	Yes ☑	No ☐	
8. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
9. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
10. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
11. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
12. Were any sample containers received broken?	Yes ☐	No ☑	
13. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
14. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
15. Is it clear what analyses were requested?	Yes ☑	No ☐	
16. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

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

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

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

Person Notified: _____ Date: _____

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

Regarding: _____

Client Instructions: _____

18. Additional remarks:

19. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.9	Good	Yes			

Chain-of-Custody Record

Client: Western Refining

Mailing Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4135

email or Fax#:

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)
☐ Other _____
☐ EDD (Type) _____

Turn-Around Time:
☒ Standard ☐ Rush _____

Project Name:
Drill Cuttings 5-16-12

Project #:

Project Manager:

Sampler: Bob & Terry 2.9 on ice
On Ice: ☒ Yes ☐ No
Sample Temperature: 2.9

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.
5-16-12	1:15	Soil	Group 6 & 8	1-8oz Jar		1205717-001
5-16-12	1:15	Soil	Group 6 & 8	1-8oz Jar		2

Analysis Request

BTEX + MTBE + TPH (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 TCLP	Anions (F,Cl,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	RCI				Air Bubbles (Y or N)
X															
						X					X				

Date:	Time:	Relinquished by:	Received by:	Date	Time
5-16-12	3:00	Robert Bracken			
Date:	Time:	Relinquished by:	Received by:	Date	Time
				05/16/12	1015

Remarks:

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

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

MAY-17-2012 10:16 WESTERN REF.-BLOOMFIELD 505 632 3911 P.01/01
TOTAL P.01

Appendix H

Quality Assurance/Quality Control Review

1.0 DATA VALIDATION INTRODUCTION

This summary presents data verification results for soil samples collected from soil boring installed at the Bloomfield Refinery in accordance with the approved Investigation Work Plan - Group 8. The data review was performed in accordance with the procedures specified in the Order issued by NMED (NMED, 2007), USEPA Functional Guidelines for Organic and Inorganic Data Review, and quality assurance and control parameters set by the project laboratory Hall Environmental Analysis Laboratory, Inc.

A total of 64 soil samples were collected between January 2012 and February 2012 in accordance with the Group 8 Investigation Work Plan. Soil samples were submitted to Hall Environmental Analysis Laboratory for the following parameters in accordance with the approved Work Plan:

- volatile organic compounds (VOCs) by USEPA Method 8260B;
- semi-volatile organic compounds (SVOCs) by USEPA Method 8270;
- Gasoline, diesel, and motor oil range organics by SW-846 Method 8015B;
- Total recoverable metals (Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, nickel, selenium, silver, vanadium, and zinc) by SW846 Method 6010/6020;
- Cyanide by SW-846 method 9012; and
- Mercury by EPA Method 7470.

Additionally, 12 quality assurance samples consisting of trip blanks, field blanks, equipment rinsate blanks, and field duplicates were collected and analyzed as part of the investigation activities. Table A-1 presents a summary of the sample identifications, laboratory sample identifications, and requested analytical parameters.

2.0 QUALITY CONTROL PARAMETERS REVIEWED

Sample results were subject to a Level II data review that includes an evaluation of the following quality control (QC) parameters:

- Chain-of-Custody;
- Sample Preservation and Temperature Upon Laboratory Receipt
- Holding Times;
- Blank Contamination (method blanks, trip blanks, field blanks, and equipment rinsate blanks);
- Surrogate Recovery (for organic parameters);
- Laboratory Control Sample (LCS) Recovery and Relative Percent Difference (RPD);
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recovery and RPD;
- Duplicates (field duplicate, laboratory duplicate); and
- Other Applicable QC Parameters.

The data qualifiers used to qualify the analytical results associated with QC parameters outside of the established data quality objectives are defined below:

J+	The analyte was positively identified; however, the result should be considered an estimated value with a potential high bias.
J-	The analyte was positively identified; however, the result should be considered an estimated value with a potential low bias.
UJ	The reporting limit is considered an estimated value.
R	Quality control indicates that the data is not usable.

Results qualified as "J+", "J-", or "UJ" are of acceptable data quality and may be used quantitatively to fulfill the objectives of the analytical program, per EPA guidelines.

Results for the performance monitoring events that required qualification based on the data verification are summarized in Table A-2.

2.1 CHAIN-OF-CUSTODY

The chain-of-custody documentation associated with project samples was found to be complete. Chain-of-custodies included sample identifications, date and time of collection, requested parameters, and relinquished/received signatures.

2.2 SAMPLE PRESERVATION AND TEMPERATURE UPON LABORATORY RECEIPT

Samples collected were received preserved and intact by Hall Environmental Laboratories, Inc. Samples were received by the laboratory at a temperature of 6.0 degrees Celsius or lower. Data qualification on lower temperature samples was not required.

2.3 HOLDING TIMES

All samples were extracted and analyzed within method-specified holding time limits. Data qualification for exceeding holding times was not required.

2.4 BLANK CONTAMINATION

2.4.1 Method Blank

Method blanks were analyzed at the appropriate frequency. Target compounds were not detected in the method blanks, with the exception of the following:

- Acetone was detected in the method blank for analytical batch 513 and 569. Associated field sample results were non-detect, therefore data qualification was not required.

2.4.2 Trip Blank

Trip blanks were analyzed at the appropriate frequency as specified in the Order. Target compounds were not detected in the trip blanks.

2.4.3 Field Blanks/Equipment Rinsate Blank

Field and equipment rinsate blanks were not collected as specified in the Group 8 Investigation Work Plan.

2.4.4 Common Laboratory Contaminants

Per USEPA guidelines, common laboratory contaminants for VOC analysis are acetone, 2-butanone (MEK), cyclohexane, chloromethane, and methylene chloride. Common laboratory contaminants for SVOC analysis include phthalates. Data qualification was not required since field analytical results were not detected in the method blank or were detected at concentrations greater than 10 times the blank concentration.

2.4.5 Methanol Blanks

Methanol Blanks provided by the laboratory were analyzed for VOCs. There were no analytes detected in the methanol blanks above the respective laboratory reporting limits.

2.5 SURROGATE RECOVERY

Surrogate recoveries for the organic and inorganic analyses were performed at the required frequency and were within laboratory acceptance limits, with the following exceptions:

- Surrogate recovery for bromofluorobenzene (BFB) were above the upper acceptance limit for field sample SWMU 3-3 (26-27'). The associated field sample result was qualified J+ due to a potential high bias.
- Surrogate recoveries for di-n-octyl phthalate (DNOP) was below the lower acceptance limit for field sample SWMU 3-20 (2-4'). Low surrogate recovery was due to required sample dilution for analytical analysis and/or matrix interference; therefore data qualification was not required.
- Surrogate recovery for 1,2-Dichloroethane-d4 (55.9%) and Dibromofluoromethane (58.8%) was below the lower acceptance limit of 70 for field sample SWMU 3-20 (14.5-15.5'). Data qualification was not required because the remaining acid and base/neutral fractions were within acceptance limits.

2.6 LCS RECOVERY AND RELATIVE PERCENT DIFFERENCE

LCS/LCS duplicates were performed at the required frequency and were evaluated based on the following criteria:

- If the analyte recovery was above acceptance limits for the LCS or LCS duplicate, but the analyte was not detected in the associated batch, then data qualification was not required.
- If the analyte recovery was above acceptance limits for the LCS or LCS duplicate and the analyte was detected in the associated batch, then the analyte results were qualified "J+" to account for a potential high bias.
- If the analyte recovery was below acceptance limits for LCS or LCS duplicate then the analyte results in the associated analytical batch were qualified ("UJ" for non-detects and "J-" for detected results) to acount for a potential low bias.

LCS/LCSD percent recoveries and relative percent differences (RPDs) were within acceptance limits except for the following:

- The LCS percent recovery for N-Nitrosodi-n-propylamine (88.4%) was above the upper acceptance limit of 86.9%. Data qualification was not required since the recoveries for the associated field sample was non-detect.

2.7 MS/MSD RECOVERY AND RELATIVE PERCENT DIFFERENCE

MS/MSD samples were performed at the required frequency and were evaluated by the following criteria:

- If the MS or MSD recovery for an analyte was above acceptance limits but the analyte was not detected in the associated analytical batch, then data qualification was not required.
- If the MS or MSD recovery for an analyte was above acceptance limits and the analyte was detected in the associated analytical batch, then analyte results were qualified "J+" to account for a potential low bias.
- Low MS/MSD recoveries for inorganic parameters result in sample qualification of the associated analytical batch.
- Results were not qualified based on non-project specific MS/MSD (i.e., batch QC) recoveries.

MS/MSD percent recoveries and RPDs were within acceptance limits except for the following:

- The MS/MSD percent recoveries for Antimony (30.1% / 30.1%) and Selenium (64.6% / 64.1%) were below the lower acceptance limit of 75% for analytical batch 21949. Associated field sample results were non-detect. Data qualification "UJ" was required to indicate a potential low bias for the associated samples.
- The MS/MSD percent recoveries for Chromium (74.4% / 74.1%) were below the lower acceptance limit of 75% for analytical batch 504. Data qualification "J-" was required to indicate a potential low bias.
- The MS/MSD percent recoveries for Cobalt (67.8% / 65.7%) were below the lower acceptance limit of 75% for analytical batch 504. Data qualification "J-" was required to indicate a potential low bias.
- The MS/MSD percent recoveries for Lead (67.8% / 65.7%) were below the lower acceptance limit of 75% for analytical batch 504. Data qualification "J-" was required to indicate a potential low bias.
- The MS/MSD percent recoveries for Nickel (65.8% / 65.9%) were below the lower acceptance limit of 75% for analytical batch 504. Data qualification "J-" was required to indicate a potential low bias.
- The MS/MSD percent recoveries for Zinc (60.2% / 64.1%) were below the lower acceptance limit of 75% for analytical batch 504. Data qualification "J-" was required to indicate a potential low bias.
- The MS/MSD percent recoveries for Antimony (35.1% / 33.5%) were below the lower acceptance limit of 75% for analytical patch 568. The associated field sample results were qualified "UJ" due to a potential low bias.

- The MS/MSD percent recoveries for Antimony (49% / 46.1%) were below the lower acceptance limit of 75% for analytical patch 600. The associated field sample results were qualified "UJ" due to a potential low bias.
- The MS duplicate relative percent difference for Selenium (27.2%) was above the acceptance limit of 20%. Data qualification was not required since the MS and MSD recoveries were within their respective acceptance range.
- The MS/MSD percent recoveries for Antimony (37.2% / 37.9%) were below the lower acceptance limit of 75% for analytical patch 677. The associated field sample results were qualified "UJ" due to a potential low bias.
- The MS/MSD percent recoveries for Selenium (71.2% / 74.2%) were below the lower acceptance limit of 75% for analytical patch 600. The associated field sample results were qualified "UJ" due to a potential low bias.
- The MS percent recovery for Lead (74.6%) was below the lower acceptance limit of 75% for analytical patch 600. Data qualification was not required since the respective MSD recovery was within the acceptance limit.

2.8 DUPLICATES

2.8.1 Field Duplicates

Field duplicates were collected at a rate as stated in the approved Group 8 Investigation work Plan. The RPDs between the field duplicate and its associated sample were calculated and are presented in Table A-3. The field duplicates were evaluated by the following criteria:

- If an analyte was detected at a concentration greater than five times the method reporting limit, the RPD should be less than 35 percent for soil and 25 percent for ground water samples.
- If an analyte was detected at a concentration that is less than five times the method reporting limit, then the difference between the sample and the field duplicate should not exceed the method reporting limit.
- Duplicate RPDs are calculated by dividing the difference of the concentrations by the average of the concentrations.

Field duplicate RPDs were within acceptance limits except for the following:

- Barium for field sample SWMU 3-13 (5.5-6.5') and SWMU 3-27 (2.5-3.5').
- Toluene for field sample SWMU 3-7 (0-2').

3.0 COMPLETENESS SUMMARY

Two types of completeness were calculated for this project: contract and technical. The following equations were used to calculate the two types of completeness:

$$\%\ \text{Contract Completeness} = \left(\frac{\text{Number of contract compliant results}}{\text{Number of reported results}}\right) \times 100$$

$$\%\ \text{Technical Completeness} = \left(\frac{\text{Number of usable results}}{\text{Number of reported results}}\right) \times 100$$

The overall contract completeness, which includes the evaluation of protocol and contract deviations, which includes the evaluation of the QC parameters listed in Section 2.0, was approximately 99 percent for soil. The technical completeness attained for Group 8 RCRA Investigation activities was 100 percent. The completeness results are provided in Table A-4. The analytical results for the required analytes per the approved Group 8 Work Plan were considered usable for the intended purposes and the project DQOs have been met.

TABLE A-1
Sampling and Analysis Schedule

Table A-1
Sampling and Analysis Schedule
Group 8 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

Sample ID	Lab ID	Date Collected	Sample Type
SWMU 3-4 (6-7')	1201800-001	1/25/2012	N
SWMU 3-4 (10-11')	1201800-002	1/25/2012	N
SWMW 3-4 (12-14')	1201800-003	1/25/2012	N
SWMU 3-25 (5-6')	1201800-004	1/25/2012	N
SWMU 3-25 (9-10')	1201800-005	1/25/2012	N
SWMU 3-17 (5-6')	1201800-006	1/25/2012	N
SWMU 3-17 (9.10')	1201800-007	1/25/2012	N
SWMU 3-15 (5.5-6.5')	1201800-008	1/26/2012	N
SWMU 3-15 (9.5-10.5')	1201800-009	1/26/2012	N
SWMU 3-18 (4.5-5.5')	1201800-010	1/26/2012	N
SWMU 3-18 (8.5-9.5')	1201800-011	1/26/2012	N
SWMU 3-13 (5.5-6.5')	1201800-012	1/26/2012	N
SWMU 3-13 (5.5-6.5') DUP	1201800-013	1/26/2012	FD
SWMU 3-13 (9.5-10.5')	1201800-014	1/26/2012	N
SWMU 3-12 (5-6')	1201800-015	1/26/2012	N
SWMU 3-12 (9-10')	1201800-016	1/26/2012	N
SWMU 3-23 (8-9')	1201800-017	1/26/2012	N
SWMU 3-23 (12-13')	1201800-018	1/26/2012	N
MeOH Blank	1201800-019		TB
SWMU 3-22 (5-6')	1201827-001	1/26/2012	N
SWMU 3-22 (9-10')	1201827-002	1/26/2012	N
SWMU 3-19 (4.5-5.5')	1201827-003	1/26/2012	N
SWMU 3-19 (8.5-9.5')	1201827-004	1/26/2012	N
SWMU 3-3 (3.5-4.5')	1201827-005	1/27/2012	N
SWMU 3-3 (7.5-8.5')	1201827-006	1/27/2012	N
SWMU 3-3 (24-26')	1201827-007	1/27/2012	N
SWMU 3-3 (26-27')	1201827-008	1/27/2012	N
MeOH Blank	1201827-009		TB
SWMU 6-4 (5-6')	1201828-001	1/27/2012	N
SWMU 6-4 (9-10')	1201828-002	1/27/2012	N
MeOH Blank	1201828-003		TB
SWMU 3-1 (3.5-4.5')	1201871-001	1/30/2012	N
SWMU 3-1 (7.5-8.5')	1201871-002	1/30/2012	N
SWMW 3-26 (2.5-3.5')	1201871-003	1/30/2012	N
SWMU 3-26 (6.5-7.5')	1201871-004	1/30/2012	N
SWMU 3-27 (2.5-3.5')	1201871-005	1/30/2012	N
SWMU 3-27 (2.5-3.5') DUP	1201871-006	1/30/2012	FD
SWMU 3-27 (6.5-7.5')	1201871-007	1/30/2012	N
SWMU 3-28 (2.5-3.5')	1201871-008	1/30/2012	N
SWMU 3-28 (6.5-7.5')	1201871-009	1/30/2012	N
SWMU 3-5 (4.5-5.5')	1201871-010	1/30/2012	N
SWMU 3-5 (8.5-9.5')	1201871-011	1/30/2012	N
MeOH BLANK	1201871-012		TB
SWMU 3-14 (4.5-5.5')	1202017-001	1/30/2012	N
SWMU 3-14 (8.5-9.5')	1202017-002	1/30/2012	N
MeOH BLANK	1202017-003		TB
SWMU 3-24 (5.5-6.5)	1202147-001	2/2/2012	N
SWMU 3-24 (9.5-10.5')	1202147-002	2/2/2012	N
SWMU 3-11 (6.5-7.5')	1202147-003	2/2/2012	N
SWMU 3-11 (10.5-11.5')	1202147-004	2/2/2012	N
SWMU 3-7 (4.25-5.25')	1202147-005	2/2/2012	N
SWMU 3-7 (8.25-9.25')	1202147-006	2/2/2012	N
SWMU 3-7 (0-2')	1202147-007	2/2/2012	N
SWMU 3-7 (0-2') Dup	1202147-008	2/2/2012	FD
MeOH Blank	1202147-009		TB
SWMU 3-21 (6.5-7.5')	1202148-001	2/2/2012	N
SWMU 3-21 (10.5-11.5')	1202148-002	2/2/2012	N
SWMU 3-20 (2-4')	1202148-003	2/2/2012	N
SWMU 3-20 (10.5-11.5')	1202148-004	2/2/2012	N
SWMU 3-20 (14.5-15.5')	1202148-005	2/2/2012	N
SWMU 3-16 (4.25-5.25')	1202148-006	2/2/2012	N
SWMU 3-16 (4.25-5.25') Dup	1202148-007	2/2/2012	FD
SWMU 3-16 (8.25-9.25')	1202148-008	2/2/2012	N
MeOH Blank	1202148-009		TB

Table A-1
Sampling and Analysis Schedule
Group 8 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

Sample ID	Lab ID	Date Collected	Sample Type
SWMU 3-10 (2-4')	1202151-001	2/3/2012	N
SWMU 3-10 (10-12')	1202151-002	2/3/2012	N
SWMU 3-10 (13.5-14')	1202151-003	2/3/2012	N
SWMU 3-9 (14-16')	1202151-004	2/3/2012	N
SWMU 3-9 (18-19')	1202151-005	2/3/2012	N
SWMU 3-8 (6-7')	1202199-001	2/6/2012	N
SWMU 3-8 (10-11')	1202199-002	2/6/2012	N
SWMU 3-8 (12-14')	1202199-003	2/6/2012	N
SWMU 3-8 (14-16')	1202199-004	2/6/2012	N
SWMU 3-6 (6-7')	1202199-005	2/6/2012	N
SWMU 3-6 (10-11')	1202199-006	2/6/2012	N
MeOH BLANK	1202199-007		TB

Notes:

VOCs = Volatile Organic Compounds
N = Normal field sample
FD = Field duplicate
na = not applicable
FB = Field Blank
TB = Trip Blank
EB = Equipment Blank
GW = Groundwater

TABLE A-2
Qualified Data

Table A-2
Qualified Data
Group 8 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

Sample ID	Date Collected	Analyte	Result	Units	Matrix	Qualifier	Comments
SWMU 3-3 (26-27')	1/27/2012	Gasoline Range Organics (GRO)	28	mg/Kg	Soil	J+	Qualified high bias due to high surrogate recovery.
SWMU 6-4 (5-6')	1/27/2012	Zinc	18	mg/kg	Soil	UJ	Qualified low bias due to low MS/MSD recoveries.
SWMU 6-4 (5-6')	1/27/2012	Chromium	5.4	mg/kg	Soil	J-	Qualified low bias due to low MS/MSD recoveries.
SWMU 6-4 (5-6')	1/27/2012	Cobalt	2.9	mg/kg	Soil	J-	Qualified low bias due to low MS/MSD recoveries.
SWMU 6-4 (5-6')	1/27/2012	Lead	2.6	mg/kg	Soil	J-	Qualified low bias due to low MS/MSD recoveries.
SWMU 6-4 (5-6')	1/27/2012	Nickel	4.7	mg/kg	Soil	J-	Qualified low bias due to low MS/MSD recoveries.
SWMU 6-4 (5-6')	1/27/2012	Antimony	< 2.5	mg/kg	Soil	J-	Qualified low bias due to low MS/MSD recoveries.
SWMU 6-4 (5-6')	1/27/2012	Selenium	< 2.5	mg/kg	Soil	J-	Qualified low bias due to low MS/MSD recoveries.
SWMU 3-14 (4.5-5.5')	1/30/2012	Antimony	< 5.0	mg/kg	Soil	UJ	Qualified low bias due to low MS/MSD recoveries.
SWMU 3-14 (8.5-9.5')	1/30/2012	Antimony	< 5.0	mg/kg	Soil	UJ	Qualified low bias due to low MS/MSD recoveries.
SWMU 3-24 (5.5-6.5)	2/2/2012	Antimony	< 13	mg/kg	Soil	UJ	Qualified low bias due to low MS/MSD recoveries.
SWMU 3-8 (6-7')	2/6/2012	Antimony	< 2.5	mg/kg	Soil	UJ	Qualified low bias due to low MS/MSD recoveries.
SWMU 3-8 (6-7')	2/6/2012	Selenium	< 2.5	mg/kg	Soil	UJ	Qualified low bias due to low MS/MSD recoveries.

Notes:
UJ = estimated reporting limit
J- = Low bias
J+ = High bias

TABLE A-3
Field Duplicate Summary

Table A-3
Field Duplicate Summary
Group 8 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 3-13 (5.5-6.5') Sample Result	SWMU 3-13 (5.5-6.5')DUP Field Duplicate	RPD (%)
TPH (mg/kg-dry):	Diesel Range Organics (DRO)	< 10	< 9.7	NC
	Motor Oil Range Organics (MRO)	< 50	< 49	NC
	Gasoline Range Organics (GRO)	< 5.0	< 5.0	NC
VOCs (ug/kg-dry)	1,1,1,2-Tetrachloroethane	< 1.00	< 0.928	NC
	1,1,1-Trichloroethane	< 1.00	< 0.928	NC
	1,1,2,2-Tetrachloroethane	< 1.00	< 0.928	NC
	1,1,2-Trichloroethane	< 1.00	< 0.928	NC
	1,1-Dichloroethane	< 1.00	< 0.928	NC
	1,1-Dichloroethene	< 1.00	< 0.928	NC
	1,1-Dichloropropene	< 1.00	< 0.928	NC
	1,2,3-Trichlorobenzene	< 1.00	< 0.928	NC
	1,2,3-Trichloropropane	< 1.00	< 0.928	NC
	1,2,4-Trichlorobenzene	< 1.00	< 0.928	NC
	1,2,4-Trimethylbenzene	< 1.00	< 0.928	NC
	1,2-Dibromo-3-chloropropane	< 1.00	< 0.928	NC
	1,2-Dibromoethane (EDB)	< 1.00	< 0.928	NC
	1,2-Dichlorobenzene	< 1.00	< 0.928	NC
	1,2-Dichloroethane (EDC)	< 1.00	< 0.928	NC
	1,2-Dichloropropane	< 1.00	< 0.928	NC
	1,3,5-Trimethylbenzene	< 1.00	< 0.928	NC
	1,3-Dichlorobenzene	< 1.00	< 0.928	NC
	1,3-Dichloropropane	< 1.00	< 0.928	NC
	1,4-Dichlorobenzene	< 1.00	< 0.928	NC
	1-Methylnaphthalene	< 4.00	< 3.71	NC
	2,2-Dichloropropane	< 1.00	< 0.928	NC
	2-Butanone	< 1.00	< 0.928	NC
	2-Chlorotoluene	< 1.00	< 0.928	NC
	2-Hexanone	< 1.00	< 0.928	NC
	2-Methylnaphthalene	< 4.00	< 3.71	NC
	4-Chlorotoluene	< 1.00	< 0.928	NC
	4-Isopropyltoluene	< 1.00	< 0.928	NC
	4-Methyl-2-pentanone	< 1.00	< 0.928	NC
	Acetone	< 5.00	< 4.64	NC
	Benzene	< 1.00	< 0.928	NC
	Bromobenzene	< 1.00	< 0.928	NC
	Bromodichloromethane	< 1.00	< 0.928	NC
	Bromoform	< 1.00	< 0.928	NC
	Bromomethane	< 1.00	< 0.928	NC
	Carbon disulfide	< 1.00	< 0.928	NC
	Carbon tetrachloride	< 1.00	< 0.928	NC
	Chlorobenzene	< 1.00	< 0.928	NC
	Chloroethane	< 1.00	< 0.928	NC
	Chloroform	< 1.00	< 0.928	NC
	Chloromethane	< 1.00	< 0.928	NC
	cis-1,2-DCE	< 1.00	< 0.928	NC
	cis-1,3-Dichloropropene	< 1.00	< 0.928	NC
	Dibromochloromethane	< 1.00	< 0.928	NC
	Dibromomethane	< 1.00	< 0.928	NC
	Dichlorodifluoromethane	< 1.00	< 0.928	NC
	Ethylbenzene	< 1.00	< 0.928	NC
	Hexachlorobutadiene	< 1.00	< 0.928	NC
	Isopropylbenzene	< 1.00	< 0.928	NC
	Methyl tert-butyl ether (MTBE)	< 1.00	< 0.928	NC
	Methylene chloride	< 1.00	< 0.928	NC
	Naphthalene	< 2.00	< 1.86	NC
	n-Butylbenzene	< 1.00	< 0.928	NC
	n-Propylbenzene	< 1.00	< 0.928	NC
	sec-Butylbenzene	< 1.00	< 0.928	NC
	Styrene	< 1.00	< 0.928	NC
	tert-Butylbenzene	< 1.00	< 0.928	NC
	Tetrachloroethene (PCE)	< 1.00	< 0.928	NC
	Toluene	< 1.00	< 0.928	NC
	trans-1,2-DCE	< 1.00	< 0.928	NC
	trans-1,3-Dichloropropene	< 1.00	< 0.928	NC
	Trichloroethene (TCE)	< 1.00	< 0.928	NC
	Trichlorofluoromethane	< 1.00	< 0.928	NC
	Vinyl chloride	< 1.00	< 0.928	NC
	Xylenes, Total	< 1.00	< 0.928	NC

Table A-3
Field Duplicate Summary
Group 8 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 3-13 (5.5-6.5') Sample Result	SWMU 3-13 (5.5-6.5')DUP Field Duplicate	RPD (%)
SVOCs (mg/kg-dry):	1,2,4-Trichlorobenzene	< 0.20	< 0.20	NC
	1,2-Dichlorobenzene	< 0.20	< 0.20	NC
	1,3-Dichlorobenzene	< 0.20	< 0.20	NC
	1,4-Dichlorobenzene	< 0.20	< 0.20	NC
	1-Methylnaphthalene	< 0.20	< 0.20	NC
	2,4,5-Trichlorophenol	< 0.20	< 0.20	NC
	2,4,6-Trichlorophenol	< 0.20	< 0.20	NC
	2,4-Dichlorophenol	< 0.40	< 0.40	NC
	2,4-Dimethylphenol	< 0.30	< 0.30	NC
	2,4-Dinitrophenol	< 0.40	< 0.40	NC
	2,4-Dinitrotoluene	< 0.50	< 0.50	NC
	2,6-Dinitrotoluene	< 0.50	< 0.50	NC
	2-Chloronaphthalene	< 0.25	< 0.25	NC
	2-Chlorophenol	< 0.20	< 0.20	NC
	2-Methylnaphthalene	< 0.20	< 0.20	NC
	2-Methylphenol	< 0.50	< 0.50	NC
	2-Nitroaniline	< 0.20	< 0.20	NC
	2-Nitrophenol	< 0.20	< 0.20	NC
	3,3'-Dichlorobenzidine	< 0.25	< 0.25	NC
	3+4-Methylphenol	< 0.20	< 0.20	NC
	3-Nitroaniline	< 0.20	< 0.20	NC
	4,6-Dinitro-2-methylphenol	< 0.50	< 0.50	NC
	4-Bromophenyl phenyl ether	< 0.20	< 0.20	NC
	4-Chloro-3-methylphenol	< 0.50	< 0.50	NC
	4-Chloroaniline	< 0.50	< 0.50	NC
	4-Chlorophenyl phenyl ether	< 0.20	< 0.20	NC
	4-Nitroaniline	< 0.40	< 0.40	NC
	4-Nitrophenol	< 0.25	< 0.25	NC
	Acenaphthene	< 0.20	< 0.20	NC
	Acenaphthylene	< 0.20	< 0.20	NC
	Aniline	< 0.20	< 0.20	NC
	Anthracene	< 0.20	< 0.20	NC
	Azobenzene	< 0.20	< 0.20	NC
	Benz(a)anthracene	< 0.20	< 0.20	NC
	Benzo(a)pyrene	< 0.20	< 0.20	NC
	Benzo(b)fluoranthene	< 0.20	< 0.20	NC
	Benzo(g,h,i)perylene	< 0.20	< 0.20	NC
	Benzo(k)fluoranthene	< 0.20	< 0.20	NC
	Benzoic acid	< 0.50	< 0.50	NC
	Benzyl alcohol	< 0.20	< 0.20	NC
	Bis(2-chloroethoxy)methane	< 0.20	< 0.20	NC
	Bis(2-chloroethyl)ether	< 0.20	< 0.20	NC
	Bis(2-chloroisopropyl)ether	< 0.20	< 0.20	NC
	Bis(2-ethylhexyl)phthalate	< 0.50	< 0.50	NC
	Butyl benzyl phthalate	< 0.20	< 0.20	NC
	Carbazole	< 0.20	< 0.20	NC
	Chrysene	< 0.20	< 0.20	NC
	Dibenz(a,h)anthracene	< 0.20	< 0.20	NC
	Dibenzofuran	< 0.20	< 0.20	NC
	Diethyl phthalate	< 0.20	< 0.20	NC
	Dimethyl phthalate	< 0.20	< 0.20	NC
	Di-n-butyl phthalate	< 0.50	< 0.50	NC
	Di-n-octyl phthalate	< 0.25	< 0.25	NC
	Fluoranthene	< 0.20	< 0.20	NC
	Fluorene	< 0.20	< 0.20	NC
	Hexachlorobenzene	< 0.20	< 0.20	NC
	Hexachlorobutadiene	< 0.20	< 0.20	NC
	Hexachlorocyclopentadiene	< 0.20	< 0.20	NC
	Hexachloroethane	< 0.20	< 0.20	NC
	Indeno(1,2,3-cd)pyrene	< 0.20	< 0.20	NC
	Isophorone	< 0.50	< 0.50	NC
	Naphthalene	< 0.20	< 0.20	NC
	Nitrobenzene	< 0.50	< 0.50	NC
	N-Nitrosodi-n-propylamine	< 0.20	< 0.20	NC
	N-Nitrosodiphenylamine	< 0.20	< 0.20	NC
	Pentachlorophenol	< 0.40	< 0.40	NC
	Phenanthrene	< 0.20	< 0.20	NC
	Phenol	< 0.20	< 0.20	NC
	Pyrene	< 0.20	< 0.20	NC
	Pyridine	< 0.50	< 0.50	NC

Table A-3
Field Duplicate Summary
Group 8 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 3-13 (5.5-6.5') Sample Result	SWMU 3-13 (5.5-6.5')DUP Field Duplicate	RPD (%)
Metals (mg/kg-dry):	Antimony	< 2.5	< 2.5	NC
	Arsenic	< 2.5	< 2.5	NC
	Barium	160	240	**40***
	Beryllium	0.35	0.36	NC
	Cadmium	< 0.10	< 0.10	NC
	Chromium	5.3	5.3	0
	Cobalt	3.1	3.2	3.2
	Cyanide	<0.3	<0.3	NC
	Lead	2.7	2.9	2.2
	Mercury	< 0.033	< 0.033	NC
	Nickel	4.6	4.7	2.2
	Selenium	< 2.5	< 2.5	NC
	Silver	< 0.25	< 0.25	NC
	Vanadium	17	17	0
	Zinc	18	19	5

Notes:
RPD = Relative percent difference; [(difference)/(average)]* 100
NC = Not calculated; RPD values were not calculated for non-detects
ug/kg-dry = micrograms per kilogram dry
mg/kg-dry = milligrams per kilogram
* = Field Duplicate RPD Outlier

Table A-3
Field Duplicate Summary
Group 8 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 3-27 (2.5-3.5') Sample Result	SWMU 3-27 (2.5-3.5') DUP Field Duplicate	RPD (%)
TPH (mg/kg-dry):	Diesel Range Organics (DRO)	< 9.7	< 9.9	NC
	Motor Oil Range Organics (MRO)	< 49	< 50	NC
	Gasoline Range Organics (GRO)	< 5.0	< 5.0	NC
VOCs (ug/kg-dry)	1,1,1,2-Tetrachloroethane	< 1.00	< 1.00	NC
	1,1,1-Trichloroethane	< 1.00	< 1.00	NC
	1,1,2,2-Tetrachloroethane	< 1.00	< 1.00	NC
	1,1,2-Trichloroethane	< 1.00	< 1.00	NC
	1,1-Dichloroethane	< 1.00	< 1.00	NC
	1,1-Dichloroethene	< 1.00	< 1.00	NC
	1,1-Dichloropropene	< 1.00	< 1.00	NC
	1,2,3-Trichlorobenzene	< 1.00	< 1.00	NC
	1,2,3-Trichloropropane	< 1.00	< 1.00	NC
	1,2,4-Trichlorobenzene	< 1.00	< 1.00	NC
	1,2,4-Trimethylbenzene	< 1.00	< 1.00	NC
	1,2-Dibromo-3-chloropropane	< 1.00	< 1.00	NC
	1,2-Dibromoethane (EDB)	< 1.00	< 1.00	NC
	1,2-Dichlorobenzene	< 1.00	< 1.00	NC
	1,2-Dichloroethane (EDC)	< 1.00	< 1.00	NC
	1,2-Dichloropropane	< 1.00	< 1.00	NC
	1,3,5-Trimethylbenzene	< 1.00	< 1.00	NC
	1,3-Dichlorobenzene	< 1.00	< 1.00	NC
	1,3-Dichloropropane	< 1.00	< 1.00	NC
	1,4-Dichlorobenzene	< 1.00	< 1.00	NC
	1-Methylnaphthalene	< 4.00	< 4.00	NC
	2,2-Dichloropropane	< 1.00	< 1.00	NC
	2-Butanone	< 1.00	< 1.00	NC
	2-Chlorotoluene	< 1.00	< 1.00	NC
	2-Hexanone	< 1.00	< 1.00	NC
	2-Methylnaphthalene	< 4.00	< 4.00	NC
	4-Chlorotoluene	< 1.00	< 1.00	NC
	4-Isopropyltoluene	< 1.00	< 1.00	NC
	4-Methyl-2-pentanone	< 1.00	< 1.00	NC
	Acetone	< 5.00	< 5.00	NC
	Benzene	< 1.00	< 1.00	NC
	Bromobenzene	< 1.00	< 1.00	NC
	Bromodichloromethane	< 1.00	< 1.00	NC
	Bromoform	< 1.00	< 1.00	NC
	Bromomethane	< 1.00	< 1.00	NC
	Carbon disulfide	< 1.00	< 1.00	NC
	Carbon tetrachloride	< 1.00	< 1.00	NC
	Chlorobenzene	< 1.00	< 1.00	NC
	Chloroethane	< 1.00	< 1.00	NC
	Chloroform	< 1.00	< 1.00	NC
	Chloromethane	< 1.00	< 1.00	NC
	cis-1,2-DCE	< 1.00	< 1.00	NC
	cis-1,3-Dichloropropene	< 1.00	< 1.00	NC
	Dibromochloromethane	< 1.00	< 1.00	NC
	Dibromomethane	< 1.00	< 1.00	NC
	Dichlorodifluoromethane	< 1.00	< 1.00	NC
	Ethylbenzene	< 1.00	< 1.00	NC
	Hexachlorobutadiene	< 1.00	< 1.00	NC
	Isopropylbenzene	< 1.00	< 1.00	NC
	Methyl tert-butyl ether (MTBE)	< 1.00	< 1.00	NC
	Methylene chloride	< 1.00	< 1.00	NC
	Naphthalene	< 2.00	< 2.00	NC
	n-Butylbenzene	< 1.00	< 1.00	NC
	n-Propylbenzene	< 1.00	< 1.00	NC
	sec-Butylbenzene	< 1.00	< 1.00	NC
	Styrene	< 1.00	< 1.00	NC
	tert-Butylbenzene	< 1.00	< 1.00	NC
	Tetrachloroethene (PCE)	< 1.00	< 1.00	NC
	Toluene	< 1.00	< 1.00	NC
	trans-1,2-DCE	< 1.00	< 1.00	NC
	trans-1,3-Dichloropropene	< 1.00	< 1.00	NC
	Trichloroethene (TCE)	< 1.00	< 1.00	NC
	Trichlorofluoromethane	< 1.00	< 1.00	NC
	Vinyl chloride	< 1.00	< 1.00	NC
	Xylenes, Total	< 1.00	< 1.00	NC

Table A-3
Field Duplicate Summary
Group 8 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 3-27 (2.5-3.5') Sample Result	SWMU 3-27 (2.5-3.5') DUP Field Duplicate	RPD (%)
SVOCs (mg/kg-dry):	1,2,4-Trichlorobenzene	< 0.20	< 0.20	NC
	1,2-Dichlorobenzene	< 0.20	< 0.20	NC
	1,3-Dichlorobenzene	< 0.20	< 0.20	NC
	1,4-Dichlorobenzene	< 0.20	< 0.20	NC
	1-Methylnaphthalene	< 0.20	< 0.20	NC
	2,4,5-Trichlorophenol	< 0.20	< 0.20	NC
	2,4,6-Trichlorophenol	< 0.20	< 0.20	NC
	2,4-Dichlorophenol	< 0.40	< 0.40	NC
	2,4-Dimethylphenol	< 0.30	< 0.30	NC
	2,4-Dinitrophenol	< 0.40	< 0.40	NC
	2,4-Dinitrotoluene	< 0.50	< 0.50	NC
	2,6-Dinitrotoluene	< 0.50	< 0.50	NC
	2-Chloronaphthalene	< 0.25	< 0.25	NC
	2-Chlorophenol	< 0.20	< 0.20	NC
	2-Methylnaphthalene	< 0.20	< 0.20	NC
	2-Methylphenol	< 0.50	< 0.50	NC
	2-Nitroaniline	< 0.20	< 0.20	NC
	2-Nitrophenol	< 0.20	< 0.20	NC
	3,3'-Dichlorobenzidine	< 0.25	< 0.25	NC
	3+4-Methylphenol	< 0.20	< 0.20	NC
	3-Nitroaniline	< 0.20	< 0.20	NC
	4,6-Dinitro-2-methylphenol	< 0.50	< 0.50	NC
	4-Bromophenyl phenyl ether	< 0.20	< 0.20	NC
	4-Chloro-3-methylphenol	< 0.50	< 0.50	NC
	4-Chloroaniline	< 0.50	< 0.50	NC
	4-Chlorophenyl phenyl ether	< 0.20	< 0.20	NC
	4-Nitroaniline	< 0.40	< 0.40	NC
	4-Nitrophenol	< 0.25	< 0.25	NC
	Acenaphthene	< 0.20	< 0.20	NC
	Acenaphthylene	< 0.20	< 0.20	NC
	Aniline	< 0.20	< 0.20	NC
	Anthracene	< 0.20	< 0.20	NC
	Azobenzene	< 0.20	< 0.20	NC
	Benz(a)anthracene	< 0.20	< 0.20	NC
	Benzo(a)pyrene	< 0.20	< 0.20	NC
	Benzo(b)fluoranthene	< 0.20	< 0.20	NC
	Benzo(g,h,i)perylene	< 0.20	< 0.20	NC
	Benzo(k)fluoranthene	< 0.20	< 0.20	NC
	Benzoic acid	< 0.50	< 0.50	NC
	Benzyl alcohol	< 0.20	< 0.20	NC
	Bis(2-chloroethoxy)methane	< 0.20	< 0.20	NC
	Bis(2-chloroethyl)ether	< 0.20	< 0.20	NC
	Bis(2-chloroisopropyl)ether	< 0.20	< 0.20	NC
	Bis(2-ethylhexyl)phthalate	< 0.50	< 0.50	NC
	Butyl benzyl phthalate	< 0.20	< 0.20	NC
	Carbazole	< 0.20	< 0.20	NC
	Chrysene	< 0.20	< 0.20	NC
	Dibenz(a,h)anthracene	< 0.20	< 0.20	NC
	Dibenzofuran	< 0.20	< 0.20	NC
	Diethyl phthalate	< 0.20	< 0.20	NC
	Dimethyl phthalate	< 0.20	< 0.20	NC
	Di-n-butyl phthalate	< 0.50	< 0.50	NC
	Di-n-octyl phthalate	< 0.25	< 0.25	NC
	Fluoranthene	< 0.20	< 0.20	NC
	Fluorene	< 0.20	< 0.20	NC
	Hexachlorobenzene	< 0.20	< 0.20	NC
	Hexachlorobutadiene	< 0.20	< 0.20	NC
	Hexachlorocyclopentadiene	< 0.20	< 0.20	NC
	Hexachloroethane	< 0.20	< 0.20	NC
	Indeno(1,2,3-cd)pyrene	< 0.20	< 0.20	NC
	Isophorone	< 0.50	< 0.50	NC
	Naphthalene	< 0.20	< 0.20	NC
	Nitrobenzene	< 0.50	< 0.50	NC
	N-Nitrosodi-n-propylamine	< 0.20	< 0.20	NC
	N-Nitrosodiphenylamine	< 0.20	< 0.20	NC
	Pentachlorophenol	< 0.40	< 0.40	NC
	Phenanthrene	< 0.20	< 0.20	NC
	Phenol	< 0.20	< 0.20	NC
	Pyrene	< 0.20	< 0.20	NC
	Pyridine	< 0.50	< 0.50	NC

Table A-3
Field Duplicate Summary
Group 8 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 3-27 (2.5-3.5') Sample Result	SWMU 3-27 (2.5-3.5') DUP Field Duplicate	RPD (%)
Metals (mg/kg-dry):	Antimony	< 2.5	< 2.5	NC
	Arsenic	< 2.5	< 2.5	NC
	Barium	46	100	74*
	Beryllium	0.21	0.22	4.7
	Cadmium	< 0.10	< 0.10	NC
	Chromium	2.8	2.9	4
	Cobalt	1.7	1.6	6.1
	Cyanide	<0.3	<0.3	NC
	Lead	1.9	1.7	11.1
	Mercury	< 0.033	< 0.033	NC
	Nickel	2.6	2.6	0.0
	Selenium	< 2.5	< 2.5	NC
	Silver	< 0.25	< 0.25	NC
	Vanadium	10	10	0
	Zinc	11	11	0

Notes:
RPD = Relative percent difference; [(difference)/(average)]* 100
NC = Not calculated; RPD values were not calculated for non-detects
ug/kg-dry = micrograms per kilogram dry
mg/kg-dry = milligrams per kilogram
* = Field Duplicate RPD Outlier

Table A-3
Field Duplicate Summary
Group 8 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 3-7 (0-2') Sample Result	SWMU 3-7 (0-2') Dup Field Duplicate	RPD (%)
TPH (mg/kg-dry):	Diesel Range Organics (DRO)	< 10	< 9.9	NC
	Motor Oil Range Organics (MRO)	< 51	< 49	NC
	Gasoline Range Organics (GRO)	< 5.0	< 5.0	NC
VOCs (ug/kg-dry)	1,1,1,2-Tetrachloroethane	< 1.00	< 0.050	NC
	1,1,1-Trichloroethane	< 1.00	< 0.050	NC
	1,1,2,2-Tetrachloroethane	< 1.00	< 0.050	NC
	1,1,2-Trichloroethane	< 1.00	< 0.050	NC
	1,1-Dichloroethane	< 1.00	< 0.10	NC
	1,1-Dichloroethene	< 1.00	< 0.050	NC
	1,1-Dichloropropene	< 1.00	< 0.10	NC
	1,2,3-Trichlorobenzene	< 1.00	< 0.10	NC
	1,2,3-Trichloropropane	< 1.00	< 0.10	NC
	1,2,4-Trichlorobenzene	< 1.00	< 0.050	NC
	1,2,4-Trimethylbenzene	< 1.00	< 0.050	NC
	1,2-Dibromo-3-chloropropane	< 1.00	< 0.10	NC
	1,2-Dibromoethane (EDB)	< 1.00	< 0.050	NC
	1,2-Dichlorobenzene	< 1.00	< 0.050	NC
	1,2-Dichloroethane (EDC)	< 1.00	< 0.050	NC
	1,2-Dichloropropane	< 1.00	< 0.050	NC
	1,3,5-Trimethylbenzene	< 1.00	< 0.050	NC
	1,3-Dichlorobenzene	< 1.00	< 0.050	NC
	1,3-Dichloropropane	< 1.00	< 0.050	NC
	1,4-Dichlorobenzene	< 1.00	< 0.050	NC
	1-Methylnaphthalene	< 4.00	< 0.20	NC
	2,2-Dichloropropane	< 1.00	< 0.10	NC
	2-Butanone	1.35	< 0.50	NC
	2-Chlorotoluene	< 1.00	< 0.050	NC
	2-Hexanone	< 1.00	< 0.50	NC
	2-Methylnaphthalene	< 4.00	< 0.20	NC
	4-Chlorotoluene	< 1.00	< 0.050	NC
	4-Isopropyltoluene	< 1.00	< 0.050	NC
	4-Methyl-2-pentanone	< 1.00	< 0.50	NC
	Acetone	15.5	< 0.75	NC
	Benzene	< 1.00	< 0.050	NC
	Bromobenzene	< 1.00	< 0.050	NC
	Bromodichloromethane	< 1.00	< 0.050	NC
	Bromoform	< 1.00	< 0.050	NC
	Bromomethane	< 1.00	< 0.15	NC
	Carbon disulfide	< 1.00	< 0.50	NC
	Carbon tetrachloride	< 1.00	< 0.10	NC
	Chlorobenzene	< 1.00	< 0.050	NC
	Chloroethane	< 1.00	< 0.10	NC
	Chloroform	< 1.00	< 0.050	NC
	Chloromethane	< 1.00	< 0.15	NC
	cis-1,2-DCE	< 1.00	< 0.050	NC
	cis-1,3-Dichloropropene	< 1.00	< 0.050	NC
	Dibromochloromethane	< 1.00	< 0.050	NC
	Dibromomethane	< 1.00	< 0.10	NC
	Dichlorodifluoromethane	< 1.00	< 0.050	NC
	Ethylbenzene	< 1.00	< 0.050	NC
	Hexachlorobutadiene	< 1.00	< 0.10	NC
	Isopropylbenzene	< 1.00	< 0.050	NC
	Methyl tert-butyl ether (MTBE)	< 1.00	< 0.050	NC
	Methylene chloride	< 1.00	< 0.15	NC
	Naphthalene	< 2.00	< 0.10	NC
	n-Butylbenzene	< 1.00	< 0.050	NC
	n-Propylbenzene	< 1.00	< 0.050	NC
	sec-Butylbenzene	< 1.00	< 0.050	NC
	Styrene	< 1.00	< 0.050	NC
	tert-Butylbenzene	< 1.00	< 0.050	NC
	Tetrachloroethene (PCE)	< 1.00	< 0.050	NC
	Toluene	29.6	0.11	**198***
	trans-1,2-DCE	< 1.00	< 0.050	NC
	trans-1,3-Dichloropropene	< 1.00	< 0.050	NC
	Trichloroethene (TCE)	< 1.00	< 0.050	NC
	Trichlorofluoromethane	< 1.00	< 0.050	NC
	Vinyl chloride	< 1.00	< 0.050	NC
	Xylenes, Total	< 1.00	< 0.10	NC

Table A-3
Field Duplicate Summary
Group 8 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 3-7 (0-2') Sample Result	SWMU 3-7 (0-2') Dup Field Duplicate	RPD (%)
SVOCs (mg/kg-dry):	1,2,4-Trichlorobenzene	< 0.20	< 0.20	NC
	1,2-Dichlorobenzene	< 0.20	< 0.20	NC
	1,3-Dichlorobenzene	< 0.20	< 0.20	NC
	1,4-Dichlorobenzene	< 0.20	< 0.20	NC
	1-Methylnaphthalene	< 0.20	< 0.20	NC
	2,4,5-Trichlorophenol	< 0.20	< 0.20	NC
	2,4,6-Trichlorophenol	< 0.20	< 0.20	NC
	2,4-Dichlorophenol	< 0.40	< 0.40	NC
	2,4-Dimethylphenol	< 0.30	< 0.30	NC
	2,4-Dinitrophenol	< 0.40	< 0.40	NC
	2,4-Dinitrotoluene	< 0.49	< 0.50	NC
	2,6-Dinitrotoluene	< 0.49	< 0.50	NC
	2-Chloronaphthalene	< 0.25	< 0.25	NC
	2-Chlorophenol	< 0.20	< 0.20	NC
	2-Methylnaphthalene	< 0.20	< 0.20	NC
	2-Methylphenol	< 0.49	< 0.50	NC
	2-Nitroaniline	< 0.20	< 0.20	NC
	2-Nitrophenol	< 0.20	< 0.20	NC
	3,3'-Dichlorobenzidine	< 0.25	< 0.25	NC
	3+4-Methylphenol	< 0.20	< 0.20	NC
	3-Nitroaniline	< 0.20	< 0.20	NC
	4,6-Dinitro-2-methylphenol	< 0.49	< 0.50	NC
	4-Bromophenyl phenyl ether	< 0.20	< 0.20	NC
	4-Chloro-3-methylphenol	< 0.49	< 0.50	NC
	4-Chloroaniline	< 0.49	< 0.50	NC
	4-Chlorophenyl phenyl ether	< 0.20	< 0.20	NC
	4-Nitroaniline	< 0.40	< 0.40	NC
	4-Nitrophenol	< 0.25	< 0.25	NC
	Acenaphthene	< 0.20	< 0.20	NC
	Acenaphthylene	< 0.20	< 0.20	NC
	Aniline	< 0.20	< 0.20	NC
	Anthracene	< 0.20	< 0.20	NC
	Azobenzene	< 0.20	< 0.20	NC
	Benz(a)anthracene	< 0.20	< 0.20	NC
	Benzo(a)pyrene	< 0.20	< 0.20	NC
	Benzo(b)fluoranthene	< 0.20	< 0.20	NC
	Benzo(g,h,i)perylene	< 0.20	< 0.20	NC
	Benzo(k)fluoranthene	< 0.20	< 0.20	NC
	Benzoic acid	< 0.49	< 0.50	NC
	Benzyl alcohol	< 0.20	< 0.20	NC
	Bis(2-chloroethoxy)methane	< 0.20	< 0.20	NC
	Bis(2-chloroethyl)ether	< 0.20	< 0.20	NC
	Bis(2-chloroisopropyl)ether	< 0.20	< 0.20	NC
	Bis(2-ethylhexyl)phthalate	< 0.49	< 0.50	NC
	Butyl benzyl phthalate	< 0.20	< 0.20	NC
	Carbazole	< 0.20	< 0.20	NC
	Chrysene	< 0.20	< 0.20	NC
	Dibenz(a,h)anthracene	< 0.20	< 0.20	NC
	Dibenzofuran	< 0.20	< 0.20	NC
	Diethyl phthalate	< 0.20	< 0.20	NC
	Dimethyl phthalate	< 0.20	< 0.20	NC
	Di-n-butyl phthalate	< 0.49	< 0.50	NC
	Di-n-octyl phthalate	< 0.25	< 0.25	NC
	Fluoranthene	< 0.20	< 0.20	NC
	Fluorene	< 0.20	< 0.20	NC
	Hexachlorobenzene	< 0.20	< 0.20	NC
	Hexachlorobutadiene	< 0.20	< 0.20	NC
	Hexachlorocyclopentadiene	< 0.20	< 0.20	NC
	Hexachloroethane	< 0.20	< 0.20	NC
	Indeno(1,2,3-cd)pyrene	< 0.20	< 0.20	NC
	Isophorone	< 0.49	< 0.50	NC
	Naphthalene	< 0.20	< 0.20	NC
	Nitrobenzene	< 0.49	< 0.50	NC
	N-Nitrosodi-n-propylamine	< 0.20	< 0.20	NC
	N-Nitrosodiphenylamine	< 0.20	< 0.20	NC
	Pentachlorophenol	< 0.40	< 0.40	NC
	Phenanthrene	< 0.20	< 0.20	NC
	Phenol	< 0.20	< 0.20	NC
	Pyrene	< 0.20	< 0.20	NC
	Pyridine	< 0.49	< 0.50	NC

Table A-3
Field Duplicate Summary
Group 8 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	SWMU 3-7 (0-2') Sample Result	SWMU 3-7 (0-2') Dup Field Duplicate	RPD (%)
Metals (mg/kg-dry):	Antimony	< 2.5	< 2.5	NC
	Arsenic	< 2.5	< 2.5	NC
	Barium	130	120	8.0
	Beryllium	0.33	0.35	NC
	Cadmium	< 0.10	< 0.10	NC
	Chromium	4.7	4.7	0
	Cobalt	2.7	2.9	7.1
	Cyanide	< 0.30	< 0.30	NC
	Lead	2.5	2.4	4.1
	Mercury	< 0.033	< 0.033	NC
	Nickel	3.9	4.0	2.5
	Selenium	< 2.5	< 2.5	NC
	Silver	< 0.25	< 0.50	NC
	Vanadium	14	15	7
	Zinc	17	17	0

Notes:
RPD = Relative percent difference; [(difference)/(average)]* 100
NC = Not calculated; RPD values were not calculated for non-detects
ug/kg-dry = micrograms per kilogram dry
mg/kg-dry = milligrams per kilogram
* = Field Duplicate RPD Outlier

TABLE A-4
Completeness Summaries

Tab. 4

Completeness Summary - Soil
Group 8 Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	Total Number of Results	Number of Contractual Compliance	Percent Contractural Compliance	Number of Usable Results	Percent Technical Compliance
TPH (mg/kg-dry):	Diesel Range Organics (DRO)	64	64	100	64	100
	Motor Oil Range Organics (MRO)	64	64	100	64	100
	Gasoline Range Organics (GRO)	64	63 [b]	98.4	64	100
VOCs (ug/kg-dry)	All VOC Analytes	64	64	100	64	100
SVOCs (mg/kg-dry):	All SVOC Analytes	64	64	100	64	100
Metals (mg/kg-dry):	Antimony	64	59 [a]	92.2	64	100
	Chromium	64	63 [a]	98.4	64	100
	Cobalt	64	63 [a]	98.4	64	100
	Lead	64	63 [a]	98.4	64	100
	Nickel	64	63 [a]	98.4	64	100
	Selenium	64	63 [a]	98.4	64	100
	Zinc	64	63 [a]	98.4	64	100
	All remaining metals	64	64	100.0	64	100

Notes:
Number of samples used in completeness calculations includes field duplicates but does not include equipment rinsate, field, or trip blanks.
Percent Contractural Compliance = (number of contract compliant results / Number of reported results)*100
Percent Technial Compliance = (Number of usable results / Number of reported results) * 100
a = Qualified due to low MS/MSD recovery
b = Qualified due to high surrogate recoveries

Western Refining
LOGISTICS

WNR LISTED NYSE

July 5, 2012

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

UPS Mail #: 1Z 881 839 24 5495 0702 (NMED)
Certified Mail #: 7010 3090 0001 3450 2876 (OCD)

Re: Background Concentrations Investigation Report
Western Refining Southwest, Inc., Bloomfield Refinery
EPA ID# NMD089416416

Dear Mr. Kieling:

Western Refining Southwest Inc., Bloomfield Refinery submits the referenced Investigation Report pursuant to Section IV.B.7 of the July 2007 HWB Order. This Investigation Report includes a summary of the background investigation activities completed as of June 2012, and a statistical evaluation of the background soil analytical results. Background groundwater results for the first sampling event are presented in this report. However, a statistical evaluation of the background groundwater will be submitted once sufficient data is collected.

If you have any questions or would like to discuss the Investigation Report, please contact me at (505) 632-4171.

Sincerely,

P.P. Kelly Roberson for,

James R. Schmaltz
Health, Safety, Environmental, and Regulatory Director
Western Refining Southwest, Inc.
Bloomfield Refinery.

cc: Dave Cobrain – NMED HWB
Leona Tsinnajinnie – NMED HWB
Carl Chavez – NMOCD
Allen Hains – Western Refining El Paso
Scott Crouch – RPS Austin

RPS

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INVESTIGATION REPORT
BACKGROUND CONCENTRATIONS

Bloomfield Refinery
Western Refining Southwest, Inc.
#50 Rd 4990
Bloomfield, New Mexico 87413

July 2012

James R. Schmaltz
Health, Safety, Environmental, and Regulatory Director
Western Refining Southwest, Inc.
Bloomfield Refinery

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List of Acronyms

American Petroleum Institute (API)
areas of concern (AOCs)
benzene, toluene, ethylbenzene, and xylene (BTEX)
below ground surface (bgs)
Code of Federal Regulations (CFR)
Environmental Protection Agency (EPA)
global positioning system (GPS)
hollow-stem auguring (HSA)
investigation derived waste (IDW)
liquefied petroleum gas (LPG).
maximum contaminant level (MCL)
monitoring well (MW)
New Mexico Administrative Code (NMAC)
New Mexico Environment Department (NMED)
Resource Conservation and Recovery Act (RCRA)
overburden drilling with excentric drilling (ODEX)
photoionization detector (PID)
polyvinyl chloride (PVC)
recovery well (RW)
separate phase hydrocarbon (SPH)
Solid Waste Management Units (SWMUs)
total petroleum hydrocarbon (TPH)
unified soil classification system (USCS)
United States Department of Agriculture (USDA)
volatile organic constituent (VOC)
upper tolerance limit (UTL)
Water Quality Control Commission (WQCC)
Western Regional Climate Center (WRCC)

Executive Summary

The Bloomfield Refinery, which is located in the Four Corners Area of New Mexico, has been in operation since the late 1950s. Past inspections by State and federal environmental inspectors have identified locations where releases to the environment may have occurred. These locations are generally referred to as Solid Waste Management Units (SWMUs) or Areas of Concern (AOCs).

Pursuant to the terms and conditions of an Order issued on July 27, 2007 by the New Mexico Environment Department (NMED) to San Juan Refining Company and Giant Industries Arizona, Inc. for the Bloomfield Refinery, this environmental site investigation was completed to support development of site-specific background concentrations for inorganic constituents.

The investigation activities included collection and analysis of soil and groundwater samples for inorganic constituents beginning on January 24, 2012 and continuing through June 14, 2012. This included the completion of eight shallow soil borings and two deep soil borings, which were completed as permanent background monitoring wells. Twenty soil samples and two groundwater samples (excluding additional quality assurance samples) were collected for analysis of inorganic constituents. One soil sample was analyzed for organic constituents to confirm the selected background locations were not in areas with historical impacts.

Constituents were detected at sufficient concentrations and frequencies in soil to support development of site-specific background concentrations based on the 95% upper tolerance limit (UTL) for aluminum, arsenic, barium, beryllium, boron, chromium, cobalt, copper, fluoride, iron, lead, manganese, nickel, vanadium, and zinc. Either all or the vast majority of soil samples analyzed for antimony, cadmium, chloride, cyanide, selenium, silver, thallium, and uranium did not contain these constituents at concentrations above the detection limit and thus background concentrations were not developed for these constituents. Mercury and molybdenum were detected in most samples but at concentrations below the quantitation limit, thus only summary statistics (e.g., mean, median, etc.) were calculated for these constituents. Only summary statistics are presented for sulfate because the analytical results are highly varied with many low estimated concentrations reported while other results are very high and outside the laboratory calibration range.

Groundwater results for the first sampling event are presented, but no statistical evaluation is possible at this time. After a sufficient number of samples have been collected, the results will be evaluated pursuant to Section VIII.H. of the Order.

Section 1
Introduction

The Bloomfield Refinery is located immediately south of Bloomfield, New Mexico in San Juan County (Figure 1). The physical address is #50 County Road 4990, Bloomfield, New Mexico 87413. The Bloomfield Refinery is located on approximately 263 acres. Bordering the facility is a combination of federal and private properties. Public property managed by the Bureau of Land Management lies to the south. The majority of undeveloped land in the vicinity of the facility is used extensively for oil and gas production and, in some instances, grazing. U.S. Highway 4990 is located approximately one-half mile west of the facility. The topography of the main portion of the site is generally flat with steep bluffs to the north where the San Juan River intersects Tertiary terrace deposits.

The Bloomfield Refinery is currently owned by San Juan Refining Company, a New Mexico corporation, and operated by Western Refining Southwest, Inc. formerly known as Giant Industries Arizona, Inc., an Arizona corporation. The Bloomfield Refinery had an approximate refining capacity of 18,000 barrels per day. Various process units operated at the facility, included crude distillation, reforming, fluidized catalytic cracking, sulfur recovery, merox treater, catalytic polymerization, and diesel hydrotreating. Products produced at the refinery included gasoline, diesel fuels, jet fuels, kerosene, propane, butane, naphtha, residual fuel, fuel oils, and liquefied petroleum gas (LPG).

On July 27, 2007, the New Mexico Environment Department (NMED) issued an Order to San Juan Refining Company and Giant Industries Arizona, Inc. ("Western") requiring investigation and corrective action at the Bloomfield Refinery. The purpose of this background investigation is to establish site-specific background concentrations for inorganic constituents that are naturally occurring in soils and groundwater. This Investigation Report has been prepared to describe the sample collection and analyses methods that were used to support development of site-specific background concentrations pursuant to Section VIII.H. of the Order. The evaluation of the analytical data, which has been completed in accordance with the Order, is presented, including the calculation of UTLs where appropriate.

Section 2
Background

This section presents background information for the areas chosen from which to collect background samples, including a review of historical waste management activities.

2.1 Soil Sample Locations

The area targeted for collection of soil samples to establish background concentrations is located on the far southeastern portion of the refinery property so as to avoid any potential for current or historical impacts from refinery operations. The selected area is located south of the Regional Transportation office, which is located south the County Road 4990 and east of Wooten Road. (Figure 2). There is no current commercial or industrial activity in this area and no historical commercial or industrial activities are known to have occurred in this area. The proposed sample collection area is located on a separate tract of land owned by Western, just south of the Refinery property.

2.2 Groundwater Sample Locations

The areas targeted for collection of groundwater samples to establish background concentrations are located at the far eastern portion of the refinery property and south of the refinery property on a separate tract of land owned by San Juan Refining Company. This separate tract covers approximately 32.4 acres and is located approximately 200 feet south of the southernmost evaporation pond (Figure 3). These areas were selected because they are anticipated to be up-gradient of the refinery operations and as such groundwater samples collected from these areas will not be affected by any current or historical refinery operations. There is no current commercial or industrial activity in this area and no known historical commercial or industrial activities are known to have occurred in these areas with the exception of a single natural gas well. The southernmost location for a background monitoring well is approximately 700 feet southwest of the gas well, which should place the monitoring well beyond any potential impacts from operations near the gas well.

2.3 Site Conditions

The conditions at the site, including surface and subsurface conditions that could affect the fate and transport of any contaminants, are discussed below. This information is based on recent visual observations and historical subsurface investigations.

2.3.1 Surface Conditions

Regionally, the surface topography slopes toward the floodplain of the San Juan River, which runs along the northern boundary of the refinery complex. To the south of the refinery, the drainage is generally to the northwest. North of the refinery complex, across the San Juan River, surface water flows in a southeasterly direction toward the San Juan River. The active portion of the refinery property, where the process units and storage tanks are located, is generally of low relief with an overall northwest gradient of approximately 0.02 ft/ft. The refinery sits on an alluvial floodplain terrace deposit and there is a steep bluff (approx. drop of 90 feet) at the northern boundary of the refinery where the San Juan River intersects the floodplain terrace.

There are two locally significant arroyos, one immediately east and another immediately west of the refinery, which collect most of the surface water flows in the area, thus significantly reducing surface water flows across the refinery and background soil sample collection area. A minor drainage feature is located on the eastern portion of the refinery, where the Landfill Pond (SWMU No. 9) was located and there are several steep arroyos along the northern refinery boundary that primarily capture only local surface water flows and minor groundwater discharges. The southernmost proposed location for a background monitoring well is situated along a northwest/southeast trending topographic high, which is higher in elevation than any of the other refinery property. Moving off this topographic high toward the refinery, the slope is predominantly to the northeast where surface runoff would feed the arroyo than runs along the eastern portion of the refinery property. The proposed location for the background monitoring well to the east is near an arroyo that runs along the eastern portion of the refinery property. The land surface at the proposed location for collection of background soil samples slopes north/northeast and feeds into the larger arroyo that runs along the east portion of the refinery property.

The land surface is characterized by sparse shrubby vegetation, which is adapted to the arid conditions. Bare soil is exposed in many areas, consisting of a loam in the upper five inches and a clay loam to a depth of 60 inches (USDA, 2010).

The prevailing wind direction for the area is from the east as measured at the nearby Farmington, New Mexico airport (WRCC, 2011). The Farmington airport is located approximately 17 miles west of the refinery and both locations are along the east-west trending San Juan River Valley. The soil sample collection locations discussed in Sections 3.1 and 4.1

are located southeast of the refinery process area and thus are in a generally upwind location from potential on-site air emission sources.

2.3.2 Subsurface Conditions

Numerous soil borings and monitoring wells have been completed across the refinery property during previous site investigations and installation of the slurry wall, which runs along the northern and western refinery boundary. Based on the available site-specific and regional subsurface information, the site is underlain by the Quaternary Jackson Lake terrace deposits, which unconformably overlie the Tertiary Nacimiento Formation. The Recent eolian deposits are predominantly silt and fine to medium grained sand that is poorly sorted. The thickness of the eolian deposits has not been determined as the underlying Jackson Lake deposits similarly are composed of silt and fine grained sand and there is no clear demarcation between the two deposits. The Jackson Lake deposits consist of fine grained sand, silt and clay that grades to coarse sand, gravel and cobble size material closer to the contact with the Nacimiento Formation. The Jackson Lake Formation is over 40 feet thick near the southeast portion of the refinery operations area and generally thins to the northwest toward the San Juan River. In the locations of background wells, which are on the far eastern margins of the refinery property and on the separate tract to the south, the Jackson Lake deposits are over 70 feet thick. The Nacimiento Formation is primarily composed of fine grained materials (e.g., carbonaceous mudstone/claystone with interbedded sandstones) with a reported local thickness of approximately 570 feet (Groundwater Technology Inc., 1994).

A review of the vadose zone materials as examined in the numerous soil borings located across the refinery property indicates a similar lithology (e.g., color, mineralogical composition, and grain size) above the horizon within the Jackson Lake Formation where there is a marked increase in grain size with the introduction of gravel and cobble sized material. The vadose zone above the gravel and cobble is composed predominantly of silt and fine to medium grained sand with minor portions of clay sized material. Across the site, there are minor variations in the percentages of the various sized fractions but it is commonly a difficult field judgment whether to classify a particular sample as sandy silt or silty sand, with some minor portion of clay present in most samples. The sand and silt sized grains are predominantly composed of quartz.

Within the deeper interval that includes the gravel and cobble sized material, the matrix is similar to the finer grained material discussed above. While the gravel and cobble materials are composed of both quartz and igneous rocks of various compositions, the finer grained matrix

material will have the dominant influence on contaminant fate and transport through this interval. Also, the finer grained matrix material would represent the potential exposure medium in this deeper interval and not the gravel and cobble sized fraction, thus any evaluation of background constituent concentrations should be performed on the finer grained matrix material.

A review of the soil survey information (see Appendix A) also shows similar lithology within the upper five feet (USDA, 2010). The Doak soil map unit is described as a loam from 0 – 5" and a clay loam from 5 – 60". The Avalon soil map unit is described as a loam from 0 – 60" and a gravelly loam from 60 – 64". As shown on the soil survey map included in Appendix A, the same soil map unit (Doak-Avalon association) occurs across most of the refinery complex (USDA, 2010). The area from which the background samples were collected is within this same soil association (i.e., DN). Based on the actual soils samples observed in the soil borings completed the areas represented by the Doak-Avalon association (DN) and Haplargids-Blackston-Torriorthents complex (HA), there are not sufficient differences to denote distinct lithologic units in the vadose zone in these areas and the background soil samples collected from the "DN" area should also be representative of the areas shown on page 8 of Appendix A as HA. The two sample depths as discussed in Section 4.1 were selected based on the chemical soil properties reported in Appendix A, which show a slight variation with depth for the Doak-Avalon association soils. The slight difference appears to be related to leaching of soluble constituents (e.g., calcium carbonate) from the surface soils (e.g., 0-6") and precipitation in deeper intervals (e.g., 18-24").

Figures 4 and 5 present cross-sections of the shallow subsurface based on borings logs from on-site monitoring well completions with the addition of the new background wells. The uppermost aquifer is under water table conditions and occurs within the sand and gravel deposits of the Jackson Lake Formation. The Nacimiento Formation functions as an aquitard at the site and prevents site related contaminants from migrating to deeper aquifers. The potentiometric surface as measured in April 2012 is presented as Figure 6 and shows the groundwater predominantly flowing to the northwest. The saturated thickness of the shallow aquifer within the Jackson Lake Formation is greatest near and along the Hammond Irrigation Ditch and other potential sources of recharge (e.g., the raw water ponds), and decreases to the southeast in the up-gradient portions of the refinery property.

Previous site investigations have identified and delineated on-site impacts to groundwater from historical site operations, which are down-gradient of the locations selected for the two new

background monitoring wells. Figure 7 shows the distribution of SPH in the subsurface based on the apparent thickness of SPH measured in on-site monitoring wells. Dissolved-phase impacts are depicted on Figure 8.

Section 3
Scope of Activities

3.1 Soil Boring, Monitoring Well Installation and Sample Collection

Pursuant to Section VIII. H. of the Order, an investigation of soils and groundwater was conducted to determine the concentration of naturally occurring constituents (i.e., background concentrations). To accomplish this objective, soil borings and monitoring wells were installed at areas that have not been affected by on-site operations or any other commercial/industrial operations (Figures 2 and 3).

Eight two-foot soil borings (BK-1 through BK-8) were completed with samples collected from depths of 0-0.5' and 1.5-2.0' (Figure 9). In addition, soil samples were collected from depths of five feet below ground surface (bgs) and at the top of saturation in the two soil borings (BK-9 and BK-10) drilled for the background monitoring wells to verify the monitoring wells were drilled at locations without evidence of historical impacts (Figure 3). The soil samples were all analyzed for inorganic constituents and the 5-5.5' sample collected at BK-9 was also analyzed for total petroleum hydrocarbons (TPH). The other soil samples collected at the background monitoring well locations [i.e., BCK-9 (54-56'), BCK-10 (5-6'), and BCK-10 (40-42')] were inadvertently not analyzed for TPH and this is the only instance of a deviation from the approved Investigation Work Plan.

Soil borings BCK-9 and BCK-10, located south and east of the refinery, were completed as background monitoring wells. Groundwater samples were collected and analyzed for inorganic constituents, which may be naturally occurring.

3.2 Background Information Research

Documents containing the results of previous investigations and subsequent routine groundwater monitoring data from monitoring wells were reviewed to facilitate development of the Background Concentrations Investigation Work Plan (Western, 2010). The previously collected data provides valuable information on the overall subsurface conditions, including hydrogeology and contaminant distribution within groundwater.

3.3 Collection and Management of Investigation Derived Waste

Drill cuttings, excess sample material and decontamination fluids, and all other investigation derived waste (IDW) associated with soil borings and monitoring wells were contained and characterized. Because the soils were all collected from within areas that were purposely selected to not have any impacts, the characterization is based on the actual soil sample analyses.

The sample analyses for the background soil samples indicate that the samples were collected from locations without any historical environmental impacts and thus the soils are "clean" and suitable to reuse on-site. All purged groundwater and decontamination water (approximately 17 gallons) was disposed in the refinery wastewater treatment system upstream of the American Petroleum Institute (API) Separator.

3.4 Surveys

Known site features and/or site survey grid markers were used as references to locate each boring as part of the field documentation prior to surveying the location. The boring locations were measured to the nearest foot and locations were placed on a scaled map. In addition, a hand held global positioning system (GPS) receiver was used to record the coordinates of each soil boring. These coordinates were recorded on the field boring logs. The soil boring locations were subsequently surveyed by a registered surveyor.

The horizontal coordinates and elevation of each boring, the top of each monitoring well casing (north side), and the ground surface at each monitoring well location; and the locations of all other pertinent structures were determined by a registered New Mexico professional land surveyor in accordance with the State Plane Coordinate System (NMSA 1978 47-1-49-56 (Repl. Pamp. 1993)). The surveys were conducted 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. Horizontal positions were measured to the nearest 0.1-ft, and vertical elevations were measured to the nearest 0.01-ft. The survey data is included in Appendix B.

Section 4
Field Investigation Results

This section provides a summary the installation of soil borings, field screening of soils, and collection of soil samples for analysis. This is followed by a description of the installation of permanent monitoring wells, collection of groundwater samples, and a description of groundwater conditions.

4.1 Exploratory Drilling Investigations, Soil Sampling and Boring Abandonment

This subsection provides a description of background soil investigation. This includes soil field screening results, soil sampling intervals and methods for collection of soil samples in background sampling locations.

The shallow two-foot soil borings were completed with a hand auger. The two deep soil borings were drilled using the hollow-stem auguring (HSA) method and it was necessary to switch to the overburden drilling-excentric drilling (ODEX) drilling method to complete MW-BCK1. The drilling equipment was decontaminated between each borehole, as described in Appendix C.

Discrete soil samples were collected for laboratory analyses at the following intervals:

- 0-0.5' (all two-foot borings);
- 1.5-2' (all two-foot borings);
- From five feet bgs (the two deep borings);
- A discrete lithologic interval (BK-9 54-56'); and
- The interval just above saturation (the two deep borings).

The installation of soil borings and collection of soil samples is discussed below in numerical order. A description of the field screening and soil sampling procedures are presented in Appendix C – Field Methods. Copies of the boring logs are provided in Appendix D. In addition to being included on the soil boring logs, the soil vapor (i.e., headspace) screening results are summarized in Table 1. The locations of the soil borings appear on Figures 3 and 9.

<u>BCK-1</u>

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 - 0.5' and 1.5 – 2 feet. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The lithology is described as silt, some minor

very fine sand, loose to compact. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

BCK-2

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 - 0.5' and 1.5 – 2 feet. The lithology is described as silt, some minor very fine sand, loose to compact. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

BCK-3

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 - 0.5' and 1.5 – 2 feet. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The lithology is described as silt, some minor very fine sand, loose to compact. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

BCK-4

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 - 0.5' and 1.5 – 2 feet. The lithology is described as clayey silt from 0-0.5' that grades to silt, with some minor very fine sand, loose to compact below 0.5 feet. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

BCK-5

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 - 0.5' and 1.5 – 2 feet. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The lithology is described as silt, some minor very fine sand, loose. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

BCK-6

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 - 0.5' and 1.5 – 2 feet. The lithology is described as silt, some minor very fine sand, loose. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

BCK-7

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 - 0.5' and 1.5 – 2 feet. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The lithology is described as silt, some minor very fine sand, loose. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

BCK-8

On January 27, 2012, a hand auger was used to complete a soil boring to a depth of two feet bgs. Soil samples were collected from 0 - 0.5' and 1.5 – 2 feet. The lithology is described as silt, some minor very fine sand, loose. There were no indications of impacts based on the field screening results nor was there any visual or olfactory evidence of impacts from the surface to a depth of 2 feet bgs. The borehole was backfilled to the surface on January 27, 2012 using bentonite chips.

BCK-9

On January 24, 2012 the drilling rig was set up on location BCK-9 and drilled to a depth of 59 feet using hollow stem augers. A soil sample was collected using split-spoon samplers at a pre-determined depth of 5-5.5 feet. A second sample was collected from a depth of 54-56 feet as the sample representative of the zone just above saturation. This interval was at the top of a damp clay. Drilling stopped for the day at a depth of 70.5 feet. On January 25th drilling continued to a depth of 72 feet where drilling conditions became difficult and it was determined that the rig would be required to switch over to air rotary/ODEX. On January 31st, ODEX casing was ran to 70 feet. On February 1, 2012, the drilling resumed using air rotary/ODEX. The

borehole was drilled to the termination depth of 79 feet, where it was completed as a permanent monitoring well; as discussed below in Section 4.2.

No odors were observed and no elevated readings with a photoionization detector (PID) were recorded throughout the entire boring. The lithology near the land surface was recorded as silty very fine grained sand, which continued to a depth of six feet, where a fine sand was encountered from six to seven feet. A one foot interval of sandy clay extended from seven to eight feet. Fine sand was encountered from eight to 27.75 feet bgs. A silty clay layer was logged from 27.75 feet to 30 feet bgs, where it graded to a clayey silt. The clayey silt extended from 30 feet to 34 feet and then graded to a silty sand that continued until 54 feet bgs. A stiff clay was logged from 54 feet to 59 feet bgs, with gravel in the sample from 58 to 59 feet. The gravel interval continued from 59 feet to 73.5 where a clay/shale was encountered that continued to the termination depth of 79 feet. The top of the Nacimiento Formation was logged at 73.5 feet bgs. The interval just above the top of the Nacimiento Formation (73-73.5') was described as moist to saturated.

BCK-10

On February 7, 2012 the drilling rig was set up on location BCK-10 and drilled to a depth of 42 feet using hollow stem augers before there was a mechanical failure on the rig. The rig was repaired and drilling resumed the next day. Drilling continued to a depth of 45 feet where the boring was temporarily halted to determine if water was present at this depth. No groundwater was measured at the bottom of the boring and drilling resumed on February 13, 2012. The drilling continued to a depth of 60 feet, where the boring was completed as a permanent monitoring well, as discussed below in Section 4.2.

No odors were observed and no elevated readings with a PID were recorded throughout the entire boring. The lithology near the land surface was recorded as silt with very fine grained sand, which continued to a depth of six feet, where a sandy gravel was encountered from six to ten feet. A soil sample was collected from a pre-determined depth of 5-6'. No sample was recovered for the depth interval of ten to 12 feet. A silty sandy clay was logged from 12 to 14 feet, which graded to a silty clay that extended to 18 feet. A four foot thick clayey silt was present from 18 to 22 and then graded back to a silty clay that continued to 26 feet. A compact/cemented silty sand was logged from 26 feet to 32 feet. Clayey silt extended from 32 feet to 42 feet, where the sand content increased and water appeared to be present. A soil

sample was collected from a depth of 40-42 feet as the depth interval representative of the zone just above saturation. The clayey silt/sand continued to a depth of 45 feet and then graded to a silty sand, which continued to the termination depth of 60 feet. No distinct zone of saturation was logged in the well during drilling; however, the outside of the core from the 42-44' interval appeared to be wet. The Nacimiento Formation was not encountered before reaching the termination depth of 60 feet.

4.2 Monitoring Well Construction and Groundwater Sampling

This section describes the methods and details of monitoring well construction and the collection of groundwater samples. The description includes the dates of well construction. The wells and groundwater samples are discussed in numerical order of the associated soil borings. Copies of the boring and well construction logs are provided in Appendix D. The well development and purging procedures and groundwater sample collection procedures are discussed in Appendix C. The locations of the monitoring wells and borings from which groundwater samples were collected appear on Figure 3.

MW-BCK1 (BK-9)

On January 24, 2012 the drilling rig was set up on location BCK-9 and drilled to a depth of 59 feet using hollow stem augers. Drilling stopped for the day at a depth of 70.5 feet. On January 25th drilling continued to a depth of 72 feet where drilling conditions became difficult and it was determined that the rig would be required to switched over to air rotary/ODEX. On January 31st, ODEX casing was ran to 70 feet. On February 1, 2012, the drilling resumed using air rotary/ODEX. The borehole was drilled to the termination depth of 79 feet, where it was completed as a permanent monitoring well. There were no indications of any impacts throughout the depth of the boring and no distinct zones of saturation were observed. As shown on the well construction log for MW-BCK1, the Nacimiento Formation was encountered at 73.5 feet bgs and consists of very dense clay/shale.

In order to accommodate the screen placement the borehole was advanced to a depth of 79 feet bgs. On February 1, 2012, slotted (0.01 inch) 2-inch rigid PVC well screen was placed near the bottom of the boring and extended for 15 feet (75 to 60 feet) to ensure that the well would be open to any saturated intervals above the Nacimiento. The 10/20 sand filter pack was installed to 58 feet bgs. As the sand was installed in the well bore the ODEX casing was removed. Approximately five feet of bentonite was placed over the filter pack and hydrated. On February

2, 2012 an annular grout was installed to within two feet of the ground surface and allowed to cure for a minimum of 24 hours. On February 7, 2012, the surface pad and protective aluminum cover were installed. The surface completion consists of stickup completion, which includes a protective aluminum enclosure with cap that was secured in a concrete pad measuring 4-feet by 4-feet wide by 6-inches thick. The concrete pad was wire reinforced. The aluminum protective casing extended 4 feet above the top surface of the concrete pad.

Four-inch diameter steel bollards were installed 6 inches from each corner of the concrete pad. The bollards were installed two feet below grade and extended three feet above grade. The bollards were installed vertically level and extend the same height. The holes for the bollards were dug by hand with the diameter of the borehole measured a minimum of 6-inches. Each bollard was cemented into the ground with the cement extending from the bottom of the hole to the surface. The bollard was filled with cement. Each bollard was pretreated to remove rust, primed, and painted with two coats of safety-yellow paint.

Groundwater samples were collected at MW-BCK1 on June 14, 2012. The water samples were collected following the procedures discussed in Appendix C.

MW-BCK2 (BCK-10)

On February 7, 2012 the drilling rig was set up on location BCK-10 and drilled to a depth of 42 feet using hollow stem augers before there was a mechanical failure on the rig. The rig was repaired and drilling resumed the next day. Drilling continued to a depth of 45 feet where the boring was temporarily halt to determine if water was present at this depth. No groundwater was measured at the bottom of the boring and drilling resumed on February 13, 2012. The drilling continued to a depth of 60 feet, where the boring was completed as a permanent monitoring well. The Nacimiento Formation was not encountered at the termination depth of 60 feet and no obvious zones of saturation were observed.

On February 13, 2012, a two-inch diameter, slotted (0.01 inch) rigid PVC well screen was placed at the bottom of the well and extended for 20 feet (60 to 40 feet) to help ensure that any possible zones of saturation would be in communication with the well. Rigid Schedule 40 PVC with threads was utilized for the well casing. A 8-inch sand bed was placed at the bottom of the well bore. The 10/20 sand filter pack was installed to three feet over the top of the well screen. As the sand was installed in the well bore the hollow stem augers were removed. Two feet of bentonite was placed over the filter pack and hydrated. On February 14, 2012 an annular grout

was installed to within two feet of the ground surface and allowed to cure for a minimum of 24 hours. Subsequently, the surface pad and protective aluminum cover were installed. The surface completion consists of stickup completion, which includes a protective aluminum enclosure with cap that was secured in a concrete pad measuring 4-feet by 4-feet wide by 6-inches thick. The concrete pad was wire reinforced. The aluminum protective casing extended 4 feet above the top surface of the concrete pad.

Four-inch diameter steel bollards were installed 6 inches from each corner of the concrete pad. The bollards were installed two feet below grade and extended three feet above grade. The bollards were installed vertically level and extend the same height. The holes for the bollards were dug by hand with the diameter of the borehole measured a minimum of 6-inches. Each bollard was cemented into the ground with the cement extending from the bottom of the hole to the surface. The bollard was filled with cement. Each bollard was pretreated to remove rust, primed, and painted with two coats of safety-yellow paint.

Groundwater samples were collected at MW-BCK2 on June 14, 2012. The well was first purged and the water samples collected following the procedures discussed in Appendix C.

4.3 Groundwater Conditions

The uppermost aquifer is under water table conditions and occurs within the sand and gravel deposits of the Jackson Lake Formation. The Nacimiento Formation functions as an aquitard at the site and prevents site related contaminants from migrating to deeper aquifers. The potentiometric surface as measured in April 2012 is presented in Figure 6 and shows the groundwater predominantly flowing to the northwest. The potentiometric surface at the site is consistent with the regional gradient in that movement is toward to the San Juan River, which is a location of regional groundwater discharge. The installation of the slurry wall and collection wells/French drain along the western and northern boundary of the refinery controls the flow of groundwater in this area.

The depth to water measured in the area of the new background monitoring wells varies from approximately 77 feet near MW-BCK1 to 26 feet at MW-BCK2 (Table 2). There is also a significant difference between the top of casing elevations at the two locations (Table 2). The saturated thickness in the water table aquifer as measured in on-site wells varies from zero feet in the southern and eastern portions of the refinery to a maximum of approximately eight feet along the northern portion of the refinery. The saturated thickness in the new background wells is

estimated to be only one foot or less at MW-BCK1. The saturated thickness at MW-BCK2, where the top of Nacimiento Formation does not appear to have been encountered, is over 30 feet based on fluid level measurements. However, during the drilling of MW-BCK2 there was no indication of saturation in any of the sediments encountered and it is unlikely there is water movement throughout this 30 foot plus "saturated" interval. When purging water from MW-BCK2 for sample collection, water recovered very slowly to the well, which is not indicative of a fully saturated 30 foot plus interval.

Section 5
Background Analytical Results and Summary Statistics

The analytical results for the background soil and the initial round of background groundwater samples are discussed below. Pursuant to Section VIII.H of the Order the following summary statistics have been determined for each constituent for soils:

1. Number of detects;
2. Total number of samples;
3. Frequency of detection;
4. Minimum detected concentration;
5. Maximum detected concentration;
6. Minimum sample quantitation limit (SQL);
7. Maximum SQL;
8. Arithmetic mean;
9. Median;
10. Standard deviation; and
11. Coefficient of variation.

5.1 Soil Background Concentrations

As discussed above in Section 4.1, 16 soil samples were collected from the upper two feet and two additional samples were collected from a depth of five feet. A review of the soil boring information in Section 4.1 indicates that all of these soil samples are of similar lithology and that the analytical results can be evaluated together as a single population for purposes of establishing background concentrations for near surface soils at the Bloomfield Refinery. The three deeper soil samples collected from borings BK-9 and BK-10, which were completed to facilitate installation of monitoring wells, appear to have different lithologies with a stiff clay present in BK-9 (54-56') and a clayey silt present in BK-10 (40-42'). The three deeper soil samples are not included the "background" data set discussed below. The analytical results are included in Table 3.

The soil samples were analyzed for the constituents listed below using the specified analytical methods.

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020

Analyte	Analytical Method
Beryllium	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Cyanide	SW-846 method 335.4/335.2 mod
Iron	SW-846 method 6010/6020
Lead	SW-846 method 6010/6020
Manganese	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Molybdenum	SW-846 method 6010/6020
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Thallium	SW846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Zinc	SW-846 method 6010/6020
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300

In addition to the constituents list above, sample BK-9 (5-5.5') was analyzed for TPH by SW-846 method 8015. The results for all three fractions (gasoline range, diesel range, and motor oil range) were non-detect, indicating a lack of petroleum hydrocarbon impacts to soils in the vicinity of background monitoring well MW-BCK1.

The inorganic analytical results are summarized in Table 3 and the analytical data reports are provided in Appendix E. Data validation is included in Appendix F. The summary statistics as listed above are presented in Table 3, along with the 95% upper tolerance limit (UTL) for aluminum, arsenic, barium, beryllium, boron, chromium, cobalt, copper, fluoride, iron, lead, manganese, nickel, vanadium, and zinc. Arsenic had one result that was non-detect and this result was replaced with a value of ½ the SQL. Fluoride had two results that were non-detect and these two samples were replaced with a value of ½ the SQL prior to evaluation of the summary statistics. This is consistent with EPA's most recent guidance that discusses options

for dealing with non-detect values; if the percentage of non-detect values is no more than 10-15% using ½ of the reporting limit should not affect tolerance limits (EPA, 2009).

Either all or the vast majority of soil samples analyzed for antimony, cadmium, chloride, cyanide, selenium, silver, thallium, and uranium did not contain these constituents at concentrations above the detection limit and thus background concentrations (i.e., 95% UTL) were not developed for these constituents. Mercury and molybdenum were detected in most samples but at concentrations below the quantitation limit ("j-flagged" data), thus only summary statistics (e.g., mean, median, etc.) were calculated for these constituents. The "j-flagged" data indicate the concentration is less than the SQL but above the method detection limit, thus it is reported as an estimated concentration. Only summary statistics are presented for sulfate because the analytical results are highly varied with many low estimated concentrations reported while other results are very high and outside the laboratory calibration range.

Prior to calculation of the 95% UTL, each data set was evaluated using EPA's statistical software program ProUCL Version 4.00.05 to determine if there are any potential outliers and to determine the distribution of the data (e.g., normal vs. lognormal). The check for outliers was performed using graphic methods (e.g., box plots and Q-Q plots) and Dixon's outlier test. An explanation of the Dixon's outlier test performed by the ProUCL software is provided in Appendix G. Barium and boron were the only constituents found to potentially have any outliers and for which outliers were removed. The two upper values of 760 and 480 mg/kg were removed from the data set prior to evaluating the distribution of the data and calculating the 95% UTL for barium. The maximum value of 12 mg/kg was removed from the boron data set as a potential outlier. Box plots and the results of the Dixon's outlier tests are included in Appendix H.

The distribution of the data was checked using histograms and normal probability plots, both of which are presented in Appendix H for each constituent. All of the data subject to a statistical evaluation is normally distributed as shown on the probability plots with the exception of barium and fluoride, which are lognormally distributed.

The 95% UTL (α = .05 & 95% coverage) was calculated using the ProUCL software (version 4.00.05) and the output data sheets for each constituent are included in Appendix H. For normally distributed data sets, an upper (1 – α) % tolerance limit with tolerance or coverage

coefficient = p (that is providing coverage to at least p% proportion of observations) is given by the following equation (EPA, 2010).

UTL = mean + (K x standard deviation)

Here, $K = K(n, \alpha, p)$ is the tolerance factor and depends upon the sample size, n, confidence coefficient = $(1 - \alpha)$, and the coverage proportion = p. The UTL given by the above equation represents a $(1 - \alpha)$% confidence interval for the p^{th} percentile of the underlying normal distributions. The values of the tolerance factor, K, have been tabulated extensively in the various statistical books (e.g., Hahn and Meeker 1991). Those K values are based upon non-central t-distributions. In the ProUCL 4.0 software package, the values of K for samples of sizes ≤ 30, as given in Hahn and Meeker, have been directly programmed. For a 95% confidence coefficient, 95% coverage, and sample sizes of 18, 17, and 16 samples, the values for K are 2.453, 2.486, and 2.524, respectively.

The procedure to compute UTLs for lognormally distributed data sets is similar to that for normally distributed data sets (EPA, 2010). First, the sample mean, $\bar{y}$, and standard deviation (sd), s_y, of the log-transformed data are computed. An upper $(1 - \alpha)$% tolerance limit with tolerance or coverage coefficient = p (that is, providing coverage to at least p% proportion of observations) is given by the following equation.

UTL = $\exp(\bar{y} + K * s_y)$

Note that, just as for the normal distribution, the UTL given by the above equation represents a $(1 - \alpha)$% confidence interval for the p^{th} percentile of the lognormal distribution. The K factor used to compute the lognormal UTL is the same as the one used to compute the normal UTL. The resulting values for the 95% UTL, as calculated with the ProUCL software, are summarized in Table 3.

5.2 Groundwater Background Concentrations

As discussed above in Section 4.2, two groundwater samples were collected from new background monitoring wells MW-BCK1 and MW-BKC2 on June 14, 2012. The groundwater samples were analyzed for the constituents listed below using the specified analytical methods. Metals results analyzed by methods 200.7 and 200.8 are reported for both total and dissolved concentrations.

Analyte	Analytical Method
Aluminum	EPA method 200.7
Antimony	EPA method 200.8
Arsenic	EPA method 200.8
Barium	EPA method 200.7
Beryllium	EPA method 200.7
Boron	EPA method 200.7
Cadmium	EPA method 200.7
Chromium	EPA method 200.7
Cobalt	EPA method 200.7
Copper	EPA method 200.7
Cyanide	SW-846 method 335.4/335.2 mod
Iron	EPA method 200.7
Lead	EPA method 200.8
Manganese	EPA method 200.7
Mercury	EPA method 245.1
Molybdenum	EPA method 200.7
Nickel	EPA method 200.7
Selenium	EPA method 200.8
Silver	EPA method 200.7
Thallium	EPA method 200.8
Vanadium	EPA method 200.7
Uranium	EPA method 200.8
Zinc	EPA method 200.7
Chloride	SW-846 method 300
Sulfate	SW-846 method 300
Fluoride	SW-846 method 300
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B
Calcium	EPA method 200.7
Magnesium	EPA method 200.7
Sodium	EPA method 200.7
Potassium	EPA method 200.7
Nitrate/nitrite	EPA method 300.0

The analytical results are summarized in Table 4. The field measured parameters are presented in Table 5. As this is the first sampling event for background groundwater, no statistical analysis of the data is possible at this time. After a sufficient number of samples have been collected, then the groundwater data will be evaluated pursuant to Section VIII.H. of the Order.

Section 6
References

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Tables

TABLE 1
Background Soil Boring Samples - Vapor Screening Results
Bloomfield Refinery - Bloomfield, New Mexico

Sample Interval Depth	BCK-1	BCK-2	BCK-3	BCK-4	BCK-5	BCK-6	BCK-7	BCK-8	BCK-9	BCK-10
0 – 2'	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 – 4'									0.0	0.0
4 – 6'									0.0	0.0
6 – 8'									0.0	0.0
8 –10'									0.0	NR
10 – 12'									0.0	0.0
12 – 14'									0.0	0.0
14 – 16'									0.0	0.0
16 – 18'									0.0	0.0
18 – 20'									0.0	0.0
20 – 22'									0.0	0.0
22 – 24'									0.0	0.0
24 – 26'									0.0	0.0
26 - 28'									0.0	0.0
28 - 30'									0.0	0.0
30 - 32'									0.0	0.0
32 - 34'									0.0	0.0
34 - 36'									0.0	0.0
36 - 38'									0.0	0.0
38 - 40'									0.0	0.0
40 - 42'									0.0	0.0
42 - 44'									0.0	0.0
44 - 46'									0.0	0.0
46 - 48'									0.0	0.0
48 - 50'									0.0	0.0
50 - 52'									0.0	0.0
52 - 54'									0.0	0.0
54 - 56'									0.0	0.0
56 - 58'									0.0	0.0
58 - 60'									0.0	0.0
60 - 62'									0.0	0.0
62 - 64'									0.0	
64 - 66'									0.0	
66 - 68'									0.0	
68 - 70'									NM	
70 - 72'									NM	
72 - 74'									NM	
74 - 76'									NM	
76 - 78'									NM	
78 - 79'									NM	

UNITS - PPM
NM - not measured, switched to ODEX drilling
NR - Not recovered

TABLE 2

Water Level Measurements

Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Measuring Point Elevation (amsl)	Total Well Depth	Depth To Product (ft below TOC)	Depth To Water (ft below TOC)	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-BCK1	4/2/2012	5620.14	NM	NPP	77.07	5543.07	NPP
MW-BCK1	6/14/2012	5620.14	80.50	NPP	77.04	5543.10	NPP
MW-BCK2	4/2/2012	5517.80	46.97	NPP	25.81	5491.99	NPP
MW-BCK2	6/14/2012	5517.80	46.96	NPP	26.17	5491.63	NPP

NM = Not Measured
NPP = No Product Present
NWP = No Water Present
amsl = above mean sea level
ft = feet
TOC = top of casing

Table 3
Soil Analytical Results and Statistical Summary
Background Investigation
Western Refinery Southwest - Bloomfield Refinery

ClientSampID	Aluminum		Antimony			Arsenic				Barium			Beryllium			Boron				Cadmium			Chloride			Chromium	
	Result	SQL	Result	Flag	SQL	Result	Flag	Result [2]	SQL	Result	nat. log	SQL	Result	Flag	SQL	Result	Flag	result [1]	SQL	Result	Flag	SQL	Result	Flag	SQL	Result	SQL
BK-1 (0-0.5')	20000	1500	< 2.5	U	2.5	2.8		2.8	2.50	160	5	0.13	0.55		0.01	6.7		6.7	0.28	0.034	J	0.01	<7.5	U	7.5	7.8	0.05
BK-1 (1.5-2.0')	17000	1500	< 5.0	U	5	1.9	J	1.9	5.00	260	6	0.26	0.56		0.02	8		8	0.28	< 0.20	U	0.2	14		7.5	8.4	0.09
BK-2 (0-0.5')	14000	1500	< 2.5	U	2.5	1.4	J	1.4	2.50	94	5	0.05	0.42		0.01	5.4		5.4	0.14	0.04	J	0.1	<7.5	U	7.5	6.1	0.05
BK-2 (1.5-2.0')	26000	3000	< 2.5	U	2.5	3		3	2.50	250	6	0.26	0.64		0.01	8.2		8.2	0.28	< 0.10	U	0.1	<7.5	U	7.5	9.3	0.05
BK-3 (0-0.5')	23000	1500	< 2.5	U	2.5	3.1		3.1	2.50	93	5	0.05	0.61		0.01	8.2		8.2	0.28	< 0.10	U	0.1	17		7.5	8.5	0.05
BK-3 (1.5-2.0')	11000	1500	< 2.5	U	2.5	3		3	2.50	140	5	0.13	0.38		0.01	12		see footnote 1	0.14	< 0.10	U	0.1	420		30	5.2	0.05
BK-4 (0-0.5')	17000	1500	0.54	J	2.5	2.4	J	2.4	2.50	96	5	0.05	0.48		0.01	5		5	0.14	< 0.10	U	0.1	<7.5	U	7.5	6.8	0.05
BK-4 (1.5-2.0')	17000	1500	< 2.5	U	2.5	2.6		2.6	2.50	160	5	0.13	0.42		0.01	5.1		5.1	0.14	< 0.10	U	0.1	13		7.5	6.1	0.05
BK-5 (0-0.5')	18000	1500	< 2.5	U	2.5	2.6		2.6	2.50	140	5	0.13	0.53		0.01	6.4		6.4	0.28	< 0.10	U	0.1	<7.5	U	7.5	7.5	0.05
BK-5 (1.5-2.0')	15000	1500	< 2.5	U	2.5	2.2	J	2.2	2.50	390	6	0.26	0.52		0.01	7.4		7.4	0.28	< 0.10	U	0.1	170		7.5	7.9	0.05
BK-6 (0-0.5')	12000	1500	< 2.5	U	2.5	1.9	J	1.9	2.50	98	5	0.05	0.4		0.01	4.2		4.2	0.14	0.028	J	0.1	<7.5	U	7.5	5.7	0.05
BK-6 (1.5-2.0')	15000	1500	< 2.5	U	2.5	2.7		2.7	2.50	150	5	0.13	0.47		0.01	5.5		5.5	0.14	< 0.10	U	0.1	<7.5	U	7.5	6.5	0.05
BK-7 (0-0.5')	12000	1500	< 2.5	U	2.5	3.2		3.2	2.50	140	5	0.13	0.4		0.01	4.3		4.3	0.14	< 0.10	U	0.1	<7.5	U	7.5	5.8	0.05
BK-7 (1.5-2.0')	17000	1500	< 2.5	U	2.5	2.5		2.5	2.50	760	see footnote 1	0.53	0.51		0.01	6.4		6.4	0.28	< 0.10	U	0.1	<7.5	U	7.5	7.5	0.05
BK-8 (0-0.5')	9700	600	< 2.5	U	2.5	1.6	J	1.6	2.50	150	5	0.13	0.33		0.01	4		4	0.14	< 0.10	U	0.1	<7.5	U	7.5	4.6	0.05
BK-8 (1.5-2.0')	20000	1500	< 2.5	U	2.5	2.9		2.9	2.50	480	see footnote 1	0.26	0.67		0.01	9.9		9.9	0.14	< 0.10	U	0.1	540		30	8.3	0.05
BK-9 (5-5.5')	6600	600	< 2.5	U	2.5	1.5	J	1.5	2.50	250	6	0.26	0.24		0.01	4.1		4.1	0.14	< 0.10	U	0.1	260		30	3.5	0.05
BK-10 (5-6')	7900	1500	1.1	J	5	<5	U	2.5	5.00	150	5	0.50	0.25	J	0.30	3.8	J	3.8	4.00	0.065	J	0.2	210		30	4.6	0.60
Number of Detects	18		2			17		17		18	18		18			18		18		4			8			18	
Total Number of samples	18		18			18		18		18	18		18			18		18		18			18			18	
Frequency of Detection (%)	100		11			94		94		100	100		100			100		100		22			44			100	
Minimum Detected Conc.	6,600		0.54			1.4		1.4		93			0.24			3.8		3.8		0.028J			13.0			3.5	
Maximum Detected Conc.	26,000		1.1			3.2		3.2		760			0.67			12.0		9.9		0.065J			540.0			9.3	
Minimum SQL		600			2.5				2.5			0.05			0.01				0.1			0.010			7.5		0.047
Maximum SQL		3,000			5.0				5.0			0.53			0.30				4.0			0.200			30.0		0.6
Arithmetic Mean	15,456		NC			NC		2.4		220	5.1		0.47			6.4		6.0		NC			205.5			6.7	
Median	16,000		NC			NC		2.6		150	5.0		0.48			6.0		5.5		NC			190.0			6.7	
Standard Deviation	5,089		NC			NC		0.6		171	0.4		0.12			2.3		1.8		NC			NC			1.6	
Coefficient of Variation (%)	33		NC			NC		23.2		78	8.2		26.27			35.4		30.1		NC			NC			23.9	
95 % Upper Tolerance Limit	27,940		NC			NC		3.8		639	6.1		0.77			NC		10.5		NC			NC			10.6	
											442.9																	
Deep Soil Samples																											
BK-9 (73-73.5)	10,000	1500	2.1	J	2.5	< 2.5	U		2.50	720		2.00	0.23		0.15	< 2.0	U		2.00	0.10		0.1	NR			49	0.30
BK-9 (54-56')	36,000	3000	< 5.0	U	5.0	2.7	J		5.00	52		0.20	1.2		0.30	3.8	J		4.00	< 0.20	U	0.2	2.5		1.5	13	0.60
BK-10 (40-42')	20,000	132.4	< 13	U	2.5	< 13	U		0.77	24		0.13	0.96		0.05	< 10	U		0.70	< 0.50	U	0.1	<30	U	30	11	0.24

95 % UTL = mean + (K x standard deviation)
K for sample size of 18 = 2.453
K for sample size of 17 = 2.486
K for sample size of 16 = 2.524

Sample Quantitation Limit (SQL)
U - non-detect
J - estimated concentration, concentration above method detection limit but less than SQL
E - value above quantitation range
Not applicable (NA)
Not calculated (NC)
Not reported (NR)
units - milligrams per kilogram

1- value removed as outlier
2- nondect values replaced at 1/2 of SQL

Table 3
Soil Analytical Results and Statistical Summary
Background Investigation
Western Refining Southwest - Bloomfield Refinery

ClientSampID	Cobalt		Copper		Cyanide			Fluoride					Iron		Lead		Manganese		Mercury			Molybdenum			Nickel	
	Result	SQL	Result	SQL	Result	Flag	SQL	Result	Flag	Result [2]	nat. log	SQL	Result	SQL	Result	SQL	Result	SQL	Result	Flag	SQL	Result	Flag	SQL	Result	SQL
BK-1 (0-0.5')	4.4	0.07	8.1	0.30	<0.3	U	0.3	0.94	J	0.94	0	1.5	18000	500	2.9	0.25	260	0.98	0.012	J	0.033	0.36	J	0.4	6.7	0.50
BK-1 (1.5-2.0')	5.3	0.13	8.7	0.60	<0.3	U	0.3	11		11	2	1.5	18000	500	3.2	0.50	280	1	0.018	J	0.033	0.7	J	0.8	7.4	1.00
BK-2 (0-0.5')	3.4	0.07	5.4	0.30	<0.3	U	0.3	< 1.5	U	0.75	0	1.5	13000	500	2.8	0.25	270	0.97	0.0095	J	0.033	0.28	J	0.4	4.8	0.50
BK-2 (1.5-2.0')	4.8	0.07	8.8	0.30	<0.3	U	0.3	8.6		8.6	2	1.5	19000	500	2.4	0.25	290	1	0.016	J	0.033	0.37	J	0.4	7.6	0.50
BK-3 (0-0.5')	4.1	0.07	6.7	0.30	<0.3	U	0.3	1.6		1.6	0	1.5	15,000	490	2.4	0.25	240	0.97	0.011	J	0.033	0.33	J	0.4	6	0.50
BK-3 (1.5-2.0')	2.9	0.07	5.3	0.30	<0.3	U	0.3	7.5		7.5	2	6	8,400	200	1.2	0.25	130	0.25	0.12	J	0.033	0.31	J	0.4	4.2	0.50
BK-4 (0-0.5')	3.2	0.07	5.1	0.30	<0.3	U	0.3	0.73	J	0.73	0	1.5	13,000	480	1.7	0.25	200	0.95	0.011	J	0.033	0.28	J	0.4	4.9	0.50
BK-4 (1.5-2.0')	3.9	0.07	6.5	0.30	<0.3	U	0.3	6.5		6.5	2	1.5	14,000	480	2.2	0.25	280	0.96	0.014	J	0.033	0.24	J	0.4	5.2	0.50
BK-5 (0-0.5')	4.1	0.07	6.5	0.30	<0.3	U	0.3	0.49	J	0.49	-1	1.5	18,000	500	2.4	0.25	290	1	0.013	J	0.033	0.25	J	0.4	6.1	0.50
BK-5 (1.5-2.0')	4.8	0.07	7.8	0.30	<0.3	U	0.3	5		5	2	1.5	18,000	480	3.2	0.25	290	0.95	0.015	J	0.033	0.37	J	0.4	6.8	0.50
BK-6 (0-0.5')	3.2	0.07	4.6	0.30	<0.3	U	0.3	0.79	J	0.79	0	1.5	12,000	500	2.5	0.25	250	0.97	0.0078	J	0.033	0.27	J	0.4	4.5	0.50
BK-6 (1.5-2.0')	3.9	0.07	7.2	0.30	<0.3	U	0.3	5.7		5.7	2	1.5	13,000	480	2.2	0.25	210	0.97	0.0016	J	0.033	0.28	J	0.4	5.9	0.50
BK-7 (0-0.5')	3.2	0.07	5.5	0.30	<0.3	U	0.3	< 1.5	U	0.75	0	1.5	11,000	490	2.4	0.25	200	0.98	0.012	J	0.033	0.27	J	0.4	4.6	0.50
BK-7 (1.5-2.0')	4.4	0.07	7.5	0.30	<0.3	U	0.3	2.9		2.9	1	1.5	16,000	490	2.8	0.25	260	0.99	0.013	J	0.033	0.31	J	0.4	6.6	0.50
BK-8 (0-0.5')	2.7	0.07	4	0.30	<0.3	U	0.3	0.85	J	0.85	0	1.5	8,700	200	2.3	0.25	180	1	0.0089	J	0.033	0.22	J	0.4	3.7	0.50
BK-8 (1.5-2.0')	4.1	0.07	5.2	0.30	<0.3	U	0.3	12		12	2	6	13,000	480	1.4	0.25	360	0.96	< 0.033	U	0.033	0.9		0.4	5.4	0.50
BK-9 (5-5.5')	2.1	0.07	2.3	0.30	<0.3	U	0.3	3.7		3.7	1	0.3	6,500	200	1.7	0.25	160	1	0.0063	J	0.033	0.42		0.4	3	0.50
BK-10 (5-6')	2.6	0.60	3.5	0.60	<0.3	U	0.3	3		3	1	0.3	9,100	500	2.6	0.50	180	0.48	<0.033	U	0.033	0.33	J	0.8	3.8	1.00
Number of Detects	18		18		0			16		16			18		18		18		16			18			18	
Total Number of samples	18		18		18			18		18			18		18		18		18			18			18	
Frequency of Detection (%)	100		100		0			89		89			100		100		100		89			100			100	
Minimum Detected Conc.	2.1		2.3		NA			0.5		0.5			6,500		1.2		130.0		0.0			0.22			3.0	
Maximum Detected Conc.	5.3		8.8		NA			12.0		12.0			19,000		3.2		360.0		0.1			0.90			7.6	
Minimum SQL		0.1		0.3			0.3					0.3		200		0.2		0.3			0.033			0.400		0.5
Maximum SQL		0.6		0.6			0.3					6.0		500		0.5		1.0			0.033			0.800		1.0
Arithmetic Mean	3.7		6.0		NC			NC		4.0	0.9		13,539		2.4		240.6		0.018			0.361			5.4	
Median	3.9		6.0		NC			NC		3.0	1.1		13,000		2.4		255.0		0.012			0.310			5.3	
Standard Deviation	0.9		1.8		NC			NC		3.7	1.1		3,811		0.6		57.7		0.03			0.17			1.3	
Coefficient of Variation (%)	23.2		30.0		NC			NC		92.6	122.0		28		23.9		24.0		152.0			47.5			24.5	
95 % Upper Tolerance Limit	5.9		10.5		NC			NC		13.5	3.6		22,887		3.7		382		NC			NC			8.6	
											36.0															
Deep Soil Samples																										
BK-9 (73-73.5)	6.1	0.3	19	0.30	< 0.30	U	0.3	0.85	J			1.5	NR		1.4	0.50	NR		< 0.033	U	0.033	4.0		0.4	12	0.5
BK-9 (54-56')	7.4	0.6	12	0.60	< 0.30	U	0.5	3.9				0.3	31,000	1000	3.2	0.50	350	0.9984	0.0082	J	0.033	0.96		0.8	8.5	1
BK-10 (40-42')	4.5	0.33	8.8	0.24	< 0.30	U	0	< 6.0	U			1.7	14,000	500	2.4	0.98	90	0.5	< 0.033	U	0.0058	< 2.0	U	0.2	6.7	0.13

95 % UTL = mean + (K x standard deviation)
K for sample size of 18 = 2.453
K for sample size of 17 = 2.486
K for sample size of 16 = 2.524

Sample Quantitation Limit (SQL)
U - non-detect
J - estimated concentration, concentration above method detection limit but less than SQL
E - value above quantitation range
Not applicable (NA)
Not calculated (NC)
Not reported (NR)
units - milligrams per kilogram

1- value removed as outlier
2- nondect values replaced at 1/2 of SQL

Table 3
Soil Analytical Results and Statistical Summary
Background Investigation
Western Refining Southwest - Bloomfield Refinery

ClientSampID	Sulfate			Selenium			Silver			Thallium			Uranium			Vanadium		Zinc	
	Result	Flag	SQL	Result	Flag	SQL	Result	Flag	SQL	Result	Flag	SQL	Result	Flag	SQL	Result	SQL	Result	SQL
BK-1 (0-0.5')	2.1	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	0.6	J	5	24	2.50	26	2.50
BK-1 (1.5-2.0')	17		7.5	< 5.0	U	5	< 0.50	U	0.5	< 5.0	U	5	< 10	U		30	5.00	28	5.00
BK-2 (0-0.5')	2.4	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	1	J	5	17	2.50	20	2.50
BK-2 (1.5-2.0')	17		7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U		29	2.50	30	2.50
BK-3 (0-0.5')	5.8	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	1.4	J	5	25	2.50	26	2.50
BK-3 (1.5-2.0')	7,600.0	E	30	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	17	2.50	14	2.50
BK-4 (0-0.5')	1.7	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	1.1	J	5	20	2.50	21	2.50
BK-4 (1.5-2.0')	3.6	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	23	2.50	20	2.50
BK-5 (0-0.5')	4.0	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	0.84	J	5	23	2.50	25	2.50
BK-5 (1.5-2.0')	28.0		7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	27	2.50	29	2.50
BK-6 (0-0.5')	1.4	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	0.68	J	5	19	2.50	19	2.50
BK-6 (1.5-2.0')	7.4	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	22	2.50	21	2.50
BK-7 (0-0.5')	<7.5	U	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	0.48	J	5	19	2.50	19	2.50
BK-7 (1.5-2.0')	10.0		7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	24	2.50	24	2.50
BK-8 (0-0.5')	4.0	J	7.5	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	15	2.50	15	2.50
BK-8 (1.5-2.0')	10,000.0	E	30	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	24	2.50	21	2.50
BK-9 (5-5.5')	330.0		30	< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	< 5.0	U	5	11	2.50	12	2.50
BK-10 (5-6')	2,300.0		30	1.1	J	5	<0.5	U	0.5	<5	U	5	<10	U	10	15	5.00	16	5.00
Number of Detects	17.0			1			0			0			7			18		18	
Total Number of samples	18.0			18			18			18			18			18		18	
Frequency of Detection (%)	94.4			5.6			0.0			0.0			38.9			100		100	
Minimum Detected Conc.	1.4			NA			NA			NA			0.5			11.0		12.0	
Maximum Detected Conc.	10,000.0			NA			NA			NA			1.4			30.0		30.0	
Minimum SQL			7.5			2.5			0.3			2.5			5.0		2.5		2.5
Maximum SQL			30.0			5.0			0.5			5.0			10.0		5.0		5.0
Arithmetic Mean	1196.1			NC			NC			NC			NC			21.3		21.4	
Median	7.4			NC			NC			NC			NC			22.5		21.0	
Standard Deviation	2945.7			NC			NC			NC			NC			5.1		5.2	
Coefficient of Variation (%)	246.3			NC			NC			NC			NC			24.0		24.4	
95 % Upper Tolerance Limit	NC			NC			NC			NC			NC			33.9		34.3	

Deep Soil Samples

BK-9 (73-73.5)	NR			< 2.5	U	2.5	< 0.25	U	0.25	< 2.5	U	2.5	5.6		5	35	2.50	27	2.50
BK-9 (54-56')	250		30	< 5.0	U	5	< 0.50	U	0.5	< 5.0	U	5	< 25	U	25	33	5.00	46	5.00
BK-10 (40-42')	210		30	< 13	U	1.9	< 1.3	U	0.07	< 13	U	1.6	< 25	U	1.29	28	0.10	36	1.94

95 % UTL = mean + (K x standard deviation)
K for sample size of 18 = 2.453
K for sample size of 17 = 2.486
K for sample size of 16 = 2.524

Sample Quantitation Limit (SQL)
U - non-detect
J - estimated concentration, concentration above method detection limit but less than SQL
E - value above quantitation range
Not applicable (NA)
Not calculated (NC)
Not reported (NR)
units - milligrams per kilogram

1- value removed as outlier
2- nondect values replaced at 1/2 of SQL

TABLE 4
Groundwater Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

	MW-BCK1	MW-BCK2
Sample Date -->	6/14/2012	6/14/2012
General Water Quality Parameters (mg/l)		
Bicarbonate (As CaCO3)	150	110
Carbonate (As CaCO3)	< 2.0	< 2.0
Chloride	35	21
Fluoride	0.25	< 2.0
Nitrate+Nitrite as N	< 1.0	< 2.0
Sulfate	4100	7900
Total Alkalinity (as CaCO3)	150	110
Total Dissolved Solids	4470	12700
Dissolved Metals (mg/l)		
Aluminum	0.11	3.8
Antimony	< 0.0010	< 0.0050
Arsenic	0.0014	0.0027
Barium	0.022	0.035
Beryllium	< 0.0020	< 0.0020
Boron	0.23	0.67
Cadmium	< 0.0020	< 0.0020
Calcium	420	390
Chromium	< 0.0060	< 0.0060
Cobalt	< 0.0060	0.0068
Copper	< 0.0060	< 0.0060
Iron	0.10	0.94
Lead	< 0.0010	< 0.0050
Magnesium	64	47
Manganese	0.39	1.1
Molybdenum	0.026	0.024
Nickel	< 0.010	< 0.010
Potassium	4.4	18
Selenium	0.0069	0.0079
Silver	< 0.0050	< 0.0050
Sodium	950	3700
Thallium	< 0.0010	< 0.0050
Uranium	0.012	< 0.0050
Vanadium	< 0.050	< 0.050
Zinc	0.012	0.030

TABLE 4
Groundwater Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

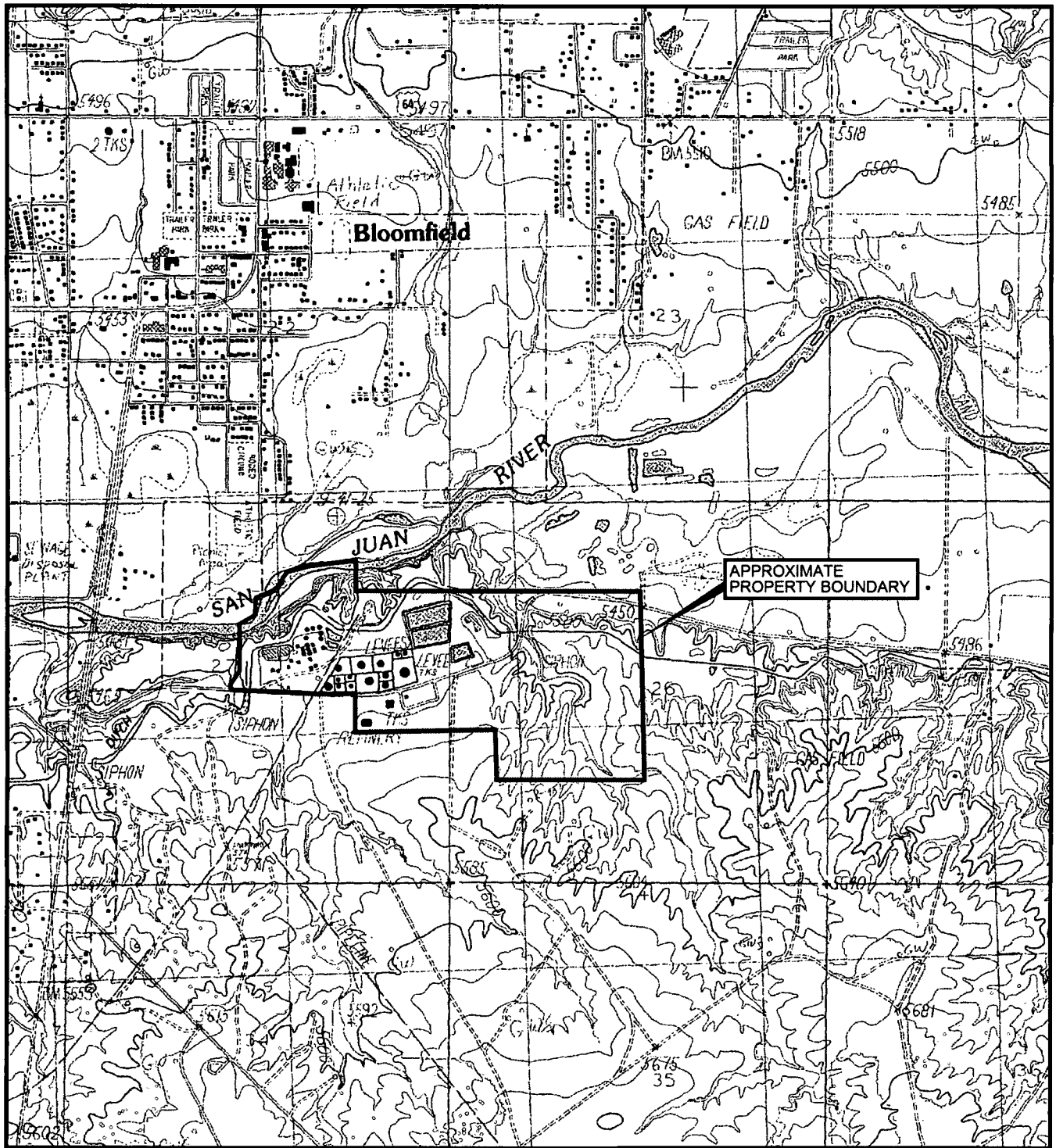
	MW-BCK1	MW-BCK2
Sample Date -->	6/14/2012	6/14/2012
Total Metals (mg/l)		
Aluminum	31	33
Antimony	< 0.0025	< 0.0025
Arsenic	0.0084	0.0047
Barium	0.28	0.12
Beryllium	0.0020	0.0023
Boron	0.19	0.60
Cadmium	< 0.0020	< 0.0020
Chromium	0.032	0.025
Cobalt	0.029	0.019
Copper	0.050	0.010
Cyanide	<0.01	<0.01
Iron	41	29
Lead	0.033	0.025
Magnesium	67	52
Manganese	1.4	1.9
Mercury	< 0.0010	< 0.0010
Molybdenum	0.019	0.017
Nickel	0.032	0.015
Selenium	0.0060	0.0041
Silver	< 0.0050	< 0.0050
Thallium	< 0.0025	< 0.0025
Uranium	0.014	0.0040
Vanadium	< 0.050	< 0.050
Zinc	0.12	0.089

TABLE 5
Groundwater Field Measurements
Bloomfield Refinery - Bloomfield, New Mexico

Well	Date	Well Volume	Temp (degrees F)	Specific Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	TDS (ppm)	Purge Volume (calculated / actual - gallons)
MW-BCK1	6/14/2012	0	61.1	5040	1.81	8.05	-67.4	3919.5	2.3 /3.0 *
		1	61.0	4766	3.07	7.66	-80.8	3724.5	
		2	60.5	4737	2.5	7.61	-73.2	3724.5	
MW-BCK2	6/14/2012	0	60.3	12492	2.39	8.09	13.4	9867	10.2/14 *
		1	59.8	12353	1.89	7.98	-41.2	9802	
		2	59.8	12354	2.15	7.97	-120.1	9815	
		3	59.9	12366	1.77	7.99	-128.1	9815	
		4	59.9	12325	1.85	7.97	-132.3	9776	

* - very slow recovery, well purged dry for sampling
F = Fahrenheit
uS/cm = microsiemens per centimeter
mg/L = milligrams per liter
ppm = parts per million

Figures



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

0 2000
SCALE IN FEET

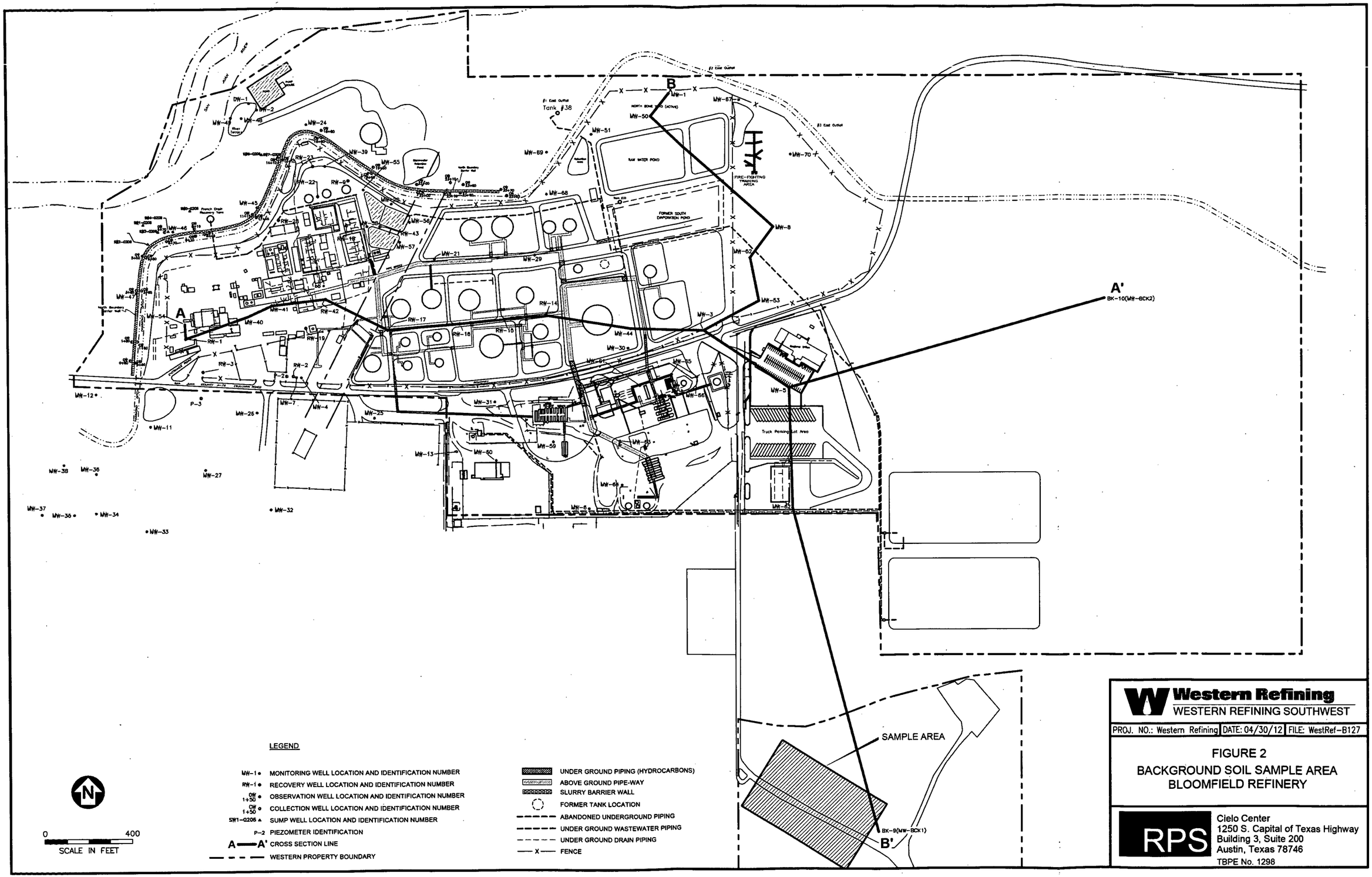
NEW MEXICO
QUADRANGLE LOCATION

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 04/01/10	FILE: WestRef-A42

FIGURE 1
SITE LOCATION MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

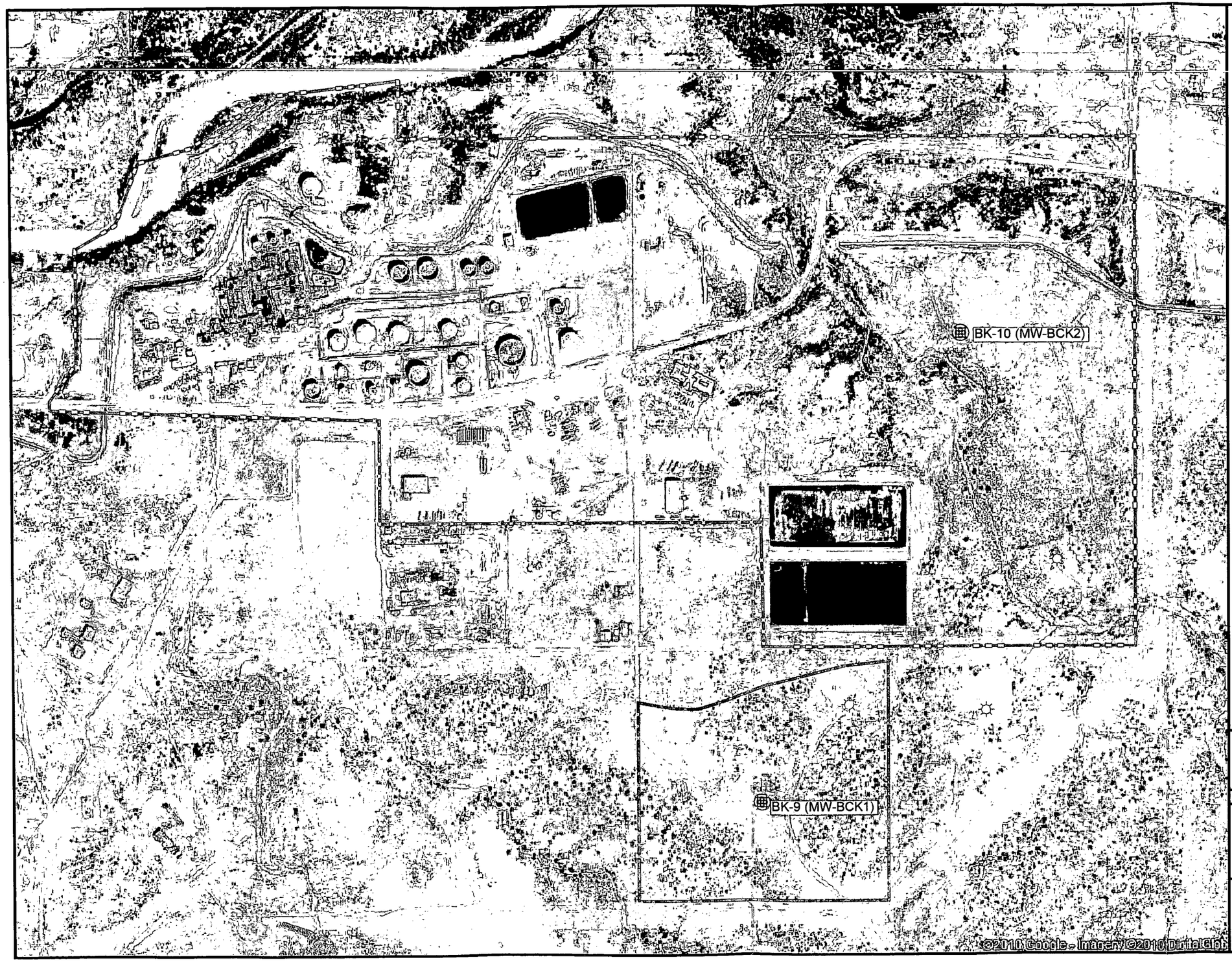


Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 04/30/12 | FILE: WestRef-B127

FIGURE 2
BACKGROUND SOIL SAMPLE AREA
BLOOMFIELD REFINERY

RPS
Cielo Center
1250 S. Capital of Texas Highway
Building 3, Suite 200
Austin, Texas 78746
TBPE No. 1298



Aerial Map Source: Google Maps, 2008 DigitalGlobe.

N

0 500

SCALE IN FEET

LEGEND

BK-9 (MW-BCK1) PROPOSED BACKGROUND MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

GAS WELL LOCATION

WESTERN PROPERTY BOUNDARY

Western Refining

WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 04/17/12 | FILE: WestRefB123

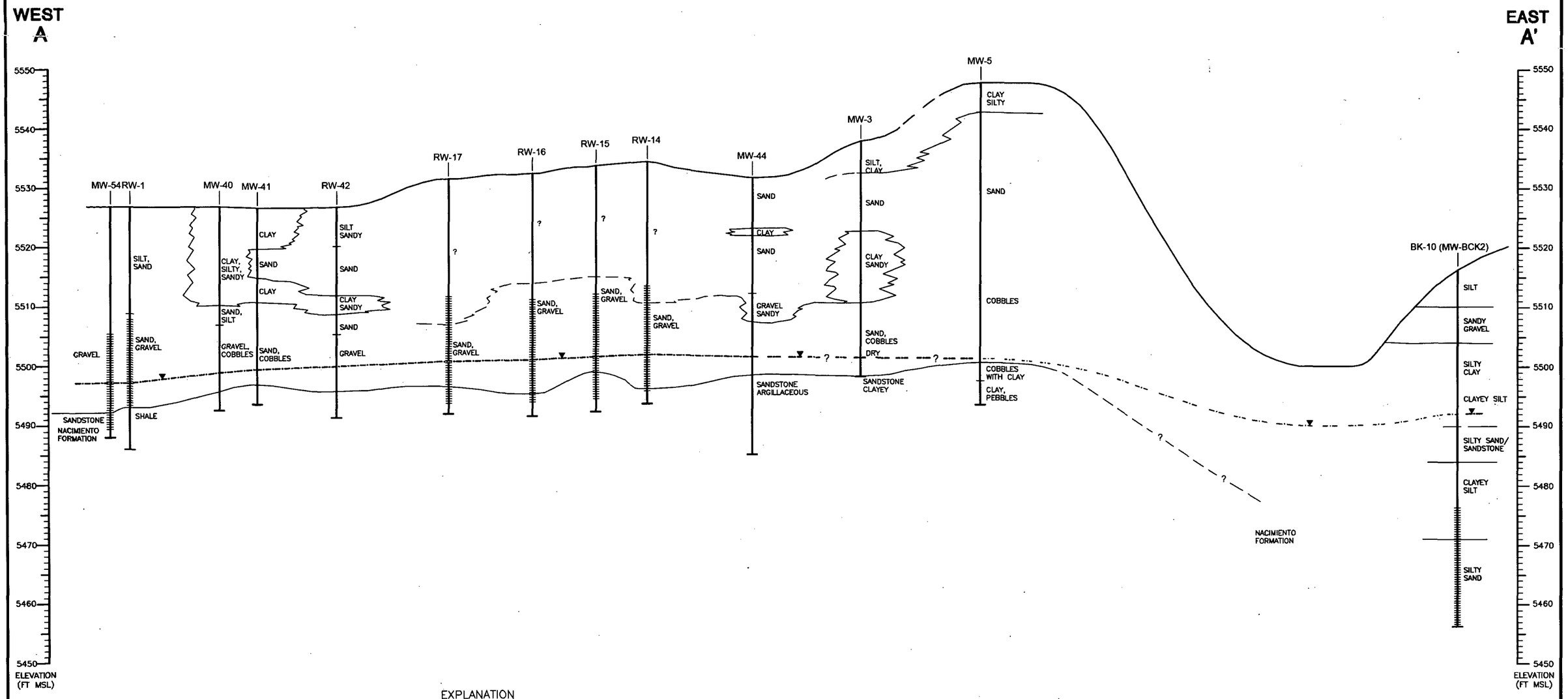
FIGURE 3

BACKGROUND MONITORING WELL LOCATIONS

BLOOMFIELD REFINERY

RPS

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EXPLANATION

MW-54 — WELL IDENTIFICATION

WELL

SCREEN INTERVAL

LITHOLOGIC CONTACTS

– POTENTIOMETRIC SURFACE MEASURED APRIL 2012

16

0 320

SCALE IN FEET
VERTICAL EXAGGERATION = 20X

NOTE:
SCREEN INTERVAL NOT AVAILABLE FOR MW–3, MW–40, MW–41, MW–44, RW–42

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 04/30/12 | FILE:WestRef–B125

FIGURE 4
CROSS SECTION A-A'
WEST TO EAST
BLOOMFIELD REFINERY

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NORTH
B

SOUTH
B'

ELEVATION (FT MSL)

5620
5610
5600
5590
5580
5570
5560
5550
5540
5530
5520
5510
5500
5490

MW-1
MW-50
MW-8
MW-52
MW-53
MW-3
MW-5
MW-62
BK-9 (MW-BCK1)

SAND CLAYEY
CLAYEY SILT
SAND, PEBBLES, COBBLES
SAND, GRAVEL
SANDSTONE CLAYEY, CLAYSTONE SANDY
NACIMIENTO FORMATION
CLAY SANDY
COBBLES, PEBBLES
SILT
CLAYEY SILT
SAND, GRAVEL
CLAY, SANDSTONE
SILT
SILT SANDY
SILT CLAYEY
SILT SANDY
SAND, GRAVEL
SILT, CLAY
SAND
CLAY SANDY
SAND, COBBLES
DRY
SANDSTONE CLAYEY
CLAY SILTY
SAND
COBBLES
DRY
COBBLES WITH CLAY
CLAY, PEBBLES
SILT
SAND
GRAVELLY SAND
SILTY SAND
CLAYEY SILTY SAND
SILTY SAND
SANDY SILT
SILTY SAND
SILT/SHALE
SILTY SAND
SAND
SILTY CLAY/ CLAYEY SILT
SILTY SAND
CLAY
GRAVEL
CLAY/ SHALE

16
0
320
SCALE IN FEET
VERTICAL EXAGGERATION = 20X

EXPLANATION

MW-8 — WELL IDENTIFICATION
— WELL
— SCREEN INTERVAL
— LITHOLOGIC CONTACTS
▼ — POTENTIOMETRIC SURFACE MEASURED APRIL 2012

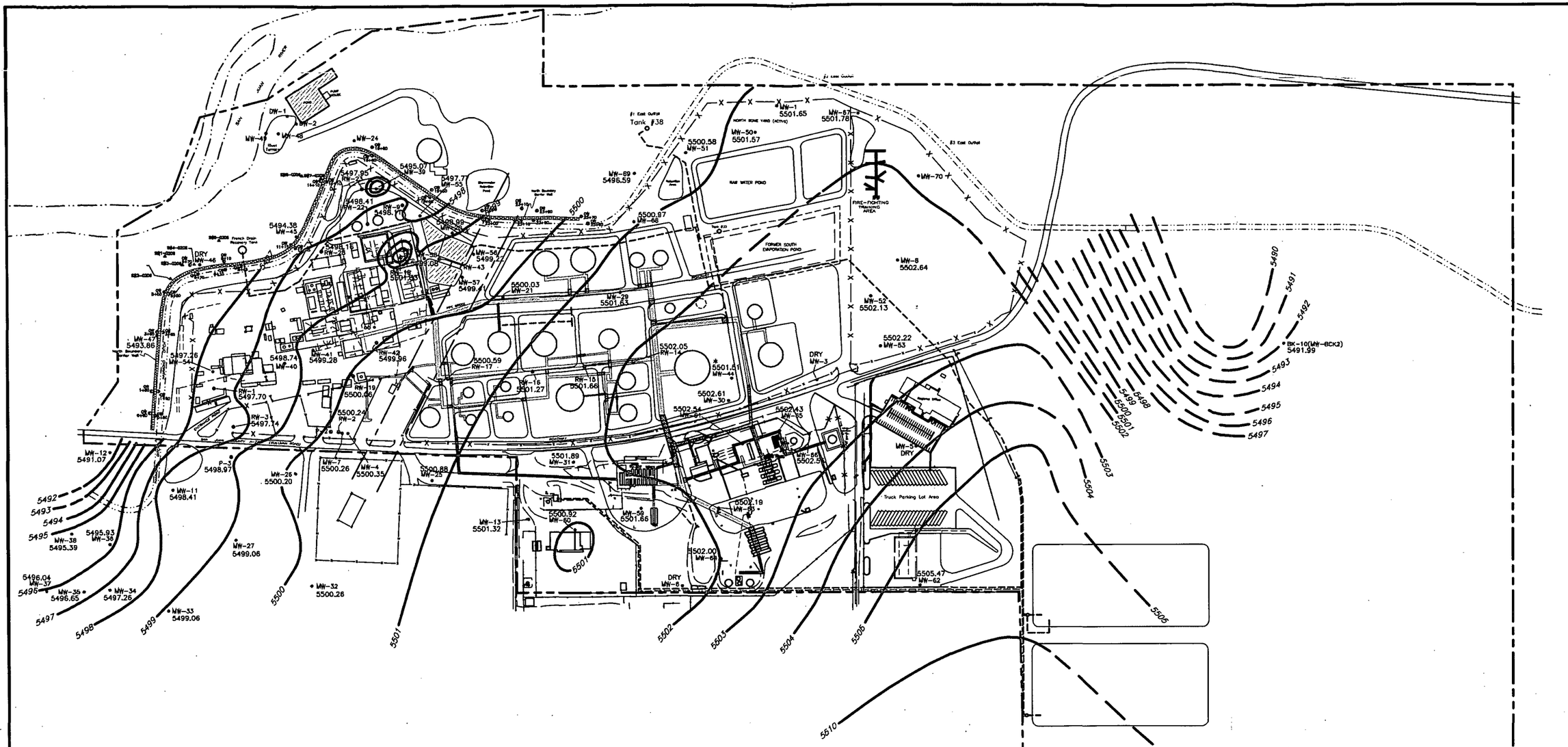
NOTE:
SCREEN INTERVAL NOT AVAILABLE FOR MW-1, MW-3, MW-5

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 04/30/12 | FILE:WestRef-B126

FIGURE 5
CROSS SECTION B-B'
NORTH TO SOUTH
BLOOMFIELD REFINERY

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TBPE No. 1298



LEGEND

- MW-1 • MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- RW-1 • RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
- OW 1+50 • OBSERVATION WELL LOCATION AND IDENTIFICATION NUMBER
- CW 1+50 • COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
- SW1-0206 ▲ SUMP WELL LOCATION AND IDENTIFICATION NUMBER
- P-2 PIEZOMETER IDENTIFICATION
- 5500 CONTOUR OF GROUNDWATER ELEVATION (FT MSL)
- 5502.61 GROUNDWATER ELEVATION (FT MSL) (APRIL 2012)
- * 5501.51 DATA POINT NOT USED IN CONTOURS

- UNDER GROUND PIPING (HYDROCARBONS)
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- FORMER TANK LOCATION
- ABANDONED UNDERGROUND PIPING
- UNDER GROUND WASTEWATER PIPING
- UNDER GROUND DRAIN PIPING
- —X— FENCE

NOTE

CONTOUR INTERVAL CHANGES FROM 1 FT TO 10 FT ON THE SOUTHEASTERN PORTION OF THE MAP

0 400
SCALE IN FEET

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 04/23/12 | FILE: WestRef-B124

FIGURE 6
POTENTIOMETRIC MAP
APRIL 2012
BLOOMFIELD REFINERY

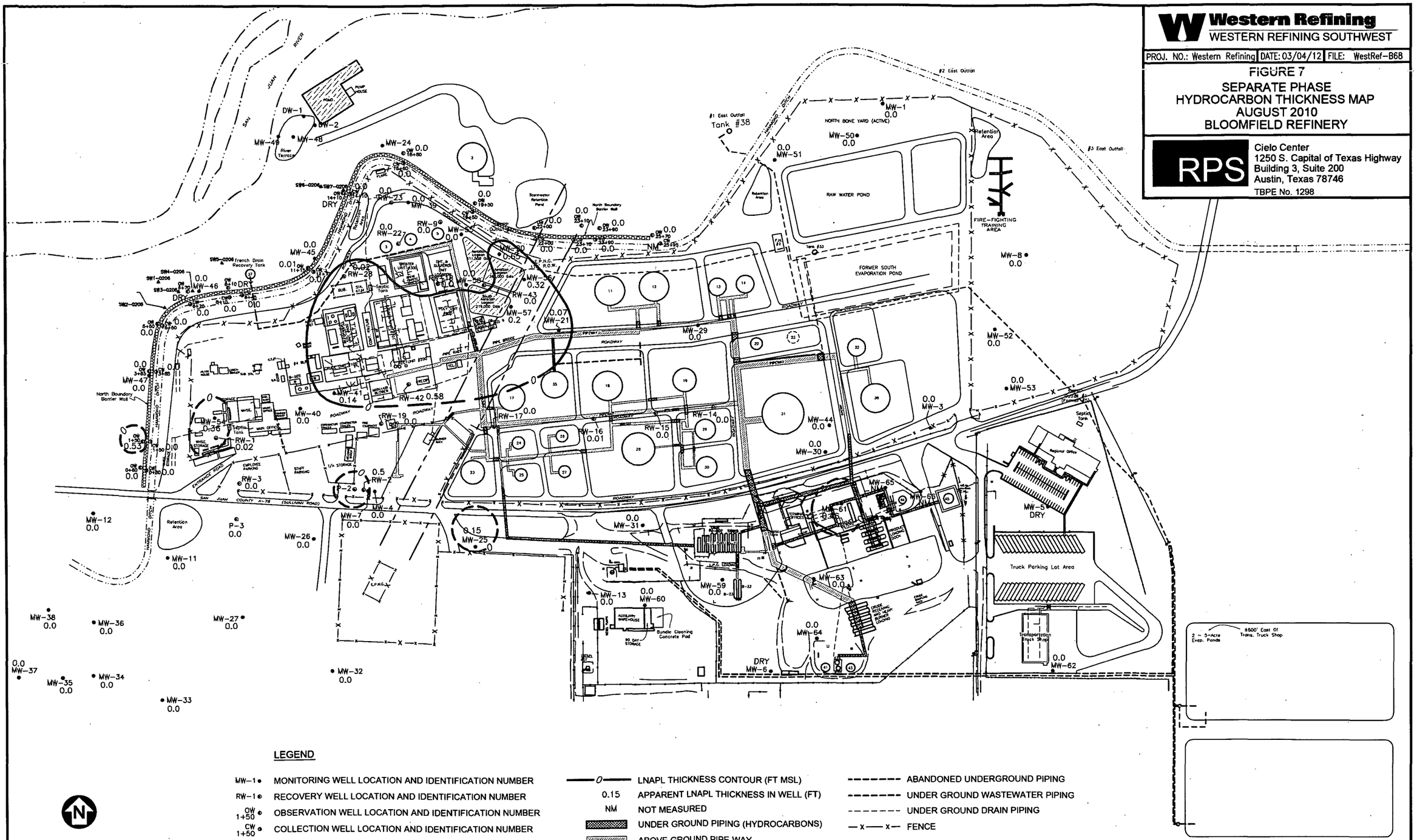
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TBPE No. 1298

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 03/04/12 | FILE: WestRef-B68

FIGURE 7
SEPARATE PHASE HYDROCARBON THICKNESS MAP
AUGUST 2010
BLOOMFIELD REFINERY

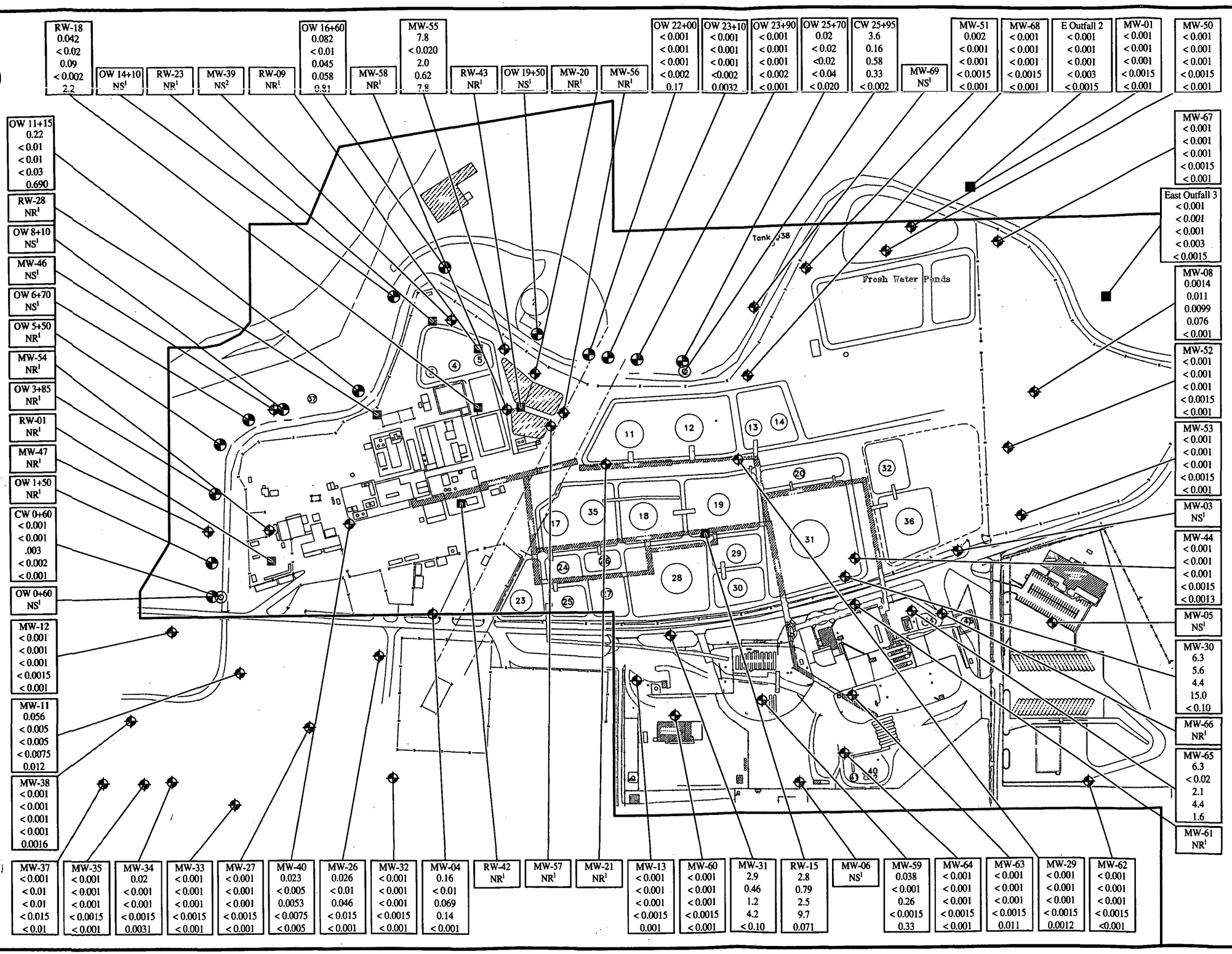
RPS
Cielo Center
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TBPE No. 1298



LEGEND

MW-1●	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
RW-1⊕	RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
OW 1+50⊕	OBSERVATION WELL LOCATION AND IDENTIFICATION NUMBER
CW 1+50⊕	COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
SW1-0206▲	SUMP WELL LOCATION AND IDENTIFICATION NUMBER
P-2	PIEZOMETER IDENTIFICATION
—0—	LNAPL THICKNESS CONTOUR (FT MSL)
0.15	APPARENT LNAPL THICKNESS IN WELL (FT)
NM	NOT MEASURED
	UNDER GROUND PIPING (HYDROCARBONS)
	ABOVE GROUND PIPE-WAY
	SLURRY BARRIER WALL
	FORMER TANK LOCATION
	ABANDONED UNDERGROUND PIPING
	UNDER GROUND WASTEWATER PIPING
	UNDER GROUND DRAIN PIPING
—x—x—	FENCE

0 300
SCALE IN FEET



Legend

- Monitoring Well
- Observation Well
- Recovery Well
- Collection Well
- Outfall
- Site
- Approximate Property Line

MW-38	-Well ID
< 0.005	-Benzene
< 0.005	-Toluene
< 0.005	-Ethylbenzene
< 0.0075	-Xylenes, Total
0.0016	-MTBE

Notes:

All concentrations in milligrams per liter (mg/L)

NS[1] = Well is Dry or Not Enough Water to Sample- No sample

NS[2] = Not sampled due to approved Facility-wide Monitoring Plan.

NS[3] = Sample Inadvertently not Collected this Sampling Event.

NR[1] = No Sample Required - Well Contains Separate Phase Hydrocarbon

NR[2] = No Sample Required per OCD and NMED Conditions

0 125 250 375 500

Feet

Western Refining

Dissolved-Phase Groundwater Data August 2011 Bloomfield Refinery

July 2012 | Figure 8



Aerial Map Source: Google Maps, 2008 DigitalGlobe.

N

0 200

SCALE IN FEET

LEGEND

- SAMPLE GRID
- BK-1 ✕ BACKGROUND SOIL SAMPLE LOCATION AND IDENTIFICATION NUMBER
- 3-9 SOIL BORING LOCATION AND IDENTIFICATION NUMBER
- —x—x— FENCE
- PP ABOVE GROUND ELECTRIC LINE AND POWER POLE
- WESTERN PROPERTY BOUNDARY

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 04/17/12	FILE: WestRefB122

FIGURE 9

BACKGROUND SOIL SAMPLE LOCATIONS
BLOOMFIELD REFINERY

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TBPE No. 1298

Appendix A

Soils Data

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Juan County, New Mexico, Eastern Part

Bloomfield Refinery Soils Report



March 30, 2010

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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Be—Beebe loamy sand.....12
DN—Doak-Avalon association, gently sloping.....13
FX—Fruitland-Persayo-Sheppard complex, hilly.....15
HA—Haplargids-Blackston-Torriorthents complex, very steep.....17
RA—Riverwash.....19
Sh—Shiprock loamy fine sand, 0 to 2 percent slopes.....21
St—Stumble loamy sand, 0 to 3 percent slopes.....21
SZ—Stumble-Slickspots complex, gently sloping.....23
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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

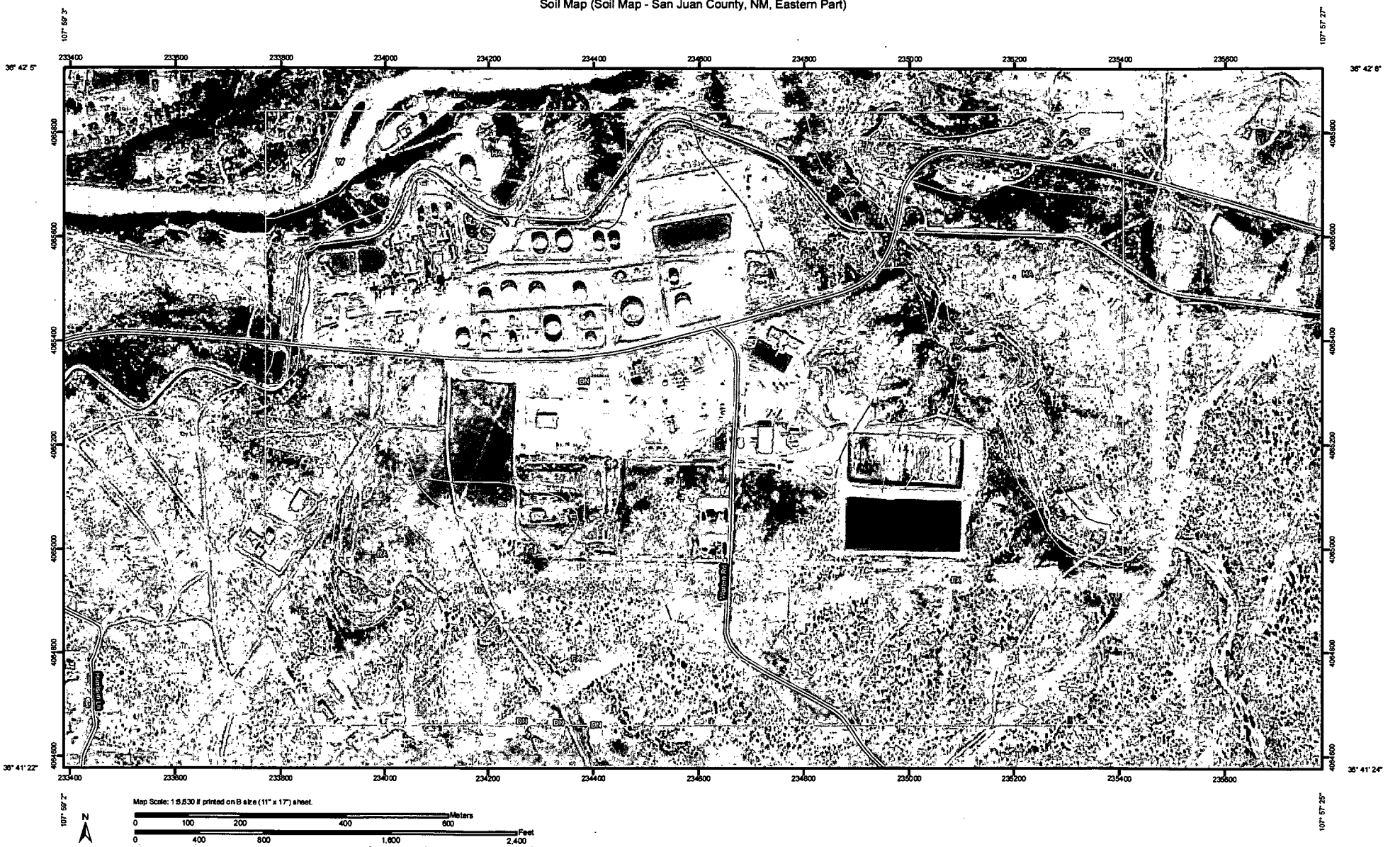
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Soil Map - San Juan County, NM, Eastern Part)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:6,630 if printed on B size (11" × 17") sheet.

The soil surveys that comprise your AOI were mapped at 1:63,360.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 13N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Juan County, New Mexico, Eastern Part
Survey Area Data: Version 10, Sep 23, 2009

Date(s) aerial images were photographed: 10/9/1997

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Soil Map - San Juan County, NM, Eastern Part)

San Juan County, New Mexico, Eastern Part (NM618)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Ay	Avalon loam, 0 to 3 percent slopes	3.8	0.8%
Be	Beebe loamy sand	6.7	1.4%
DN	Doak-Avalon association, gently sloping	168.8	35.4%
FX	Fruitland-Persayo-Sheppard complex, hilly	134.6	28.2%
HA	Haplargids-Blackston-Torriorthents complex, very steep	100.7	21.1%
RA	Riverwash	37.8	7.9%
Sh	Shiprock loamy fine sand, 0 to 2 percent slopes	5.5	1.1%
St	Stumble loamy sand, 0 to 3 percent slopes	12.4	2.6%
SZ	Stumble-Slickspots complex, gently sloping	2.1	0.4%
Tt	Turley clay loam, wet, 0 to 2 percent slopes	0.1	0.0%
W	Lakes, rivers, reservoirs	4.4	0.9%
Totals for Area of Interest		**477.0**	**100.0%**

Map Unit Descriptions (Soil Map - San Juan County, NM, Eastern Part)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used.

Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Juan County, New Mexico, Eastern Part

Ay—Avalon loam, 0 to 3 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Avalon and similar soils: 90 percent

Description of Avalon

Setting

Landform: Mesas
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits over slope alluvium derived from sandstone and shale

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (2.0 to 8.0 mmhos/cm)
Available water capacity: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability (nonirrigated): 7e
Ecological site: Limy (R035XB003NM)

Typical profile

0 to 18 inches: Loam
18 to 60 inches: Sandy clay loam
60 to 64 inches: Gravelly sandy loam

Be—Beebe loamy sand

Map Unit Setting

Elevation: 4,800 to 6,000 feet

Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition
Beebe and similar soils: 90 percent

Description of Beebe

Setting
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stream alluvium derived from igneous and sedimentary rock

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (2.0 to 4.0 mmhos/cm)
Available water capacity: Low (about 3.6 inches)

Interpretive groups
Land capability classification (irrigated): 4e
Land capability (nonirrigated): 7e
Ecological site: Sandy (R035XB002NM)

Typical profile
0 to 6 inches: Loamy sand
6 to 81 inches: Sand

DN—Doak-Avalon association, gently sloping

Map Unit Setting
Elevation: 5,600 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition
Doak and similar soils: 50 percent
Avalon and similar soils: 35 percent

Description of Doak

Setting

Landform: Fan remnants, mesas, stream terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Alluvium derived from sandstone and shale

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability (nonirrigated): 7e
Ecological site: Loamy (R035XB001NM)

Typical profile

0 to 5 inches: Loam
5 to 43 inches: Clay loam
43 to 60 inches: Clay loam

Description of Avalon

Setting

Landform: Fan remnants, mesas, stream terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Eolian deposits over alluvium derived from sandstone and shale

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0

Available water capacity: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability (nonirrigated): 7e
Ecological site: Limy (R035XB003NM)

Typical profile

0 to 14 inches: Loam
14 to 60 inches: Loam
60 to 64 inches: Gravelly loam

FX—Fruitland-Persayo-Sheppard complex, hilly

Map Unit Setting

Elevation: 4,800 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Fruitland and similar soils: 40 percent
Persayo and similar soils: 30 percent
Sheppard and similar soils: 25 percent

Description of Fruitland

Setting

Landform: Alluvial fans, stream terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from sandstone and shale

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 7e

Ecological site: Sandy (R035XB002NM)

Typical profile

0 to 4 inches: Sandy loam
4 to 60 inches: Fine sandy loam

Description of Persayo

Setting

Landform: Breaks, hills, ridges
Landform position (two-dimensional): Backslope, footslope, shoulder, toeslope
Landform position (three-dimensional): Side slope, nose slope, head slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from shale

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: 5 to 20 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Very low (about 2.9 inches)

Interpretive groups

Land capability (nonirrigated): 7e
Ecological site: Shale Hills (R035XA130NM)

Typical profile

0 to 18 inches: Clay loam
18 to 20 inches: Bedrock

Description of Sheppard

Setting

Landform: Dunes
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits over mixed alluvium

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Available water capacity: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 7e
Ecological site: Deep Sand (R035XB007NM)

Typical profile

0 to 4 inches: Loamy fine sand
4 to 60 inches: Loamy fine sand

HA—Haplargids-Blackston-Torriorthents complex, very steep

Map Unit Setting

Elevation: 4,800 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Haplargids and similar soils: 45 percent
Blackston and similar soils: 30 percent
Torriorthents and similar soils: 20 percent

Description of Haplargids

Setting

Landform: Escarpments
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Properties and qualities

Slope: 8 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Moderate (about 7.3 inches)

Interpretive groups

Land capability (nonirrigated): 7e
Ecological site: Loamy (R035XB001NM)

Typical profile

0 to 7 inches: Cobbly sandy loam
7 to 26 inches: Cobbly sandy clay loam
26 to 60 inches: Cobbly sandy clay loam

Description of Blackston

Setting

Landform: Escarpments
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Properties and qualities

Slope: 8 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Very slightly saline to slightly saline (4.0 to 8.0 mmhos/cm)
Available water capacity: Low (about 4.5 inches)

Interpretive groups

Land capability (nonirrigated): 7e
Ecological site: Limy (R035XB003NM)

Typical profile

0 to 11 inches: Gravelly loam
11 to 26 inches: Very gravelly loam
26 to 60 inches: Very gravelly sand

Description of Torriorthents

Setting

Landform: Escarpments
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Properties and qualities

Slope: 8 to 50 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)

Sodium adsorption ratio, maximum: 2.0
Available water capacity: Very low (about 2.2 inches)

Interpretive groups

Land capability (nonirrigated): 7e
Ecological site: Hills (R042XB027NM)

Typical profile

0 to 3 inches: Cobbly loam
3 to 15 inches: Cobbly clay loam
15 to 60 inches: Bedrock

RA—Riverwash

Map Unit Setting

Elevation: 4,800 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Riverwash, clayey: 35 percent
Riverwash, sandy: 35 percent
Riverwash, gravelly: 30 percent

Description of Riverwash, Sandy

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stream alluvium derived from igneous and sedimentary rock

Properties and qualities

Slope: 0 to 3 percent
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: Frequent
Available water capacity: Very low (about 2.9 inches)

Interpretive groups

Land capability (nonirrigated): 8w

Typical profile

0 to 6 inches: Sand
6 to 60 inches: Stratified coarse sand to sandy loam

Description of Riverwash, Clayey

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stream alluvium derived from igneous and sedimentary rock

Properties and qualities

Slope: 0 to 1 percent
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Available water capacity: Low (about 6.0 inches)

Interpretive groups

Land capability (nonirrigated): 8w

Typical profile

0 to 6 inches: Clay
6 to 60 inches: Clay

Description of Riverwash, Gravelly

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stream alluvium derived from igneous and sedimentary rock

Properties and qualities

Slope: 0 to 3 percent
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: Frequent
Available water capacity: Very low (about 1.9 inches)

Interpretive groups

Land capability (nonirrigated): 8w

Typical profile

0 to 6 inches: Gravelly sand
6 to 60 inches: Stratified extremely gravelly coarse sand to gravelly sand

Sh—Shiprock loamy fine sand, 0 to 2 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Shiprock and similar soils: 85 percent

Description of Shiprock

Setting

Landform: Mesas
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits over alluvium derived from sandstone and shale

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability (nonirrigated): 7e
Ecological site: Deep Sand (R035XB007NM)

Typical profile

0 to 10 inches: Loamy fine sand
10 to 60 inches: Fine sandy loam

St—Stumble loamy sand, 0 to 3 percent slopes

Map Unit Setting

Elevation: 4,800 to 6,400 feet

Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Stumble and similar soils: 90 percent
Fruitland and similar soils: 10 percent

Description of Stumble

Setting

Landform: Dunes
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits derived from sandstone

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 7e
Ecological site: Sandy (R035XB002NM)

Typical profile

0 to 5 inches: Loamy sand
5 to 29 inches: Loamy sand
29 to 49 inches: Gravelly loamy sand
49 to 81 inches: Loamy sand

Description of Fruitland

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fan alluvium derived from sandstone and shale

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability (nonirrigated): 7e
Ecological site: Loamy (R035XB001NM)

Typical profile

0 to 8 inches: Loam
8 to 60 inches: Fine sandy loam

SZ—Stumble-Slickspots complex, gently sloping

Map Unit Setting

Elevation: 4,800 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Stumble and similar soils: 70 percent
Slickspots: 20 percent

Description of Stumble

Setting

Landform: Dunes
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits derived from sandstone

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability (nonirrigated): 7e
Ecological site: Sandy (R035XB002NM)

Typical profile
0 to 4 inches: Loamy sand
4 to 60 inches: Loamy sand

Description of Slickspots

Setting
Landform: Alluvial fans
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits derived from sandstone

Properties and qualities
Slope: 0 to 5 percent
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Maximum salinity: Slightly saline to moderately saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0

Interpretive groups
Land capability (nonirrigated): 8w

Typical profile
0 to 2 inches: Clay
2 to 60 inches: Clay

Tt—Turley clay loam, wet, 0 to 2 percent slopes

Map Unit Setting
Elevation: 4,800 to 6,000 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition
Turley variant and similar soils: 90 percent

Description of Turley Variant

Setting
Landform: Alluvial fans
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fan alluvium derived from sandstone and shale

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 24 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability (nonirrigated): 6w
Ecological site: Clayey (R035XB004NM)

Typical profile

0 to 9 inches: Clay loam
9 to 60 inches: Clay loam

W—Lakes, rivers, reservoirs

Map Unit Setting

Elevation: 4,800 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Water: 95 percent

Description of Water

Setting

Landform: Channels
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Chemical Properties

This folder contains a collection of tabular reports that present soil chemical properties. The reports (tables) include all selected map units and components for each map unit. Soil chemical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil chemical properties include pH, cation exchange capacity, calcium carbonate, gypsum, and electrical conductivity.

Chemical Soil Properties (Soil Map - San Juan County, NM, Eastern Part)

This table shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced saturated hydraulic conductivity and aeration, and a general degradation of soil structure.

Chemical Soil Properties– San Juan County, New Mexico, Eastern Part								
Map symbol and soil name	**Depth**	**Cation-exchange capacity**	**Effective cation-exchange capacity**	**Soil reaction**	**Calcium carbonate**	**Gypsum**	**Salinity**	**Sodium adsorption ratio**
	In	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
Ay—Avalon loam, 0 to 3 percent slopes								
Avalon	0-18	9.8-15	—	7.9-8.4	1-5	0-2	2.0-8.0	0
	18-60	11-23	—	7.9-8.4	10-20	0-2	2.0-8.0	0
	60-64	4.0-11	—	7.9-8.4	15-20	0-2	2.0-8.0	0
Be—Beebe loamy sand								
Beebe	0-6	3.1-7.4	—	7.4-8.4	0-1	0	2.0-4.0	0
	6-81	0.8-7.4	—	7.4-8.4	0-1	0	2.0-4.0	0
DN—Doak-Avalon association, gently sloping								
Doak	0-5	11-19	—	7.4-8.4	0-5	0	0.0-2.0	0
	5-43	15-23	—	7.4-9.0	1-10	0	2.0-4.0	0
	43-60	15-23	—	7.9-9.0	5-10	0-2	2.0-4.0	0-2
Avalon	0-14	11-15	—	7.9-8.4	0-5	0	2.0-8.0	0
	14-60	11-23	—	7.9-8.4	10-20	0-2	2.0-8.0	0
	60-64	4.0-11	—	7.9-8.4	15-20	0-2	2.0-8.0	0-2
FX—Fruitland-Persayo-Sheppard complex, hilly								
Fruitland	0-4	4.1-7.6	—	7.4-8.4	5-10	0-1	0.0-4.0	0-2
	4-60	3.1-12	—	7.4-8.4	5-10	0-1	0.0-4.0	0-2
Persayo	0-18	18-23	—	7.9-9.0	0-2	0-2	0.0-8.0	0-2
	18-20	—	—	—	—	—	—	—
Sheppard	0-4	2.5-5.4	—	7.9-8.4	0	0	0.0-2.0	0
	4-60	2.5-5.4	—	7.9-8.4	0	0	0.0-2.0	0

Chemical Soil Properties– San Juan County, New Mexico, Eastern Part								
Map symbol and soil name	**Depth**	**Cation-exchange capacity**	**Effective cation-exchange capacity**	**Soil reaction**	**Calcium carbonate**	**Gypsum**	**Salinity**	**Sodium adsorption ratio**
	In	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
HA—Haplargids-Blackston-Torriorthents complex, very steep								
Haplargids	0-7	7.0-14	—	7.4-8.4	0	0	0.0-4.0	0
	7-26	13-23	—	7.4-8.4	0-5	0	0.0-4.0	0
	26-60	13-18	—	7.4-8.4	1-10	0	0.0-4.0	0
Blackston	0-11	11-18	—	7.9-8.4	0-2	0	0.0-2.0	0
	11-26	9.8-17	—	7.9-8.4	10-20	0	4.0-8.0	0
	26-60	0.0-4.6	—	7.9-8.4	15-30	0	4.0-8.0	0
Torriorthents	0-3	11-17	—	7.4-8.4	0-2	0-2	0.0-4.0	0
	3-15	5.7-19	—	7.4-8.4	0-2	0-2	0.0-4.0	0-2
	15-60	—	—	—	—	—	—	—
RA—Riverwash								
Riverwash, clayey	0-6	—	—	—	—	—	—	—
	6-60	—	—	—	—	—	—	—
Riverwash, sandy	0-6	—	—	—	—	—	—	—
	6-60	—	—	—	—	—	—	—
Riverwash, gravelly	0-6	—	—	—	—	—	—	—
	6-60	—	—	—	—	—	—	—
Sh—Shiprock loamy fine sand, 0 to 2 percent slopes								
Shiprock	0-10	8.1-11	—	7.4-8.4	0-2	0	0.0-2.0	0
	10-60	7.0-13	—	7.4-9.0	0-2	0	0.0-4.0	0

Chemical Soil Properties– San Juan County, New Mexico, Eastern Part								
Map symbol and soil name	**Depth**	**Cation-exchange capacity**	**Effective cation-exchange capacity**	**Soil reaction**	**Calcium carbonate**	**Gypsum**	**Salinity**	**Sodium adsorption ratio**
	In	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
St—Stumble loamy sand, 0 to 3 percent slopes								
Stumble	0-5	0.0-7.4	—	7.9-8.4	0-2	0	0.0-2.0	0
	5-29	0.0-7.4	—	7.9-9.0	0-2	0	0.0-2.0	0
	29-49	0.0-3.1	—	7.9-9.0	0-2	0	0.0-2.0	0
	49-81	0.0-5.7	—	7.9-9.0	0-2	0	0.0-2.0	0
Fruitland	0-8	5.7-16	—	7.4-8.4	5-10	0	0.0-4.0	0
	8-60	3.1-12	—	7.4-8.4	5-10	0	0.0-4.0	0
SZ—Stumble-Slickspots complex, gently sloping								
Stumble	0-4	0.0-7.4	—	7.9-8.4	0-1	0	0.0-2.0	0
	4-60	0.0-7.4	—	7.9-9.0	0-1	0	0.0-2.0	0
Slickspots	0-2	—	—	7.9-9.6	0	0	0.0-8.0	2-6
	2-60	—	—	7.9-9.6	0	0	8.0-16.0	4-12
Tt—Turley clay loam, wet, 0 to 2 percent slopes								
Turley variant	0-9	14-22	—	7.4-8.4	1-5	0-2	2.0-4.0	0-2
	9-60	14-22	—	7.4-8.4	1-5	0-2	2.0-4.0	0-2
W—Lakes, rivers, reservoirs								
Water	—	—	—	—	—	—	—	—

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Physical Soil Properties (Soil Map - San Juan County, NM, Eastern Part)

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The

moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Physical Soil Properties– San Juan County, New Mexico, Eastern Part														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Ay—Avalon loam, 0 to 3 percent slopes														
Avalon	0-18	-43-	-40-	15-18- 20	1.40-1.50	4.23-14.11	0.16-0.18	0.0-2.9	0.0-1.0	.43	.43	3	4L	86
	18-60	-56-	-18-	18-27- 35	1.40-1.50	4.23-14.11	0.15-0.17	3.0-5.9	0.0-0.5	.43	.43			
	60-64	-67-	-23-	5-10- 15	1.50-1.65	14.11-42.34	0.10-0.12	0.0-2.9	0.0-0.5	.32	.37			
Be—Beebe loamy sand														
Beebe	0-6	-84-	- 9-	5- 8- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.20	.20	5	2	134
	6-81	-93-	- 2-	1- 6- 10	1.45-1.55	141.14	0.03-0.08	0.0-2.9	0.0-0.5	.17	.17			
DN—Doak-Avalon association, gently sloping														
Doak	0-5	-42-	-37-	15-21- 27	1.20-1.30	4.23-14.11	0.15-0.17	0.0-2.9	0.5-0.6	.37	.37	5	5	56
	5-43	-34-	-37-	25-30- 35	1.45-1.55	1.41-4.23	0.15-0.18	3.0-5.9	0.0-0.5	.37	.37			
	43-60	-34-	-37-	25-30- 35	1.40-1.50	1.41-4.23	0.15-0.18	3.0-5.9	0.0-0.5	.37	.37			
Avalon	0-14	-43-	-40-	15-18- 20	1.40-1.50	4.23-14.11	0.16-0.18	0.0-2.9	0.5-1.0	.43	.43	3	4L	86
	14-60	-38-	-36-	18-27- 35	1.40-1.50	4.23-14.11	0.15-0.17	3.0-5.9	0.0-0.5	.43	.43			
	60-64	-46-	-44-	5-10- 15	1.50-1.65	14.11-42.34	0.10-0.12	0.0-2.9	0.0-0.5	.32	.37			

Physical Soil Properties– San Juan County, New Mexico, Eastern Part														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
FX—Fruitland-Persayo-Sheppard complex, hilly														
Fruitland	0-4	-69-	-24-	5- 8- 10	1.45-1.55	14.11-42.34	0.11-0.13	0.0-2.9	0.6-0.8	.28	.28	5	3	86
	4-60	-68-	-21-	5-12- 18	1.45-1.55	14.11-42.34	0.11-0.13	0.0-2.9	0.0-0.5	.28	.28			
Persayo	0-18	-35-	-34-	27-31- 35	1.35-1.45	1.41-4.23	0.15-0.17	3.0-5.9	0.5-1.0	.37	.37	1	8	0
	18-20	—	—	—	—	0.00-1.41	—	—	—					
Sheppard	0-4	-79-	-16-	4- 5- 7	1.45-1.60	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.15	.15	5	2	134
	4-60	-79-	-16-	4- 5- 7	1.45-1.60	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.15	.15			
HA—Haplargids-Blackston-Torriorthents complex, very steep														
Haplargids	0-7	-66-	-19-	10-15- 20	1.45-1.55	14.11-42.34	0.08-0.10	0.0-2.9	0.0-0.5	.15	.28	4	4	86
	7-26	-55-	-17-	20-28- 35	1.35-1.45	4.23-14.11	0.11-0.13	0.0-2.9	0.0-0.5	.15	.28			
	26-60	-59-	-18-	20-24- 27	1.35-1.45	4.23-14.11	0.12-0.14	0.0-2.9	0.0-0.5	.20	.37			
Blackston	0-11	-42-	-38-	15-20- 25	1.45-1.55	4.23-14.11	0.11-0.14	0.0-2.9	0.5-1.0	.10	.17	3	8	0
	11-26	-42-	-38-	15-20- 25	1.35-1.45	4.23-14.11	0.07-0.10	0.0-2.9	0.0-0.5	.10	.28			
	26-60	-96-	- 2-	0- 3- 5	1.35-1.45	42.34-141.14	0.03-0.06	0.0-2.9	0.0-0.5	.10	.28			
Torriorthents	0-3	-42-	-38-	15-20- 25	1.40-1.50	4.23-14.11	0.12-0.14	0.0-2.9	0.6-0.8	.20	.37	1	6	48
	3-15	-34-	-37-	10-30- 30	1.40-1.50	1.41-42.34	0.10-0.20	0.0-2.9	0.0-0.5	.20	.32			
	15-60	—	—	—	—	0.00-1.40	—	—	—					

Physical Soil Properties– San Juan County, New Mexico, Eastern Part														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
RA—Riverwash														
Riverwash, clayey	0-6	-12-	-28-	40-60- 80	1.65-1.75	0.00-1.41	0.09-0.11	6.0-8.9	0.0-0.1	.20	.20	5	4	86
	6-60	-12-	-28-	40-60- 80	1.65-1.75	0.00-1.41	0.09-0.11	6.0-8.9	0.0-0.1	.28	.32			
Riverwash, sandy	0-6	-98-	-2-	0- 1- 1	1.65-1.75	42.34-141.14	0.03-0.04	0.0-2.9	0.0-0.1	.10	.10	5	4	86
	6-60	-68-	-30-	0- 3- 5	1.65-1.75	42.34-141.14	0.04-0.06	0.0-2.9	0.0-0.1	.10	.10			
Riverwash, gravelly	0-6	-98-	- 2-	0- 1- 1	1.65-1.75	42.34-141.14	0.03-0.04	0.0-2.9	0.0-0.1	.05	.10	5	4	86
	6-60	-93-	- 7-	0- 1- 1	1.65-1.75	42.34-141.14	0.02-0.03	0.0-2.9	0.0-0.1	.05	.10			
Sh—Shiprock loamy fine sand, 0 to 2 percent slopes														
Shiprock	0-10	-83-	- 5-	10-13- 15	1.40-1.50	42.34-141.14	0.06-0.09	0.0-2.9	0.5-0.6	.20	.20	5	2	134
	10-60	-70-	-16-	10-14- 18	1.45-1.55	14.11-42.34	0.09-0.12	0.0-2.9	0.0-0.5	.28	.28			
St—Stumble loamy sand, 0 to 3 percent slopes														
Stumble	0-5	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17	5	2	134
	5-29	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.15	.15			
	29-49	-81-	-17-	0- 3- 5	1.45-1.55	42.34-141.14	0.04-0.06	0.0-2.9	0.0	.10	.24			
	49-81	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06	0.0-2.9	0.0	.15	.15			
Fruitland	0-8	-43-	-40-	10-18- 25	1.40-1.50	4.23-14.11	0.15-0.17	0.0-2.9	0.0-0.5	.37	.37	5	5	56
	8-60	-68-	-21-	5-12- 18	1.45-1.55	14.11-42.34	0.11-0.13	0.0-2.9	0.0-0.5	.28	.28			

Physical Soil Properties– San Juan County, New Mexico, Eastern Part														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
SZ—Stumble-Slickspots complex, gently sloping														
Stumble	0-4	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17	5	2	134
	4-60	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.15	.15			
Slickspots	0-2	-32-	-31-	15-37- 45	1.45-1.55	0.00-0.42	—	—	0.5-1.0					
	2-60	-32-	-31-	15-37- 45	1.45-1.55	0.00-1.41	—	—	0.0-0.5					
Tt—Turley clay loam, wet, 0 to 2 percent slopes														
Turley variant	0-9	-35-	-33-	28-32- 35	1.40-1.50	1.41-4.23	0.15-0.19	3.0-5.9	0.0-0.5	.32	.32	5	4L	86
	9-60	-35-	-33-	28-32- 35	1.40-1.50	1.41-4.23	0.15-0.19	3.0-5.9	0.0-0.5	.32	.32			
W—Lakes, rivers, reservoirs														
Water	—	—	—	—	—	—	—	—	—					

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Appendix B

Survey Data

Souder, Miller & Associates • 2101 San Juan Boulevard • Farmington, NM 87401-2247
(505) 325-7535 • fax (505) 326-0045

June 25, 2012

Western Refining Southwest, Inc. - Bloomfield Refinery
P.O. Box 159
50 Road 4990
Bloomfield, NM 87413

5121139

ATTN: Kelly R. Robinson
Environmental Engineer

RE: Monitoring Well Locations
Soil Boring Locations

Dear Ms. Robinson,

I, Kurt R. Shepherd hereby state that I am a New Mexico Professional Surveyor (No. 11643) and that the license is in good standing with the State.

On March 6, 2012 I supervised the field surveys for the origin of the Horizontal and Vertical Control, derived from a NGS OPUS Solution supplied by US NGS/NOAA. The coordinate basis of the Horizontal Control is State Plane Coordinates New Mexico West Zone, (code 3003). The Vertical Ortho-metric height was computed in NAVD88 using Geoid09 datum.

The attached Exhibit "A" Monitoring Wells Data were field surveyed on March 6, 2012 and computed using the above mentioned control position. All Monitoring Well positions are inside a steel casing and located on the North side of the PVC riser. Horizontal positions are measured to the nearest 0.1-ft and vertical elevations are measured to the nearest 0.01-ft.

The attached Exhibit "B" Soil Boring Locations were field surveyed on March 6, 2012 and computed using the above mentioned control position. Elevations are at ground surface.

If you have any questions or need clarification, please contact me.

Respectfully,

SOUDER, MILLER & ASSOCIATES

Kurt R. Shepherd

Kurt R. Shepherd, P.L.S.
Senior Surveyor

Enclosures

KRS/sll
(Revised)

Western Refinery
Soil Boring Location
Surveyed on March 06, 2012
SPC NM West

Exhibit "B"

Point Number	Northing	Easting	Elevation	Descriptor
5106	2070966.402	2683615.628	5614.922	BK-4
5107	2071015.801	2683527.543	5612.432	BK-3
5108	2071150.441	2683367.214	5607.917	BK-2
5109	2071217.062	2683278.259	5606.110	BK-1
5110	2071062.706	2683207.278	5606.292	BK-8
5111	2070988.248	2683308.515	5611.983	BK-7
5112	2070912.500	2683421.432	5614.640	BK-6
5113	2070842.812	2683524.437	5617.175	BK-5
5114	2072425.083	2683081.565	5560.964	3-11
5115	2071897.657	2683739.859	5562.729	3-10
5116	2072310.152	2683744.750	5547.801	3-9
5117	2072417.960	2683735.525	5545.561	3-8 APPROX
5118	2072852.131	2683728.100	5536.475	3-7
5121	2073142.651	2683527.872	5543.408	3-6
5125	2073680.648	2683043.322	5534.518	3-5
5127	2074054.545	2683140.101	5526.477	3-26
5132	2074112.867	2683139.843	5525.539	3-27
5137	2074162.263	2683138.224	5524.698	3-28
5141	2073073.202	2682630.774	5538.805	3-21
5142	2073029.620	2682908.499	5542.550	3-23
5147	2072978.678	2682770.735	5541.845	3-22
5149	2072477.987	2682681.970	5554.045	3-24
5153	2072418.903	2682662.390	5551.741	3-12
5156	2072907.016	2682311.543	5538.456	3-19
5157	2072999.105	2682328.533	5538.291	3-20
5166	2072416.017	2682171.780	5553.305	3-13
5169	2072857.067	2682062.506	5537.287	3-18
5170	2072787.476	2681956.385	5537.936	3-14
5175	2072782.685	2681877.332	5537.478	3-15
5178	2072885.743	2681803.840	5534.936	3-17
5180	2072944.418	2681461.020	5531.205	3-16
5182	2073563.107	2681625.150	5523.124	3-25
5185	2073477.156	2681915.466	5522.104	6-4
5187	2073807.200	2682138.079	5515.218	3-4
5195	2073820.002	2681031.127	5526.278	3-3
5197	2073642.845	2680626.731	5525.122	3-1



Western Refinery
Monitoring Wells
Surveyed on March 06, 2012
SPC NM West

Exhibit "A"

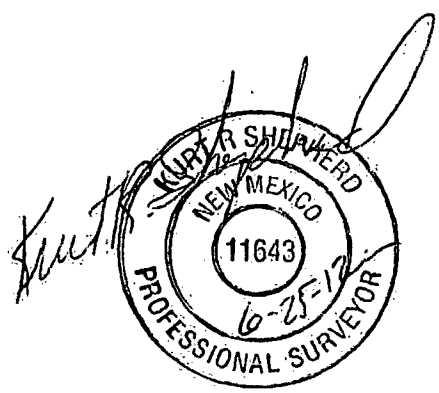
Point Number	Northing	Easting	Elevation	Descriptor
5100	2073370.61	2684757.931	5517.800	BK-10 (MW-BCK2)
5101	2073370.88	2684757.863	5516.522	CONC
5102	2073372.58	2684757.867	5516.131	GS
5103	2070898.1	2683704.928	5620.140	BK-9 (MW-BCK1)
5104	2070898.28	2683705.031	5617.952	CONC
5105	2070899.74	2683705.705	5617.508	GS
5140	2074039.6	2683303.847	5527.96	MW-67
5139	2074039.91	2683304.31	5525.398	CONC
5138	2074041.14	2683305.488	5524.776	GS

Legend

BK-9, BK-10 & MW67 = Top of casing

Conc = Concrete collar at monitoring well

GS = Ground surface at monitoring well



Appendix C

Field Methods

Field Methods

Pursuant to Section IV of the Order, an investigation of soils and groundwater was conducted to determine naturally occurring concentrations of constituents of concern. The field methods are described below and individual discussions are presented for the following activities:

- Drilling procedures;
- Soil screening;
- Decontamination procedures;
- Monitoring well development;
- Fluid level measurements;
- Purging of monitoring wells/groundwater sample collection;
- Sample collection and handling procedures;
- Vadose zone vapor sampling;
- Equipment calibration; and
- Management of investigation derived waste.

Drilling Procedures

The soil borings were drilled using the hollow-stem auguring (HSA) method and ODEX, or a hand auger was used for shallow (two-foot) borings. Soil samples were collected continuously and logged by a qualified geologist in accordance with the Unified Soil Classification System (USCS) nomenclature. As shown on the boring logs, the data recorded included the lithologic interval, symbol, percent recovery, field screening results, and a sample description of the cuttings and core samples.

Soil Screening

Samples obtained from the borings were screened in the field on 2-foot intervals for evidence of contaminants. Field screening results were recorded on the soil boring logs. Field screening results were used to aid in the selection of soil samples for laboratory analysis. The primary screening methods include: (1) visual examination, (2) olfactory examination, and (3) headspace vapor screening for volatile organic compounds.

Visual screening included examining the soil samples for evidence of staining caused by petroleum-related compounds or other substances that may have caused staining of soils such as elemental sulfur or cyanide compounds. Headspace vapor screening was conducted and involved placing a soil sample in a plastic sealable bag allowing space for ambient air. The bag was sealed, labeled and then shaken gently to expose the soil to the air trapped in the container. The sealed bag was allowed to rest for a minimum of 5 minutes while the vapors equilibrated. Vapors present within the sample bag's headspace were then measured by

inserting the probe of a MiniRae 3000 portable volatile organic constituent (VOC) monitor in a small opening in the bag. The maximum value and the ambient air temperature were recorded on the field boring log for each sample. The screening results are presented in Table 1. Field screening results and any conditions that were considered to be capable of influencing the results of the field screening were recorded on the field logs.

Decontamination Procedures

The drilling equipment (e.g., hollow-stem augers) was decontaminated between each borehole using a high pressure potable water wash. The sampling equipment coming in direct contact with the samples (e.g., hand augers and split-spoon samplers) were decontaminated using a brush, as necessary, to remove larger particulate matter followed by a rinse with potable water, wash with nonphosphate detergent, rinse with potable water, and double rinse with deionized water.

Monitoring Well Development

Following monitoring well completion activities, the new monitoring wells (MW-BCK1 and MW-BCK2) were developed using mechanical surging. The surging motion drew filter pack fines and loosened sediment into the well casing, improving the water quality within the surrounding formation and filter pack.

The groundwater/sediment mixture discharged directly into a 55-gallon drum. A glass jar was used to capture a sample of the purge water every 15 minutes to monitor the improving clarity of the purge water. Development ceased once the purge water was relatively clear.

Fluid Level Measurements

The depth to groundwater was measured prior to purging the wells of potentially stagnant groundwater. The measurements are presented in Table 2. A Keck KIR Interface Probe was used to measure fluid levels to 0.01 foot. The depth to the bottom of the wells was also recorded and the depth measured in MW-BCK2 was less than anticipated based on well construction information. This information is presented in Table 2.

Purging of Monitoring Wells/Groundwater Sample Collection

Both wells were purged dry and allowed to recover prior to sample collection. The purge volumes, which would otherwise normally apply, are calculated as follows:

Volume (gallons) = water column thickness (ft) x 3.14 x radius of well casing^2 (ft) x 7.48 (gals/ft). The calculated purge volumes and actual volumes removed from each well are presented below. The removal volumes include water purged during well development.

Well (date)	Water Column Thickness (ft)	Calculated Purge Volume (gallons) – 3 Well Volumes	Actual Purge Volume (gallons)
MW-BCK1 (6/14/2012)	3.46	2.3	3.0
MW-BCK2 (6/14/2012)	20.79	10.2	14.0

Field measurements of groundwater stabilization parameters included pH, specific conductance, dissolved oxygen concentrations, oxidation-reduction potential, and temperature. These measurements are presented in Table 5. A disposable bailer was used to remove groundwater from the well during the purging procedures.

Sample Collection and Handling Procedures

Soil samples were collected using split-spoon samplers or directly from the auger bucket for borings completed with a hand auger. The selected portion of the sample interval was placed in pre-cleaned, laboratory-prepared sample containers for laboratory chemical analysis. Three soil samples were collected for VOC analysis. An Encore® Sampler was used for collection of soil samples for low-level VOC analysis pursuant to EPA method 5035; the second sample aliquot (approximately 1 gram) was placed in a laboratory-prepared container with a methanol preservative; and the third sample aliquot was placed in an 8-ounce glass jar, which was filled to the top to minimize any head space.

Groundwater samples were collected with disposable bailers and immediately poured directly into clean laboratory supplied sample containers with the exception of samples collected for dissolved analyses. Samples specified for dissolved analyses were filtered in the field using a disposable 0.45 micron filter. A new filter and syringe enclosure were used for each sample. All samples were immediately placed into an ice chest with ice. The samples were maintained in the custody of the sampler until the chain-of-custody form was completed and the ice chest was sealed for shipment to the laboratory.

Equipment Calibration

Soil vapor screening was conducted using a MiniRae 3000 portable VOC monitor. The instrument was calibrated at the beginning of each work day to a concentration of 100 ppm isobutylene.

The instruments used to measured groundwater stabilization parameters included a YSI 550A dissolved oxygen probe and an Ultrameter 6P made by the Myron L Company. The calibration solutions used at the beginning of each day are as follows:

- 4.0 pH solution;
- 7.0 pH solution;
- 10.0 pH solution;
- 1.413 mS/cm conductivity solution; and
- 220 for ORP.

There were no field conditions encountered during the sampling event that affected procedural or sample testing results.

Management of Investigation Derived Waste

The decontamination water from the drilling equipment was collected on a mobile decon trailer and was subsequently placed in open top 55-gallon drums, which were sealed at the end of each work day. The decontamination water generated from sampling equipment was collected in buckets and placed in open top 55-gallon drums, which were sealed at the end of each work day. Purge water was also collected in a 55-gallon drum. The decon and purge water was disposed in the Refinery's wastewater treatment system up-stream of the API Separator. Soil cuttings were also placed into open top 55-gallon drums and were sealed when not in use. Each drum of soils was labeled and temporarily stored in a concrete curbed area pending waste characterization.

Appendix D

Boring Logs

RPS

LOG OF BORING

Boring No.: BK-1
Start Date: 1/27/2012 1330
Finish Date: 1/27/2012 1345

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: RPS
Drilling Rig: NA
Drilling Method: Hand Auger
Sampling Method: Auger Bucket
Comments: N 36º41.519' W 107º58.151'

Total Depth: 2' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5606.110
Site Coordinates:
N 2071217.062 **E** 2683278.259

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0								Ground Surface	0
0	0-0.5'	1330	G/4oz/ 2J		0.0 46ºF		100	**Silt (ML)** Very fine grain, loose to compact, damp, brown to light brown, no odor	0
2	.5-2'	1334	G/4oz/ 2J		0.0 46ºF			Total Depth = 2' BGL	2
4									4
6									6
8									8
10									10
12									12
14									14
16									16

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

Sheet: **1 of 1**

512/347-7588
512/347-8243 fax

RPS

LOG OF BORING

Boring No.: BK-2
Start Date: 1/27/2012 1400
Finish Date: 1/27/2012 1415

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: RPS
Drilling Rig: NA
Drilling Method: Hand Auger
Sampling Method: Auger Bucket
Comments: N 36º41.507' W 107º58.130'

Total Depth: 2' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5607.917
Site Coordinates:
N 2071150.441 **E** 2683367.214

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0								Ground Surface	0
	0-0.5'	1405	G/4oz/ 2J		0.0 46ºF		100	**Silt (ML)** Very fine grain, loose to compact, damp, brown to light brown, no odor	
2	1.5-2'	1410	G/4oz/ 2J		0.0 46ºF			Total Depth = 2' BGL	2
4									4
6									6
8									8
10									10
12									12
14									14
16									16

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

Sheet: **1 of 1**

512/347-7588
512/347-8243 fax

RPS

LOG OF BORING

Boring No.: BK-3
Start Date: 1/27/2012 1420
Finish Date: 1/27/2012 1435

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: RPS
Drilling Rig: NA
Drilling Method: Hand Auger
Sampling Method: Auger Bucket
Comments: N 36º41.486' W 107º58.097'

Total Depth: 2' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5612.432
Site Coordinates:
N 2071015.801 **E** 2683527.543

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
								Ground Surface	
0	0-0.5'	1430	G/4oz/ 2J		0.0 46ºF		100	**Silt (ML)** Very fine grain, loose to compact, damp, brown to light brown, no odor	0
2	1.5-2'	1435	G/4oz/ 2J		0.0 46ºF			Total Depth = 2' BGL	2
4									4
6									6
8									8
10									10
12									12
14									14
16									16

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

Sheet: **1 of 1**

512/347-7588
512/347-8243 fax

RPS

LOG OF BORING

Boring No.: BK-4
Start Date: 1/27/2012 1440
Finish Date: 1/27/2012 1450

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: RPS
Drilling Rig: NA
Drilling Method: Hand Auger
Sampling Method: Auger Bucket
Comments: N 36º41.478' W 107º58.079'

Total Depth: 2' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5614.922
Site Coordinates:
N 2070966.402 **E** 2683615.628

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0								Ground Surface	0
	0-0.5'	1440	G/4oz/ 2J		0.0 46ºF		100	**Clayey Silt (ML)** Very fine grain, compact, damp, brown, no odor	
2	1.5-2'	1445	G/4oz/ 2J		0.0 46ºF			**Silt (ML)** Very fine grain, loose, damp, brown to light brown, no odor	2
								Total Depth = 2' BGL	
4									4
6									6
8									8
10									10
12									12
14									14
16									16

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

Sheet: **1 of 1**

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512/347-8243 fax

RPS

LOG OF BORING

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: RPS
Drilling Rig: NA
Drilling Method: Hand Auger
Sampling Method: Auger Bucket
Comments: N 36º41.456' W 107º58.099'

Total Depth: 2' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5617.175
Site Coordinates:
N 2070842.812 **E** 2683524.437

Boring No.: BK-5
Start Date: 1/27/2012 1455
Finish Date: 1/27/2012 1510

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0								Ground Surface	0
0	0-0.5'	1500	G/4oz/ 2J		0.0 46ºF		100	**Silt (ML)** Very fine grain, loose, damp, brown to light brown, no odor	0
2	1.5-2'	1505	G/4oz/ 2J		0.0 46ºF			Total Depth = 2' BGL	2
4									4
6									6
8									8
10									10
12									12
14									14
16									16

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Sheet: **1 of 1**

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LOG OF BORING

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: RPS
Drilling Rig: NA
Drilling Method: Hand Auger
Sampling Method: Auger Bucket
Comments: N 36º41.466' W 107º58.120'

Total Depth: 2' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5614.640
Site Coordinates:
N 2070912.500 **E** 2683421.432

Boring No.: BK-6
Start Date: 1/27/2012 1515
Finish Date: 1/27/2012 1525

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0								Ground Surface	0
0	0-0.5'	1515	G/4oz/ 2J		0.0 46ºF		100	**Silt (ML)** Very fine grain, loose, damp, brown to light brown, no odor	0
2	1.5-2'	1520	G/4oz/ 2J		0.0 46ºF				2
								Total Depth = 2' BGL	
4									4
6									6
8									8
10									10
12									12
14									14
16									16

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LOG OF BORING

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: RPS
Drilling Rig: NA
Drilling Method: Hand Auger
Sampling Method: Auger Bucket
Comments: N 36°41.480' W 107°58.143'

Total Depth: 2' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5611.983
Site Coordinates:
N 2070988.248 **E** 2683308.515

Boring No.: BK-7
Start Date: 1/27/2012 1525
Finish Date: 1/27/2012 1540

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/ Containe/No.	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0								Ground Surface	0
0	0-0.5' &Dup	1530	G/4oz/ 4J		0.0 46ºF		100	**Silt (ML)** Very fine grain, loose, damp, brown to light brown, no odor	0
2	1.5-2'	1535	G/4oz/ 2J		0.0 46ºF			Total Depth = 2' BGL	2

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LOG OF BORING

Boring No.: BK-8
Start Date: 1/27/2012 1550
Finish Date: 1/27/2012 1600

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: RPS
Drilling Rig: NA
Drilling Method: Hand Auger
Sampling Method: Auger Bucket
Comments: N 36º41.493' W 107º58.164'

Total Depth: 2' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): --
Elev., PAD (ft. msl): --
Elev., GL (ft. msl): 5606.292
Site Coordinates:
N 2071062.706 **E** 2683207.278

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/ Containe/No.	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description	Depth (ft.)
0								Ground Surface	0
	0-0.5'	1550	G/4oz/ 2J		0.0 46ºF		100	**Silt (ML)** Very fine grain, loose, damp, brown, becomes calcareous at 0.5' bgl and color becomes grayish brown	
2	1.5-2'	1555	G/4oz/ 2J		0.0 46ºF			Total Depth = 2' BGL	2
4									4
6									6
8									8
10									10
12									12
14									14
16									16

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WELL CONSTRUCTION

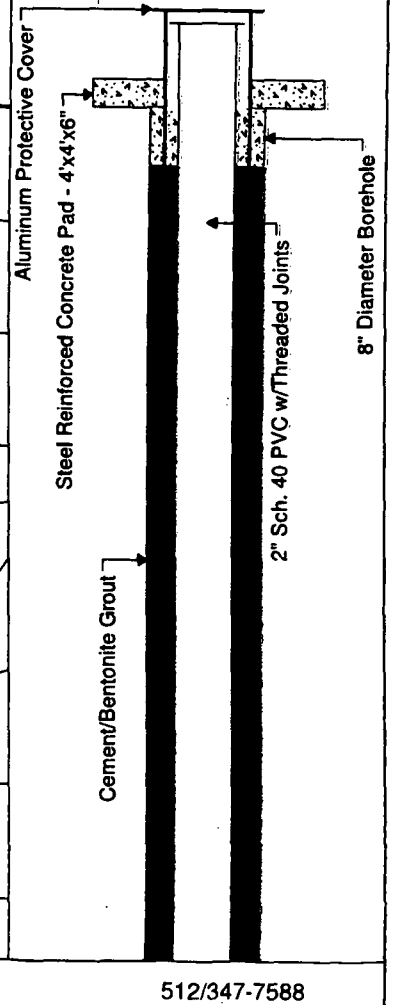
Well No.: BK-9 (MW-BCK1)
Start Date: 1/24/2012 1100
Finish Date: 2/1/2012 1425

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments:

Total Depth: 79' bgl
Ground Water: Saturated @ 73.5' bgl
Elev., TOC (ft. msl): 5620.140
Elev., PAD (ft. msl): 5617.952
Elev., GL (ft. msl): 5617.508
Site Coordinates:
N 2070898.1 **E** 2683704.928

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/Container/No	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description
0								Ground Surface
0					0.0 48ºF		70	**Silty Sand (SM)** Very fine grain, compact, brown, moist to damp, no odor
2					0.0 44ºF		90	**Silty Sand (SM)** Similar to above, light brown to tan
4	5-5.5'	1125	G/4oz/3J		0.0 44ºF		90	**Silty Sand (SM)** Similar to above
6					0.0 44ºF		90	**Sand (SP)** Fine grain, loose, damp, brown, no odor
8							90	**Sandy Clay (CL)** Moderate plasticity, firm, damp, gray, fine grain sand in partings, no odor, calcareous
10					0.0 39ºF		90	**Sand (SP)** Fine grain, loose, damp, light brown, no odor
12					0.0 38ºF		80	**Sand (SP)** Similar to above
14					0.0 38ºF		80	**Sand (SP)** Similar to above
								Sand (SP) Similar to above

Completion Results



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WELL CONSTRUCTION

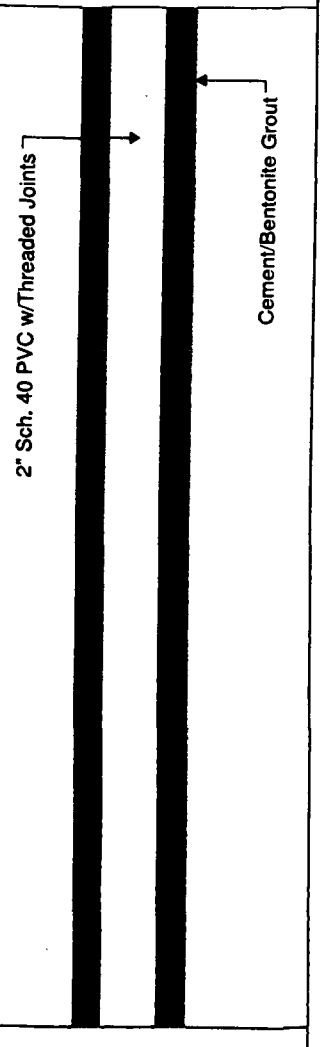
Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments:

Total Depth: 79' bgl
Ground Water: Saturated @ 73.5' bgl
Elev., TOC (ft. msl): 5620.140
Elev., PAD (ft. msl): 5617.952
Elev., GL (ft. msl): 5617.508
Site Coordinates:
N 2070898.1 **E** 2683704.928

Well No.: BK-9 (MW-BCK1)
Start Date: 1/24/2012 1100
Finish Date: 2/1/2012 1425

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description
16					0.0 38ºF		90	
18					0.0 41ºF		90	**Sand (SP)** Fine grain, loose, damp, light brown, no odor
20					0.0 41ºF		80	**Sand (SP)** Similar to above
22					0.0 41ºF		90	**Sand (SP)** Similar to above
24					0.0 45ºF		90	**Sand (SP)** Similar to above
26					0.0 45ºF		90	**Sand (SP)** Similar to above
28					0.0 50ºF		90	**Sand (SP)** Similar to above
30					0.0 50ºF		90	**Silty Clay (CL)** Low plasticity, firm, damp, brown, trace fine grain sand **Silty Clay/Clayey Silt (CL)** Low to moderate plasticity, firm, damp, brown, trace fine grain sand
32								**Clayey Silt (ML)** Low plasticity, firm to soft, brown, clay lense at base

Completion Results



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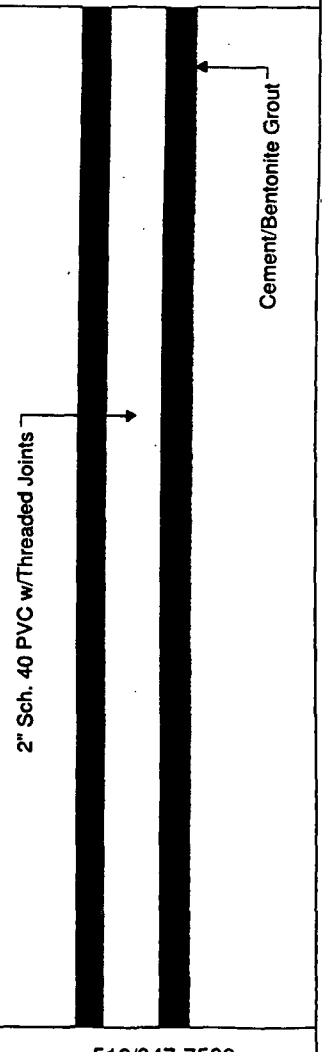
Well No.: BK-9 (MW-BCK1)
Start Date: 1/24/2012 1100
Finish Date: 2/1/2012 1425

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments:

Total Depth: 79' bgl
Ground Water: Saturated @ 73.5' bgl
Elev., TOC (ft. msl): 5620.140
Elev., PAD (ft. msl): 5617.952
Elev., GL (ft. msl): 5617.508
Site Coordinates:
N 2070898.1 **E** 2683704.928

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description
33					0.0 53ºF		90	**Clayey Silt/Silt (ML)** Similar to above, clay content decreases with depth, light brown
35					0.0 53ºF		70	**Silty Sand (SM)** Very fine grain, loose, brown, damp
37					0.0 53ºF		90	**Sand (SP)** Very fine to medium grained, subrounded, loose to compact, brown to gray, no oodor, damp
39					0.0 53ºF		80	**Silty Sand (SM)** Very fine grain, loose, brown, damp, no odor
41					0.0 54ºF		90	**Silty Sand (SM)** Similar to above
43					0.0 51ºF		90	**Silty Sand (SM)** Similar to above
45					0.0 46ºF		90	**Silty Sand (SM)** Similar to above
47					0.0 46ºF		90	**Silty Sand (SM)** Similar to above
49					0.0		90	**Silty Sand (SM)** Similar to above

Completion Results



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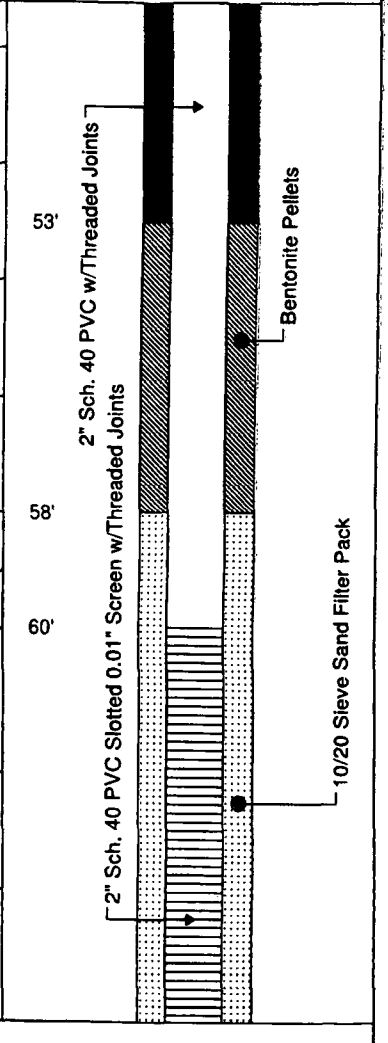
Well No.: BK-9 (MW-BCK1)
Start Date: 1/24/2012 1100
Finish Date: 2/1/2012 1425

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments:

Total Depth: 79' bgl
Ground Water: Saturated @ 73.5' bgl
Elev., TOC (ft. msl): 5620.140
Elev., PAD (ft. msl): 5617.952
Elev., GL (ft. msl): 5617.508
Site Coordinates:
N 2070898.1 **E** 2683704.928

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description
					44ºF			
51					0.0 43ºF		70	**Silty Sand (SM)** Very fine grain, loose, brown, damp, no odor, trace fine to medium grain subrounded sand
53					0.0 43ºF		70	**Silty Sand (SM)** Similar to above
55	54-56'	1500	G/4oz/3J		0.0 44ºF		95	**Clay (CH)** High plasticity, stiff, damp, dark brown
57					0.0 44ºF		90	**Clay (CH)** Similar to above
59					0.0 44ºF		70	**Clay/Gravel (CH/GW)** Refusal with split spoon, gravel chips in spoon
					0.0 44ºF		10	**Gravel (GW)** Gravel chips in spoon
61					0.0 42ºF		10	**Gravel (GW)** Split spoon from 62-62.5' bgl
63					0.0 42ºF		10	**Gravel (GW)** Split spoon from 64-64.5' bgl
65					0.0 42ºF		10	**Gravel (GW)** Split spoon from 66.0-66.5' bgl

Completion Results



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WELL CONSTRUCTION

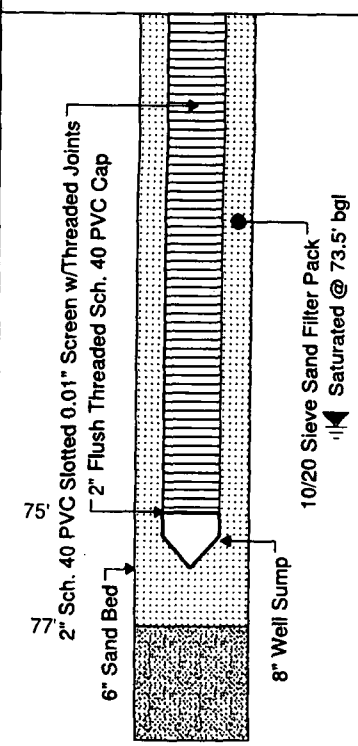
Well No.: BK-9 (MW-BCK1)
Start Date: 1/24/2012 1100
Finish Date: 2/1/2012 1425

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments

Total Depth: 79' bgl
Ground Water: Saturated @ 73.5' bgl
Elev., TOC (ft. msl): 5620.140
Elev., PAD (ft. msl): 5617.952
Elev., GL (ft. msl): 5617.508
Site Coordinates:
N 2070898.1 **E** 2683704.928

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description
68							5	**Gravel (GW)** Sampled from 70-70.5'
70					0.0 41°F			
72								**Gravel (GW)** Similar to above
74	73-73.5'	0900	G/4oz/1J	73.5'			10	**Gravel (GW)** Similar to above, moist to saturated at base
76								**Clay/Shale (CL)** Very dense, dry, yellowish brown, Nacimiento Formation
78							80	**Clay/Shale (CL)** Similar to above **Clay/Shale (CL)** Low plasticity, very dense, very stiff, dry, gray
80								Total Depth = 79' BGL
82								

Completion Results



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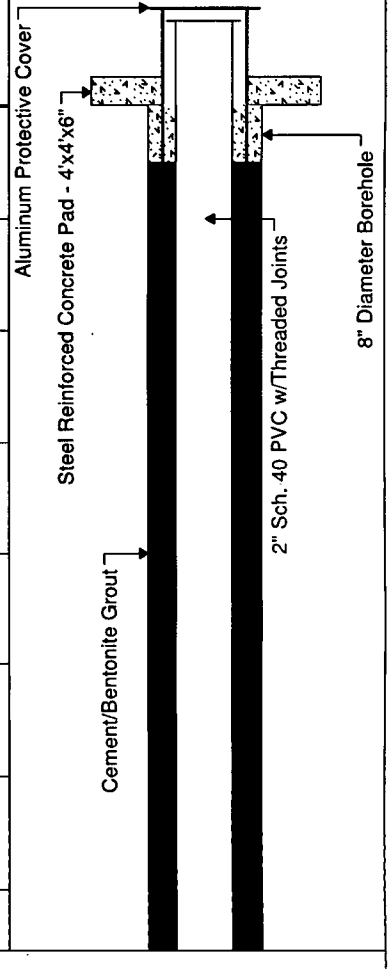
Well No.: BK-10 (MW-BCK2)
Start Date: 2/7/2012 1740
Finish Date: 2/13/2012 1400

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 36º41.873' W 107º57.845'

Total Depth: 60' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): 5517.800
Elev., PAD (ft. msl): 5516.522
Elev., GL (ft. msl): 5516.131
Site Coordinates:
N 2073370.61 **E** 2684757.931

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/Container/No	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description
								Ground Surface
0					0.0 33ºF		100	**Silt (ML)** Very fine grain, loose, dry, brown, no odor
2					0.0 33ºF		90	**Silt (ML)** Similar to above
4					0.0 33ºF		80	**Silt (ML)** Similar to above, gravel at base
6	5-6' &Dup	0753	G/4oz/4J		0.0 33ºF		10	**Sandy Gravel (GW)** Fine gravel sand in 1/2" to >3" size gravel, damp, gray, no odor
8					0.0 33ºF		30	**Sandy Gravel (GW)** Similar to above
10							--	No Recovery
12					0.0 33ºF		95	**Silt/Sand/Clay (CL)** Very fine grain, compact to dense, dry/crumbly, light gray/tan
14								**Silty Clay (CL)** Similar to above, gray, no odor, very dense

Completion Results



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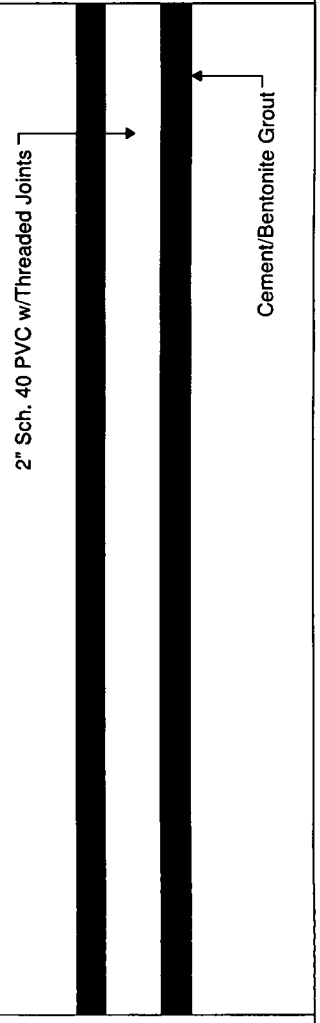
Well No.: BK-10 (MW-BCK2)
Start Date: 2/7/2012 1740
Finish Date: 2/13/2012 1400

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 36º41.873' W 107º57.845'

Total Depth: 60' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): 5517.800
Elev., PAD (ft. msl): 5516.522
Elev., GL (ft. msl): 5516.131
Site Coordinates:
N 2073370.61 **E** 2684757.931

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description
16					0.0 33ºF		80	
					0.0 33ºF		80	**Silty Clay (CL)** Similar to above, gray, very dense, calcite crystals present
18					0.0 33ºF		60	**Clayey Silt (ML)** Very low plasticity, firm, dry, grayish brown, no odor
20					0.0 33ºF		80	**Clayey Silt (ML)** Similar to above, dry, firm
22					0.0 35ºF		80	**Silty CLay (CL)** Low plasticity, very stiff/compact, dry, gray, no odor, calcite crystals
24					0.0 35ºF		90	**Silty Clay (CL)** Similar to above
26					0.0 35ºF		70	**Silty Sand/Sandstone (SP/SS)** Very fine grain, compact to cemented, damp, greenish gray, no odor
28					0.0 39ºF		50	**Silty Sand/Sandstone (SP/SS)** Similar to above, no odor
30					0.0 41ºF		50	**Silty Sand/Sandstone (SP/SS)** Similar to above, cemented, no odor, gray
32								

Completion Results



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WELL CONSTRUCTION

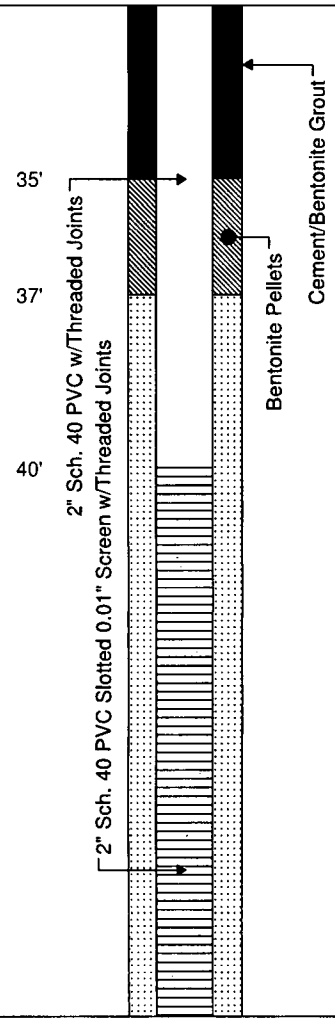
Well No.: BK-10 (MW-BCK2)
Start Date: 2/7/2012 1740
Finish Date: 2/13/2012 1400

Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 36º41.873' W 107º57.845'

Total Depth: 60' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): 5517.800
Elev., PAD (ft. msl): 5516.522
Elev., GL (ft. msl): 5516.131
Site Coordinates:
N 2073370.61 **E** 2684757.931

Depth (ft.)	Sampling: Sample Depth	Sampling: Time	Sampling: Sample Type/Container/No	Sampling: Saturation	Sampling: Organic Vapor (ppm)	Sampling: USCS Class	Recovery (%)	Sample Description
33					0.0 41ºF		80	**Clayey Silt (ML)** Very low plasticity, firm, slightly cemented, dry, gray, no odor
35					0.0 43ºF		80	**Clayey Silt (ML)** Similar to above
37					0.0 41ºF		50	**Clayey Silt (ML)** Similar to above
39					0.0 43ºF		50	**Clayey Silt (ML)** Similar to above, trace sand
41	40- 42'	1043	G/4oz/ 3J		0.0 43ºF		50	**Clayey Silt (ML)** Similar to above, trace sand, compact to cemented
43					0.0 47ºF		50	**Clayey Silt/Sand (ML/SC)** Low plasticity, firm, damp, gray, no odor, core saturated outside, poorly cemented
					0.0 47ºF			**Clayey Silt/Sand (ML/SC)** Similar to above
45					0.0 47ºF		25	**Silty Sand (SM)** Fine grain, compact to poorly cemented, damp, greenish gray, no odor
47					0.0 47ºF		75	**Silty Sand (SM)** Similar to above
49					0.0		50	**Silty Sand (SM)** Similar to above

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RPS

WELL CONSTRUCTION

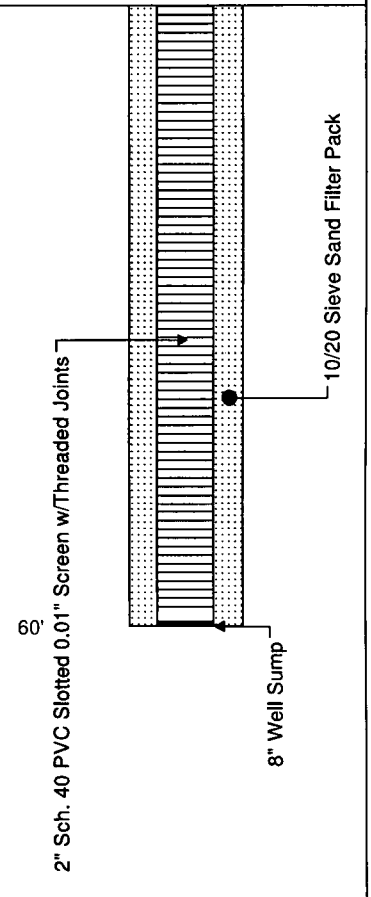
Client: Western Refining Southwest, Inc.
Site: Background Investigation, Bloomfield Refinery
Job No.: UEC01318 - Bloomfield, NM
Geologist: Tracy Payne
Driller: Enviro-Drill, Inc.
Drilling Rig: CME 75
Drilling Method: Hollow Stem Augers
Sampling Method: Split Spoon
Comments: N 36º41.873' W 107º57.845'

Total Depth: 60' bgl
Ground Water: Not Encountered
Elev., TOC (ft. msl): 5517.800
Elev., PAD (ft. msl): 5516.522
Elev., GL (ft. msl): 5516.131
Site Coordinates:
N 2073370.61 **E** 2684757.931

Well No.: BK-10 (MW-BCK2)
Start Date: 2/7/2012 1740
Finish Date: 2/13/2012 1400

Depth (ft.)	Sampling: Sample Depth	Time	Sample Type/Container/No	Saturation	Organic Vapor (ppm)	USCS Class	Recovery (%)	Sample Description
					47ºF			
51					0.0 47ºF		50	**Silty Sand (SM)** Similar to above, fine grain, compact to poorly cemented, damp, greenish gray, no odor
53					0.0 49ºF		50	**Silty Sand (SM)** Similar to above
55					0.0 49ºF		60	**Silty Sand (SM)** Similar to above, trace clayey sand
57					0.0 49ºF		60	**Silty Sand (SM)** Similar to above, trace clayey sand
59					0.0 49ºF		60	**Silty Sand (SM)** Similar to above
61								Total Depth = 60' BGL
63								
65								

Completion Results



RPS
404 Camp Craft Road
Austin, Texas 78746

512/347-7588
512/347-8243 fax

Appendix E

Analytical Data Reports

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

April 13, 2012

Kelly Robinson

Western Refining Southwest, Inc.
#50 CR 4990
Bloomfield, NM 87413
TEL: (505) 632-4135
FAX (505) 632-3911

RE: RCRA Background Investigation OrderNo.: 1201809

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 3 sample(s) on 1/27/2012 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued February 24, 2012.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1201809**
Date Reported: **4/13/2012**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: RCRA Background Investigation
Lab ID: 1201809-001 **Matrix:** SOIL

Client Sample ID: BK-9 (5-5.5')
Collection Date: 1/24/2012 11:25:00 AM
Received Date: 1/27/2012 10:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE ORGANICS						Analyst: **JMP**
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	1/29/2012 10:34:45 PM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	1/29/2012 10:34:45 PM
Surr: DNOP	85.5	77.4-131		%REC	1	1/29/2012 10:34:45 PM
EPA METHOD 8015B: GASOLINE RANGE						Analyst: **RAA**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	1/30/2012 2:23:47 PM
Surr: BFB	96.4	69.7-121		%REC	1	1/30/2012 2:23:47 PM
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	3.7	0.30		mg/Kg	1	2/1/2012 6:28:23 AM
Chloride	260	30		mg/Kg	20	2/1/2012 7:20:37 AM
Sulfate	330	30		mg/Kg	20	2/1/2012 7:20:37 AM
EPA METHOD 7471: MERCURY						Analyst: **JLF**
Mercury	0.0063	0.033	J	mg/Kg	1	1/30/2012 3:22:38 PM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	6,600	600		mg/Kg	200	2/8/2012 6:45:33 AM
Antimony	ND	2.5		mg/Kg	1	2/7/2012 9:24:54 AM
Arsenic	1.5	2.5	J	mg/Kg	1	2/7/2012 9:24:54 AM
Barium	250	1.0		mg/Kg	10	2/8/2012 10:20:06 AM
Beryllium	0.24	0.15		mg/Kg	1	2/7/2012 9:24:54 AM
Boron	4.1	2.0		mg/Kg	1	2/7/2012 9:24:54 AM
Cadmium	ND	0.10		mg/Kg	1	2/7/2012 9:24:54 AM
Chromium	3.5	0.30		mg/Kg	1	2/7/2012 9:24:54 AM
Cobalt	2.1	0.30		mg/Kg	1	2/7/2012 9:24:54 AM
Copper	2.3	0.30		mg/Kg	1	2/7/2012 9:24:54 AM
Iron	6,500	200		mg/Kg	200	2/8/2012 6:45:33 AM
Lead	1.7	0.25		mg/Kg	1	2/7/2012 9:24:54 AM
Manganese	160	1.0		mg/Kg	10	2/8/2012 10:20:06 AM
Molybdenum	0.42	0.40		mg/Kg	1	2/7/2012 9:24:54 AM
Nickel	3.0	0.50		mg/Kg	1	2/7/2012 9:24:54 AM
Selenium	ND	2.5		mg/Kg	1	2/7/2012 9:24:54 AM
Silver	ND	0.25		mg/Kg	1	2/7/2012 9:24:54 AM
Thallium	ND	2.5		mg/Kg	1	2/7/2012 9:24:54 AM
Uranium	ND	5.0		mg/Kg	1	2/7/2012 9:24:54 AM
Vanadium	11	2.5		mg/Kg	1	2/7/2012 9:24:54 AM
Zinc	12	2.5		mg/Kg	1	2/7/2012 9:24:54 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-9 (54-56')
Project: RCRA Background Investigation **Collection Date:** 1/24/2012 3:00:00 PM
Lab ID: 1201809-002 **Matrix:** SOIL **Received Date:** 1/27/2012 10:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	3.9	0.30		mg/Kg	1	2/1/2012 7:38:02 AM
Chloride	2.5	1.5		mg/Kg	1	2/1/2012 7:38:02 AM
Sulfate	250	30		mg/Kg	20	2/1/2012 7:55:27 AM
EPA METHOD 7471: MERCURY						Analyst: **JLF**
Mercury	0.0082	0.033	J	mg/Kg	1	1/30/2012 3:27:58 PM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	36,000	3,000		mg/Kg	1000	2/10/2012 6:38:26 AM
Antimony	ND	5.0		mg/Kg	2	2/8/2012 6:47:33 AM
Arsenic	2.7	5.0	J	mg/Kg	2	2/8/2012 6:47:33 AM
Barium	52	0.20		mg/Kg	2	2/8/2012 6:47:33 AM
Beryllium	1.2	0.30		mg/Kg	2	2/8/2012 6:47:33 AM
Boron	3.8	4.0	J	mg/Kg	2	2/8/2012 6:47:33 AM
Cadmium	ND	0.20		mg/Kg	2	2/8/2012 6:47:33 AM
Chromium	13	0.60		mg/Kg	2	2/8/2012 6:47:33 AM
Cobalt	7.4	0.60		mg/Kg	2	2/8/2012 6:47:33 AM
Copper	12	0.60		mg/Kg	2	2/8/2012 6:47:33 AM
Iron	31,000	1,000		mg/Kg	1000	3/18/2012 12:31:30 PM
Lead	3.2	0.50		mg/Kg	2	2/8/2012 6:47:33 AM
Manganese	350	1.0		mg/Kg	10	3/16/2012 8:40:02 AM
Molybdenum	0.96	0.80		mg/Kg	2	2/8/2012 6:47:33 AM
Nickel	8.5	1.0		mg/Kg	2	2/8/2012 6:47:33 AM
Selenium	ND	5.0		mg/Kg	2	2/8/2012 6:47:33 AM
Silver	ND	0.50		mg/Kg	2	2/8/2012 6:47:33 AM
Thallium	ND	5.0		mg/Kg	2	2/8/2012 6:47:33 AM
Uranium	ND	25		mg/Kg	5	2/10/2012 6:36:19 AM
Vanadium	33	5.0		mg/Kg	2	2/8/2012 6:47:33 AM
Zinc	46	5.0		mg/Kg	2	2/8/2012 6:47:33 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** MeOH Blank
Project: RCRA Background Investigation **Collection Date:**
Lab ID: 1201809-003 **Matrix:** MEOH BLAN **Received Date:** 1/27/2012 10:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: GASOLINE RANGE						Analyst: **RAA**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	1/30/2012 4:24:33 PM
Surr: BFB	82.5	69.7-121		%REC	1	1/30/2012 4:24:33 PM

Qualifiers:

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

CASE NARRATIVE February 22, 2012

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com *FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM*

Project Tracking No.: 1201809
Anatek Batch: 120131031

Project Summary: Two (2) soil samples were received on 1/31/2012 for Total Cyanide (EPA 335.4) analysis. All samples were received with the appropriate chain of custody. Samples were received at 1.0C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1201809-001C BK-9 (5-5.5')	120131031-001	EPA 335.4
1201809-002B BK-9 (54-56')	120131031-002	EPA 335.4

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Y	NA
Tune(s) Valid?	NA	NA
Internal Standard Responses Valid?	NA	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

1. Holding Time Requirements

No problems encountered.

2. GC/MS Tune Requirements

N/A

3. Calibration Requirements

No problems encountered.

4. Surrogate Recovery Requirements

N/A.

5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

6. Method Blank Requirements

No problems encountered.

7. Internal Standard(s) Response Requirements

N/A

8. Comments

None.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by: John W. Coll

Anatek Labs, Inc.

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

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120131031
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201809
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120131031-001	**Sampling Date**	1/24/2012	**Date/Time Received**	1/31/2012 12:00 PM
Client Sample ID	1201809-001C / BK-9 (5-5.5)	**Sampling Time**	11:25 AM		
Matrix	Soil	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/7/2012	CRW	EPA 335.4	
%moisture	3.2	Percent		2/8/2012	CRW	%moisture	

Sample Number	120131031-002	**Sampling Date**	1/24/2012	**Date/Time Received**	1/31/2012 12:00 PM
Client Sample ID	1201809-002B / BK-9 (54-56)	**Sampling Time**	3:00 PM		
Matrix	Soil	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/7/2012	CRW	EPA 335.4	
%moisture	15.7	Percent		2/8/2012	CRW	%moisture	

Authorized Signature

John Coddington, Lab Manager

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

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

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2532; ID:WA00169; WA:C585; MT:Cert0095

Anatek Labs, Inc.

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

Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 120131031
Project Name: 1201809

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Cyanide	0.470	mg/kg	0.5	94.0	80-120	2/7/2012	2/7/2012

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
120131031-001	Cyanide	ND	14.2	mg/kg	12.9	110.1	60-140	2/7/2012	2/7/2012

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide	13.9	mg/kg	12.9	107.8	2.1	0-25	2/7/2012	2/7/2012

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide	ND	mg/Kg	0.3	2/7/2012	2/7/2012

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

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C586; MT:Cert0095

Anatek Labs, Inc.

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

Login Report

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

Order ID: 120131031
Order Date: 1/31/2012

Contact Name: ANDY FREEMAN
Project Name: 1201809
Comment:

Sample #: 120131031-001 **Customer Sample #:** 1201809-001C / BK-9 (5-5.5)

Recv'd: ☑ **Collector:** **Date Collected:** 1/24/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 1/31/2012 12:00:00 P
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/10/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/10/2012	***Normal (6-10 Days)***

Sample #: 120131031-002 **Customer Sample #:** 1201809-002B / BK-9 (54-56)

Recv'd: ☑ **Collector:** **Date Collected:** 1/24/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 1/31/2012 12:00:00 P
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/10/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/10/2012	***Normal (6-10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	1.0
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

ALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY REC

PAGE: 1 OF: 1

120131 031 HALL Last Due 2/10/2012
1st SAMP 1/24/2012 1st RCVD 1/31/2012
1201809

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

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1201809-001C	BK-9 (5-5.5')	4OZGU	Soil	1/24/2012 11:25:00 AM	1	TOTAL CYANIDE
2	1201809-002B	BK-9 (54-56')	4OZGU	Soil	1/24/2012 3:00:00 PM	1	TOTAL CYANIDE
3						0	
4		MWBG				0	
5						0	
6						0	
7						0	
8						0	
9						0	
10						0	

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 1.0 °C
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ICE / ICE-PACKS PRESENT: Y
- CUSTODY SEALS PRESENT: Y
- PRESERVATIVES: —
- NUMBER OF CONTAINERS: 2 SHIPPED VIA: F
- DATE & TIME: 1-31-12 1700 INSPECTED BY: BT

SPECIAL INSTRUCTIONS / COMMENTS:

PLEASE PROVIDE LEVEL 4 QA/QC PACKAGE. Please include the blue ice. Thank you.

...allenvironmental.com. Please return all coolers and

Relinquished By:	Date: 1/27/2012	Time: 3:16 PM	Received By:		
Relinquished By:	Date:	Time:	Received By:		
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard ☐ RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

RT TRANSMITTAL DESIRED:
☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY

Temp of samples ____ °C Attempt to Cool ? ____

Comments: ____

CYANIDE EXTRACTION BENCHSHEET SW 846

Instrument names & IDs: Denver A-160 balance; Alpchem FIA

Date	SAMPLE #	% Solids	Sample Amt (g)	H2O (mL)	Final Volume	Multiplier	Chemist
1/31/12	120125012-1	10.0	10.11	250	250	24.7	CAW
	120126014-1	9.5	10.14			26.0	
	120131027-1	91.8	10.04			27.1	
	-2	92.2	9.98			27.2	
	29-1	88.5	10.03			28.2	
	-2	88.9	10.18			27.6	
	-3	87.7	9.98			28.6	
	-4	90.7	9.99			27.6	
	-5	86.4	10.06			28.8	
	-6	91.2	10.12			27.1	
	-7	96.9	10.07			25.6	
	-8	94.8	10.11			26.1	
2/1/12	120131030-1	96.3	9.98	250	250	26.0	CAW
	-2	96.8	10.04			25.7	
	-3	97.1	10.08			25.5	
	-4	90.7	10.02			27.5	
	-5	92.1	10.03			27.1	
	-6	89.8	10.12			27.5	
	-7	95.1	10.02			26.2	
	-8	91.0	10.00			27.5	
	-9	91.4	10.00			27.4	
	-10	91.1	10.02			27.4	
2/2/12	120131030-11	91.9	10.02	250	250	27.1	CAW
	-12	93.5	10.00			26.7	
	-13	93.4	10.06			26.6	
	-14	93.0	10.02			26.8	
	-15	92.8	10.01			26.9	
	-16	92.4	10.03			27.0	
	-17	97.0	10.19			25.3	
	-18	92.1	10.07			27.0	
	31-1	96.9	10.06			25.7	
	-2	94.3	10.03			27.6	
2/6/12	120210021-1	87.8	10.02	250	250	28.4	CAW
	-2	95.5	10.05			26.0	
	-3	90.6	9.97			27.7	
	-4	93.0	10.04			26.8	
	-5	89.4	10.00			~~27.0~~ 28.0	
	-6	95.8	10.05			26.0	
	-7	78.2	10.01			31.9	
	-8	96.3	10.03			25.9	
	-9	85.7	9.99			29.2	
	-10	95.6	9.98			~~26.2~~ 27.2	
	120126025-1	67.2	10.01			37.2	
	120202028-1	91.0	10.02			27.4	

Total Cyanide by Semi-Automated Colorimetry
Method: EPA 335.4\SM-4500-CN-E
Distillation Bench Sheet

Weak Acid Dissociable Cyanide by
SM 4500-CN-I (check WAD column)

Total Cyanide MS/MSD/LCS Soln: M825-01 Exp: 1/4/2013
Free Cyanide MS/MSD/LCS Soln: M824-05 Exp: 12/28/2012

Method requirements: All QC +/- 10%
Equipment: Midi-vap
Instrument: ALPCHEM FIA 3000
Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	120131031-1	Soil extn	NaOH	50mL	25.7	same		
2	-1MS	↓	↓	↓	↓	↓	1mL	
3	-1MSD				↓		↓	
4	-LCS				1x			
5	-BL				↓			
6	-2				29.6			
7	30-4				27.5			
8	-5				27.1			
9	-6				27.5			
10	-7	↓	↓	↓	26.2	↓		
11	120131030-8	Soil extn	NaOH	50mL	27.5	same		
12	-9	↓	↓	↓	27.4	↓		
13	-10				27.4			
14	-11				27.1			
15	-12				26.7			
16	-13				26.6			
17	-14				26.8			
18	-15				26.9			
19	-16				27.0			
20	-17	↓	↓	↓	25.3	↓		

* If soils this calculation is taken from cyanide extraction bench sheet.

** If soils, mLs of extract used for distillation.

Extraction Reagents:	Reagent #:
methyl red indicator	A041-03
18 N H_2SO_4	A043-08
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% $MgCl_2$	A043-06

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

Distillation Initials/Date Distilled: CMV 2/6/12

Analyst Initials/Date Analyzed: OPW 2/7/12

Peak Table: Cyanide

File name: T:\DATA1\FLOW4\2012\EPA335.4\020712CM.RST
Date: February 07, 2012
Operator: CRW

CRW 2/8/12

120206FIACNS

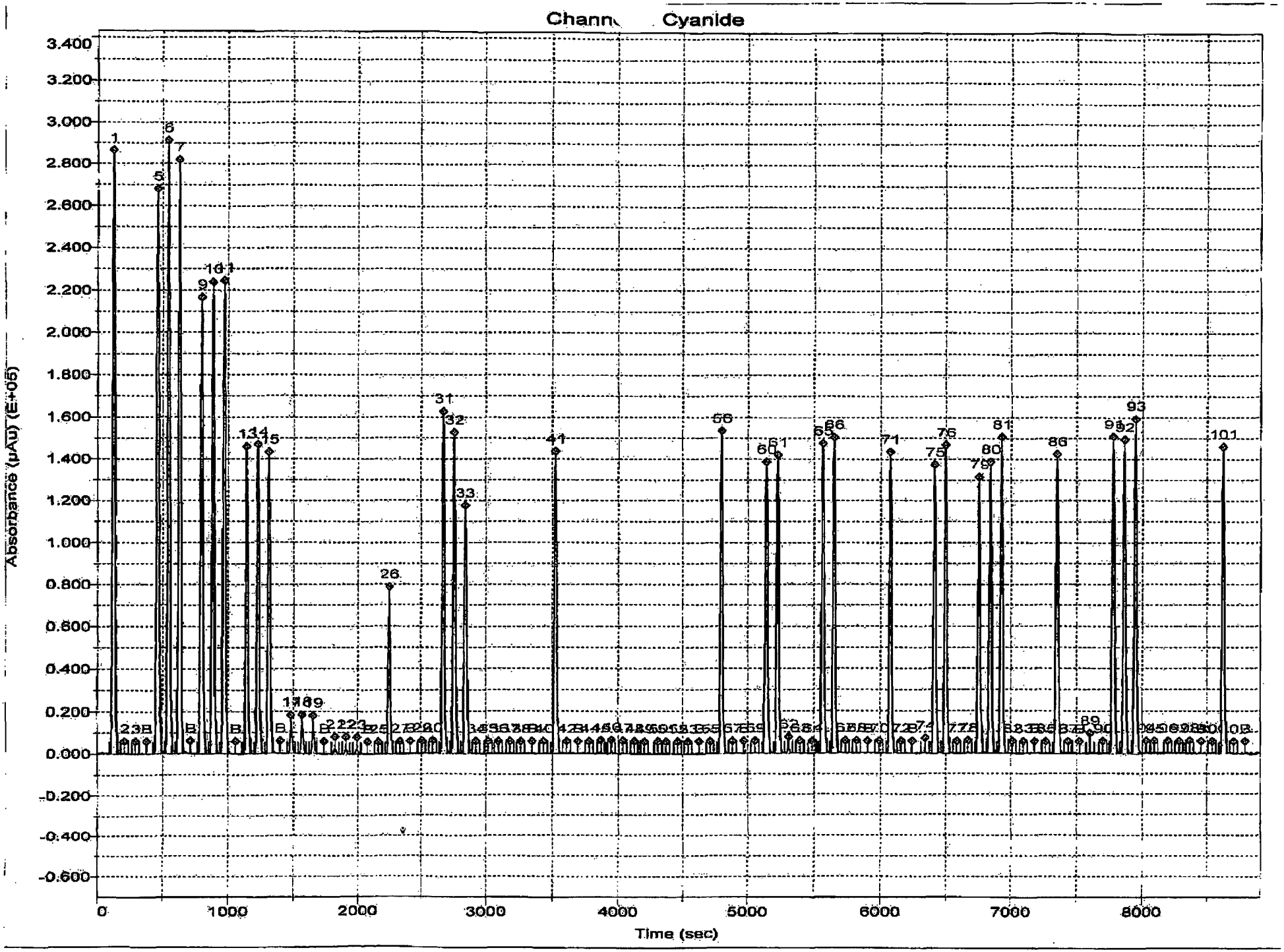
ak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
1	2	Sync	SYNC	1	1	5649722	0.999811
2	0	Carryover	CO	1	1	5578	0.003278
3	0	Carryover	CO	1	1	-4335	0.001527
B	0	Baseline	RB	1	1	-1538	0.002021
5	2	Cal 1.00 ppm	C	1	1	5644961	0.998970
6	2	Cal 1.00 ppm	C	1	1	5684558	1.005961
7	2	Cal 1.00 ppm	C	1	1	5671342	1.003628
B	0	Baseline	RB	1	1	845	0.002442
9	3	Cal 0.80 ppm	C	1	1	4469971	0.791513
10	3	Cal 0.80 ppm	C	1	1	4539475	0.803785
11	3	Cal 0.80 ppm	C	1	1	4521330	0.800581
B	0	Baseline	RB	1	1	-2089	0.001924
13	4	Cal 0.50 ppm	C	1	1	2799128	0.496508
14	4	Cal 0.50 ppm	C	1	1	2829918	0.501945
15	4	Cal 0.50 ppm	C	1	1	2819781	0.500155
B	0	Baseline	RB	1	1	-1936	0.001951
17	5	Cal 0.05 ppm	C	1	1	246194	0.045761
18	5	Cal 0.05 ppm	C	1	1	249332	0.046315
19	5	Cal 0.05 ppm	C	1	1	256284	0.047542
B	0	Baseline	RB	1	1	-1332	0.002058
21	6	Cal 0.01 ppm	C	1	1	46085	0.010430
22	6	Cal 0.01 ppm	C	1	1	47002	0.010591
23	6	Cal 0.01 ppm	C	1	1	43775	0.010022
B	0	Baseline	RB	1	1	-714	0.002167
25	1	Blank	BLNK	1	1	-4787	0.001448
26	7	ICV 0.25 ppm	CCV	1	1	1469100	0.261678
27	1	Blank	BLNK	1	1	-1123	0.002094
B	0	Baseline	RB	1	1	-1004	0.002115
29	8	120131031-BL S	U	1	1	1431	0.002545
	9	120131031-001	U	25.7	1	4217	0.078057
	10	120131031-001MS	U	25.7	1	3106466	14.154840
32	11	120131031-001MSD	U	25.7	1	3042568	13.864898
33	12	120131031-LCS	U	1	1	2647774	0.469785
34	13	120131031-002	U	29.6	1	2538	0.081129
35	14	120131030-004	U	27.5	1	-2146	0.052630
36	15	120131030-005	U	27.1	1	-2489	0.050221
37	16	120131030-006	U	27.5	1	-1456	0.055983
38	17	120131030-007	U	26.2	1	-4790	0.037909
B	0	Baseline	RB	1	1	-2099	0.001922
40	1	Blank	BLNK	1	1	28	0.002298
41	4	CCV 0.5 ppm	CCV	1	1	2774054	0.492081
42	1	Blank	BLNK	1	1	-632	0.002161
B	0	Read Baseline	RB	1	1	-819	0.002148
44	18	120131030-008	U	27.5	1	-295	0.061617
45	19	120131030-009	U	27.4	1	11932	0.120543
46	20	120131030-010	U	27.4	1	14931	0.135052
47	21	120131030-011	U	27.1	1	6211	0.091852
48	22	120131030-012	U	26.7	1	-3394	0.045218
49	23	120131030-013	U	26.6	1	-4544	0.039647
50	24	120131030-014	U	26.8	1	-2856	0.047930
51	25	120131030-015	U	26.9	1	-3799	0.043630
52	26	120131030-016	U	27	1	-5851	0.034009
53	27	120131030-017	U	25.3	1	-3846	0.040827
B	0	Baseline	RB	1	1	-1522	0.002024
55	1	Blank	BLNK	1	1	-3387	0.001695
56	4	CCV 0.5 ppm	CCV	1	1	2875216	0.509942
57	1	Blank	BLNK	1	1	3129	0.002845
B	0	Read Baseline	RB	1	1	7209	0.003566
59	28	120127027-001 WW	U	1	1	5418	0.003249
60	29	120127027-001MS	U	1	1	2857847	0.506876
61	30	120127027-001MSD	U	1	1	2864381	0.508029
?	31	120127027-002	U	5	1	50381	0.055940
]	32	120127027-005	U	1	1	9078	0.003895
64	33	120202020-001 DW	U	1	1	831	0.002439
65	34	120202020-001MS	U	1	1	2933980	0.520318
66	35	120202020-001MSD	U	1	1	2969286	0.526551

Peak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
37	36	120126041-001	U	1	1	10276	0.004107
38	37	120126041-002	U	1	1	9194	0.003916
9	0	Baseline	RB	1	1	1906	0.002629
40	1	Blank	BLNK	1	1	4062	0.003010
41	4	CCV 0.5 ppm	CCV	1	1	2861862	0.507585
42	1	Blank	BLNK	1	1	486	0.002378
3	0	Read Baseline	RB	1	1	-580	0.002190
44	38	120126041-003 RW	U	2	1	12573	0.009025
45	39	120126041-003MS	U	2	1	2821370	1.000871
46	40	120126041-003MSD	U	2	1	2954754	1.047971
47	41	120126025-BL RS	U	1	1	-6990	0.001059
48	42	120126025-001	U	37.2	1	889	0.091127
49	43	120126025-001MS	U	37.2	1	2653172	17.511463
50	44	120126025-001MSD	U	37.2	1	2806458	18.518251
51	45	120126025-LCS	U	1	1	3032619	0.537733
52	46	120202028-001	U	27.4	1	-4046	0.043246
53	47	RINSE	U	1	1	-5244	0.001367
4	0	Baseline	RB	1	1	-1934	0.001951
55	1	Blank	BLNK	1	1	-4651	0.001471
56	4	CCV 0.5 ppm	CCV	1	1	2936727	0.520803
57	1	Blank	BLNK	1	1	-2661	0.001823
8	0	Read Baseline	RB	1	1	-282	0.002243
59	48	120131031-BL	U	1	1	20842	0.005973
60	49	120131031-001	U	25.7	1	6656	0.089123
61	50	120131031-001MS	U	25.7	1	3144390	14.326928
62	51	120131031-001MSD	U	25.7	1	3054986	13.921247
63	52	120131031-LCS	U	1	1	3205898	0.568328
64	53		U	1	1	15323	0.004998
65	54		U	1	1	12107	0.004430
66	55		U	1	1	12655	0.004527
67	56		U	1	1	9435	0.003959
68	57		U	1	1	5829	0.003322
9	0	Baseline	RB	1	1	-726	0.002165
70	1	Blank	BLNK	1	1	1683	0.002590
71	4	CCV 0.5 ppm	CCV	1	1	2958652	0.524674
72	1	Blank	BLNK	1	1	-3339	0.001703
3	0	Read Baseline	RB	1	1	-3849	0.001613

Peak	Cup	Flags
5	2	
6	0	
7	0	
8	0	BL
9	2	
0	2	
1	2	
2	0	BL
3	3	
4	3	
5	3	
6	0	BL
7	4	
8	4	
9	4	
0	0	BL
1	5	
2	5	
3	5	OL
4	0	BL
5	6	
6	6	
7	6	OL
8	0	BL
9	1	
0	7	
1	1	
2	0	BL
3	8	

Peak	Cup	Flags
30	9	
31	10	
	11	
	12	
34	13	
35	14	
36	15	
37	16	
38	17	
3	0	BL
10	1	
11	4	
12	1	
3	0	BL
14	18	
15	19	
16	20	
17	21	
18	22	
19	23	
50	24	
51	25	
52	26	
53	27	
3	0	BL
55	1	
56	4	
57	1	
3	0	BL
59	28	
60	29	
61	30	
62	31	
63	32	
	33	
	34	
66	35	
67	36	
68	37	
3	0	BL
70	1	
71	4	
72	1	
3	0	BL
74	38	
75	39	
76	40	
77	41	
78	42	
79	43	
80	44	
81	45	
82	46	
83	47	
3	0	BL
85	1	
86	4	
87	1	
3	0	BL
89	48	
90	49	
91	50	
92	51	
93	52	
94	53	
95	54	
	55	
	56	
97	57	
3	0	BL
100	1	

Peak	Cup	Flags
101	4	
102	1	
B	0	BL


Chann Cyanide
Absorbance (µAU) (E+05)
Time (sec)
3.400
3.200
3.000
2.800
2.600
2.400
2.200
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
-0.200
-0.400
-0.600
0
1000
2000
3000
4000
5000
6000
7000
8000

Cyanide: Calibration, Peak 3 165

File name: T:\DATA1\FLOW4\2012\EPA335.4\020712CM.RST
Date: February 07, 2012
Operator: CRW

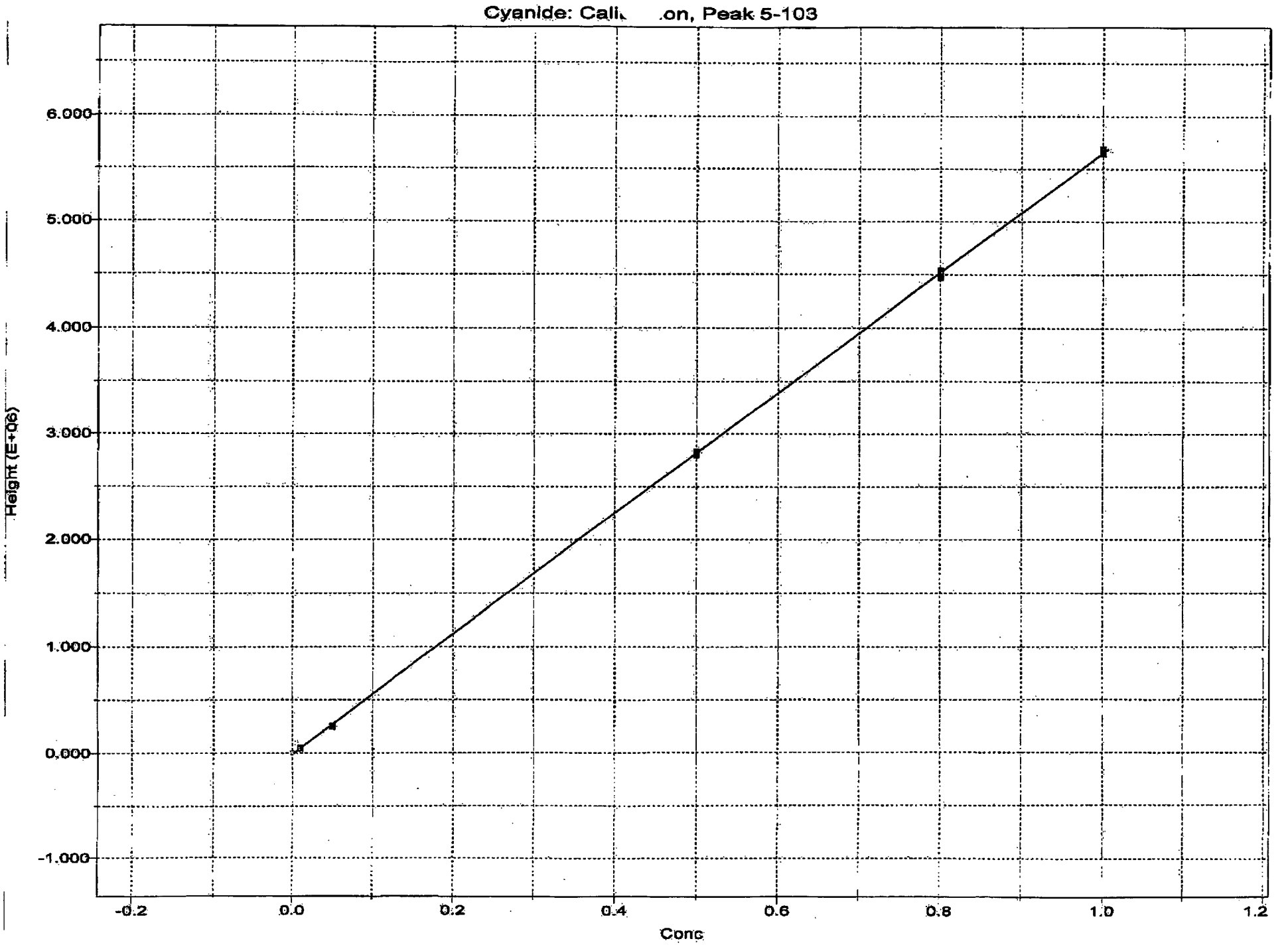
*	Name	Conc	Area
*	Cal 1.00 ppm	1.000000	5644961.000000
*	Cal 1.00 ppm	1.000000	5684557.500000
*	Cal 1.00 ppm	1.000000	5671341.500000
*	Cal 0.80 ppm	0.800000	4469971.000000
*	Cal 0.80 ppm	0.800000	4539475.000000
*	Cal 0.80 ppm	0.800000	4521330.000000
*	Cal 0.50 ppm	0.500000	2799128.250000
*	Cal 0.50 ppm	0.500000	2829918.250000
*	Cal 0.50 ppm	0.500000	2819781.250000
*	Cal 0.05 ppm	0.050000	246194.078125
*	Cal 0.05 ppm	0.050000	249331.515625
*	Cal 0.05 ppm	0.050000	256283.828125
*	Cal 0.01 ppm	0.010000	46085.363281
*	Cal 0.01 ppm	0.010000	47002.277344
*	Cal 0.01 ppm	0.010000	43775.347656

Calib Coef:
y=bx+a
a: (intercept) -1.2985e+04
b: 5.6638e+06

Corr Coef: 0.999964

Carryover: 0.0987%

No Drift Peaks


Cyanide: Cali .on, Peak 5-103
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
Height (E+06)
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Conc

QC SUMMARY REPORT

WO#: **1201809**

Hall Environmental Analysis Laboratory, Inc.

13-Apr-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID **MB-502**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS**	Batch ID: **502**	RunNo: **699**
Prep Date: **1/31/2012**	Analysis Date: **1/31/2012**	SeqNo: **19902** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.30								
Chloride	ND	1.5								
Sulfate	0.46	1.5								J

Sample ID **LCS-502**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS**	Batch ID: **502**	RunNo: **699**
Prep Date: **1/31/2012**	Analysis Date: **1/31/2012**	SeqNo: **19903** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.6	0.30	1.500	0	104	90	110			
Chloride	14	1.5	15.00	0	94.3	90	110			
Sulfate	29	1.5	30.00	0	97.2	90	110			

Sample ID **1201809-001BMS**	SampType: **MS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BK-9 (5-5.5')**	Batch ID: **502**	RunNo: **699**
Prep Date: **1/31/2012**	Analysis Date: **2/1/2012**	SeqNo: **19949** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.4	0.30	1.500	3.737	47.5	18.1	130			

Sample ID **1201809-001BMSD**	SampType: **MSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BK-9 (5-5.5')**	Batch ID: **502**	RunNo: **699**
Prep Date: **1/31/2012**	Analysis Date: **2/1/2012**	SeqNo: **19951** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.5	0.30	1.500	3.737	51.0	18.1	130	1.19	20	

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1201809**

ll Environmental Analysis Laboratory, Inc.

13-Apr-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID **MB-478**	SampType: **MBLK**	TestCode: **EPA Method 8015B: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **478**	RunNo: **635**
Prep Date: **1/28/2012**	Analysis Date: **1/29/2012**	SeqNo: **17941** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	8.5		10.00		84.6	77.4	131			

Sample ID **LCS-478**	SampType: **LCS**	TestCode: **EPA Method 8015B: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **478**	RunNo: **635**
Prep Date: **1/28/2012**	Analysis Date: **1/29/2012**	SeqNo: **17942** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	56	10	50.00	0	113	62.7	139			
Surr: DNOP	4.5		5.000		90.4	77.4	131			

ualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1201809**

13-Apr-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID **MB-476**	SampType: **MBLK**	TestCode: **EPA Method 8015B: Gasoline Range**
Client ID: **PBS**	Batch ID: **476**	RunNo: **661**
Prep Date: **1/27/2012**	Analysis Date: **1/30/2012**	SeqNo: **18848** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	880		1,000		88.2	69.7	121			

Sample ID **LCS-476**	SampType: **LCS**	TestCode: **EPA Method 8015B: Gasoline Range**
Client ID: **LCSS**	Batch ID: **476**	RunNo: **661**
Prep Date: **1/27/2012**	Analysis Date: **1/30/2012**	SeqNo: **18852** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	32	5.0	25.00	0	126	86.4	132			
Surr: BFB	1,000		1,000		102	69.7	121			

Sample ID **1201809-001AMS**	SampType: **MS**	TestCode: **EPA Method 8015B: Gasoline Range**
Client ID: **BK-9 (5-5.5')**	Batch ID: **476**	RunNo: **661**
Prep Date: **1/27/2012**	Analysis Date: **1/30/2012**	SeqNo: **18853** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	31	5.0	24.78	0	127	85.4	147			
Surr: BFB	1,000		991.1		105	69.7	121			

Sample ID **1201809-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8015B: Gasoline Range**
Client ID: **BK-9 (5-5.5')**	Batch ID: **476**	RunNo: **661**
Prep Date: **1/27/2012**	Analysis Date: **1/30/2012**	SeqNo: **18854** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	31	4.9	24.53	0	125	85.4	147	2.58	19.2	
Surr: BFB	990		981.4		101	69.7	121	0	0	

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1201809**

ıll Environmental Analysis Laboratory, Inc.

13-Apr-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID	MB-489	SampType:	MBLK		TestCode:	EPA Method 7471: Mercury				
Client ID:	PBS	Batch ID:	489		RunNo:	652				
Prep Date:	1/30/2012	Analysis Date:	1/30/2012		SeqNo:	18714	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.033								

Sample ID	LCS-489	SampType:	LCS		TestCode:	EPA Method 7471: Mercury				
Client ID:	LCSS	Batch ID:	489		RunNo:	652				
Prep Date:	1/30/2012	Analysis Date:	1/30/2012		SeqNo:	18715	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.18	0.033	0.1667	0	108	80	120			

Sample ID	1201809-001BMS	SampType:	MS		TestCode:	EPA Method 7471: Mercury				
Client ID:	BK-9 (5-5.5')	Batch ID:	489		RunNo:	652				
Prep Date:	1/30/2012	Analysis Date:	1/30/2012		SeqNo:	18717	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.18	0.033	0.1665	0.006308	102	75	125			

Sample ID	1201809-001BMSD	SampType:	MSD		TestCode:	EPA Method 7471: Mercury				
ɛnt ID:	BK-9 (5-5.5')	Batch ID:	489		RunNo:	652				
. rep Date:	1/30/2012	Analysis Date:	1/30/2012		SeqNo:	18718	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.17	0.033	0.1663	0.006308	101	75	125	1.75	20	

ualifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1201809**

13-Apr-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID **MB-514**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **PBS**	Batch ID: **514**	RunNo: **808**
Prep Date: **1/31/2012**	Analysis Date: **2/7/2012**	SeqNo: **23089** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.56	3.0								J
Antimony	ND	2.5								
Arsenic	ND	2.5								
Barium	ND	0.10								
Beryllium	ND	0.15								
Boron	ND	2.0								
Cadmium	ND	0.10								
Chromium	ND	0.30								
Cobalt	ND	0.30								
Copper	0.054	0.30								J
Iron	1.1	1.0								
Lead	ND	0.25								
Manganese	ND	0.10								
Molybdenum	ND	0.40								
Nickel	0.093	0.50								J
Selenium	1.0	2.5								J
Silver	ND	0.25								
Thallium	ND	2.5								
Uranium	ND	5.0								
Vanadium	ND	2.5								
Zinc	ND	2.5								

Sample ID **LCS-514**	SampType: **LCS**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **LCSS**	Batch ID: **514**	RunNo: **808**
Prep Date: **1/31/2012**	Analysis Date: **2/7/2012**	SeqNo: **23090** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	28	3.0	25.00	0.5570	110	80	120			
Antimony	24	2.5	25.00	0	96.4	80	120			
Arsenic	25	2.5	25.00	0	98.7	80	120			
Barium	24	0.10	25.00	0	97.1	80	120			
Beryllium	26	0.15	25.00	0	103	80	120			
Boron	24	2.0	25.00	0	97.6	80	120			
Cadmium	24	0.10	25.00	0	96.7	80	120			
Chromium	24	0.30	25.00	0	95.7	80	120			
Cobalt	24	0.30	25.00	0	95.7	80	120			
Copper	25	0.30	25.00	0.05450	98.0	80	120			
Iron	26	1.0	25.00	1.128	99.2	80	120			B
Lead	24	0.25	25.00	0	96.8	80	120			
Manganese	24	0.10	25.00	0	95.9	80	120			
Molybdenum	25	0.40	25.00	0	99.6	80	120			

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1201809**

ıll Environmental Analysis Laboratory, Inc.

13-Apr-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID	LCS-514	SampType:	LCS	TestCode:	EPA Method 6010B: Soil Metals					
Client ID:	LCSS	Batch ID:	514	RunNo:	808					
Prep Date:	1/31/2012	Analysis Date:	2/7/2012	SeqNo:	23090	Units:	mg/Kg			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nickel	24	0.50	25.00	0.09300	94.5	80	120			
Selenium	23	2.5	25.00	1.014	89.5	80	120			
Silver	4.8	0.25	5.000	0	96.5	80	120			
Thallium	24	2.5	25.00	0	96.7	80	120			
Uranium	25	5.0	25.00	0	98.6	80	120			
Vanadium	25	2.5	25.00	0	102	80	120			
Zinc	24	2.5	25.00	0	96.0	80	120			

Sample ID	1201809-001BMS	SampType:	MS	TestCode:	EPA Method 6010B: Soil Metals					
Client ID:	BK-9 (5-5.5')	Batch ID:	514	RunNo:	808					
Prep Date:	1/31/2012	Analysis Date:	2/7/2012	SeqNo:	23094	Units:	mg/Kg			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	11	2.5	24.89	0	43.8	75	125			S
Arsenic	23	2.5	24.89	1.491	87.5	75	125			
Beryllium	22	0.15	24.89	0.2370	86.9	75	125			
·on	26	2.0	24.89	4.078	89.3	75	125			
nium	21	0.10	24.89	0	83.5	75	125			
·nromium	24	0.30	24.89	3.460	82.5	75	125			
Cobalt	22	0.30	24.89	2.095	78.5	75	125			
Copper	24	0.30	24.89	2.287	88.0	75	125			
Lead	21	0.25	24.89	1.663	78.0	75	125			
Molybdenum	20	0.40	24.89	0.4185	78.8	75	125			
Nickel	22	0.50	24.89	2.968	77.4	75	125			
Selenium	19	2.5	24.89	0	77.6	75	125			
Silver	4.2	0.25	4.978	0	84.4	75	125			
Thallium	10	2.5	24.89	0	40.7	75	125			S
Uranium	21	5.0	24.89	0	86.3	75	125			
Vanadium	35	2.5	24.89	11.33	96.5	75	125			
Zinc	31	2.5	24.89	11.58	79.3	75	125			

Sample ID	1201809-001BMSD	SampType:	MSD	TestCode:	EPA Method 6010B: Soil Metals					
Client ID:	BK-9 (5-5.5')	Batch ID:	514	RunNo:	808					
Prep Date:	1/31/2012	Analysis Date:	2/7/2012	SeqNo:	23095	Units:	mg/Kg			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	10	2.5	24.81	0	41.0	75	125	6.88	20	S
Arsenic	22	2.5	24.81	1.491	82.9	75	125	5.37	20	
Beryllium	21	0.15	24.81	0.2370	84.8	75	125	2.76	20	
Boron	26	2.0	24.81	4.078	87.5	75	125	1.94	20	
Cadmium	20	0.10	24.81	0	81.1	75	125	3.27	20	
Chromium	23	0.30	24.81	3.460	79.4	75	125	3.45	20	

ıalifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1201809**

13-Apr-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID	1201809-001BMSD	SampType:	MSD		TestCode:	EPA Method 6010B: Soil Metals				
Client ID:	BK-9 (5-5.5')	Batch ID:	514		RunNo:	808				
Prep Date:	1/31/2012	Analysis Date:	2/7/2012		SeqNo:	23095	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	21	0.30	24.81	2.095	75.5	75	125	3.77	20	
Copper	24	0.30	24.81	2.287	86.7	75	125	1.70	20	
Lead	20	0.25	24.81	1.663	73.8	75	125	5.40	20	S
Molybdenum	19	0.40	24.81	0.4185	75.6	75	125	4.38	20	
Nickel	21	0.50	24.81	2.968	74.3	75	125	3.77	20	S
Selenium	18	2.5	24.81	0	74.1	75	125	4.97	20	S
Silver	4.0	0.25	4.963	0	81.3	75	125	4.01	20	
Thallium	11	2.5	24.81	0	42.5	75	125	3.98	20	S
Uranium	20	5.0	24.81	0	81.1	75	125	6.48	20	
Vanadium	34	2.5	24.81	11.33	91.5	75	125	3.75	20	
Zinc	30	2.5	24.81	11.58	73.7	75	125	4.73	20	S

Sample ID	MB-1105	SampType:	MBLK		TestCode:	EPA Method 6010B: Soil Metals				
Client ID:	PBS	Batch ID:	1105		RunNo:	1507				
Prep Date:	3/15/2012	Analysis Date:	3/16/2012		SeqNo:	42441	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	1.0								
Manganese	ND	0.10								

Sample ID	LCS-1105	SampType:	LCS		TestCode:	EPA Method 6010B: Soil Metals				
Client ID:	LCSS	Batch ID:	1105		RunNo:	1507				
Prep Date:	3/15/2012	Analysis Date:	3/16/2012		SeqNo:	42442	Units:	mg/Kg		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	26	1.0	25.00	0	105	80	120			
Manganese	24	0.10	25.00	0	94.3	80	120			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: Western Refining Southwest, Inc Bloomfield Work Order Number: 1201809

Received by/date: MG 1/27/12

Logged By: Michelle Garcia 1/27/2012 10:00:00 AM Michelle Garcia

Completed By: Michelle Garcia 1/27/2012 1:06:36 PM Michelle Garcia

Reviewed By: JA 1/27/2012

Chain of Custody

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

Log In

4. Coolers are present? (see 19. for cooler specific information)	Yes ☑	No ☐	NA ☐
5. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
6. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
7. Sample(s) in proper container(s)?	Yes ☑	No ☐	
8. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
9. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
10. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
11. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
12. Were any sample containers received broken?	Yes ☐	No ☑	
13. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
14. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
15. Is it clear what analyses were requested?	Yes ☑	No ☐	
16. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

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

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

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

Person Notified: _____ Date: _____

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

Regarding: _____

Client Instructions: _____

18. Additional remarks:

19. **Cooler Information**

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

1 of 1

Chain-of-Custody Record

Client: Western Refining Southwest, Inc.
Bloomfield Refinery
Mailing Address: 50 Road 4990
Bloomfield, NM 87401
Phone #:
email or Fax#:
QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other
☒ EDD (Type) Excel

Turn-Around Time:
☒ Standard ☐ Rush
Project Name: RCRA BACKGROUND INVESTIGATION
Project #: —
Project Manager: Kelly Robinson
Sampler: Kelly R. + Tracy P.
On Ice: ☒ Yes ☐ No
Sample Temperature: 1.2

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	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)~~	Metals (See Remarks)	TPH - DRO, MRO, ~~GRO~~	TPH - GRO		Air Bubbles (Y or N)
1/24/12	11:25	Soil	BK-9 (5-5.5')	(3) 4oz Jars	None	-1												X	X	X		
1/24/12	15:00	Soil	BK-9 (54-56')	" "	"	-2												X				
—	—	~~Water~~ Meat	MeOH BLANK	1 VIAL	MeOH	-3												X	X	X		
		At 1/27/12																				

Date: 1/24/12 Time: 1500 Relinquished by: Kelly Robinson
Received by: TO UPS Date Time
Date: Time: Relinquished by:
Received by: Mike Cox 1/27/12 1000 Date Time

Remarks: See attached sheet for analyte list.

...ssary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories ...erves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical repo

METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Thallium	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Includes ~~Soil~~ Soil Samples + GW Samples (both dissolved & total analysis)

GENERAL CHEMISTRY ANALYSES

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B (dissolved)
Chloride	EPA method 300.0 (dissolved & total)
Sulfate	EPA method 300.0 (dissolved & total)
Calcium	EPA method 6010/6020 (dissolved)
Magnesium	EPA method 6010/6020 (total)
Sodium	EPA method 6010/6020 (dissolved)
Potassium	EPA method 6010/6020 (dissolved)
Manganese	SW-846 method 6010/6020 (dissolved & total)
Nitrate/nitrite	EPA method 300.0 (dissolved)
Iron	SW-846 method 6010/6020 (dissolved & total)

For Groundwater Samples ONLY

SWMU No. 16 Constituent List

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Fluoride	SW-846 method 300

For Soil and Groundwater Samples (Dissolved and Totals)

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

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

April 13, 2012

Kelly Robinson

Western Refining Southwest, Inc.
#50 CR 4990
Bloomfield, NM 87413
TEL: (505) 632-4135
FAX (505) 632-3911

RE: RCRA Background Investigation OrderNo.: 1201885

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 18 sample(s) on 1/31/2012 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued February 23, 2012.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1201885**
Date Reported: **4/13/2012**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: RCRA Background Investigation
Lab ID: 1201885-001 **Matrix:** SOIL

Client Sample ID: BK-1 (0-0.5')
Collection Date: 1/27/2012 1:30:00 PM
Received Date: 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	0.94	1.5	J	mg/Kg	5	2/1/2012 2:01:03 PM
Chloride	ND	7.5		mg/Kg	5	2/1/2012 2:01:03 PM
Sulfate	2.1	7.5	J	mg/Kg	5	2/1/2012 2:01:03 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.012	0.033	J	mg/kg	1	2/2/2012 10:11:04 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	20,000	1,500		mg/Kg	500	2/10/2012 6:44:06 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 8:08:33 AM
Arsenic	2.8	2.5		mg/Kg	1	2/8/2012 8:08:33 AM
Barium	160	0.50		mg/Kg	5	2/10/2012 6:42:08 AM
Beryllium	0.55	0.15		mg/Kg	1	2/8/2012 8:08:33 AM
Boron	6.7	4.0		mg/Kg	2	2/8/2012 8:10:41 AM
Cadmium	0.034	0.10	J	mg/Kg	1	2/8/2012 8:08:33 AM
Chromium	7.8	0.30		mg/Kg	1	2/8/2012 8:08:33 AM
Cobalt	4.4	0.30		mg/Kg	1	2/8/2012 8:08:33 AM
Copper	8.1	0.30		mg/Kg	1	2/8/2012 8:08:33 AM
Iron	18,000	500		mg/Kg	500	3/18/2012 12:35:55 PM
Lead	2.9	0.25		mg/Kg	1	2/8/2012 8:08:33 AM
Manganese	260	0.98		mg/Kg	10	3/16/2012 8:44:21 AM
Molybdenum	0.36	0.40	J	mg/Kg	1	2/8/2012 8:08:33 AM
Nickel	6.7	0.50		mg/Kg	1	2/8/2012 8:08:33 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 8:08:33 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 8:08:33 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 8:08:33 AM
Uranium	0.60	5.0	J	mg/Kg	1	2/8/2012 8:08:33 AM
Vanadium	24	2.5		mg/Kg	1	2/8/2012 8:08:33 AM
Zinc	26	2.5		mg/Kg	1	2/8/2012 8:08:33 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: RCRA Background Investigation
Lab ID: 1201885-002 **Matrix:** SOIL

Client Sample ID: BK-1 (1.5-2.0')
Collection Date: 1/27/2012 1:34:00 PM
Received Date: 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	11	1.5		mg/Kg	5	2/1/2012 2:35:52 PM
Chloride	14	7.5		mg/Kg	5	2/1/2012 2:35:52 PM
Sulfate	17	7.5		mg/Kg	5	2/1/2012 2:35:52 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.018	0.033	J	mg/kg	1	2/2/2012 10:16:27 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	17,000	1,500		mg/Kg	500	2/10/2012 6:54:33 AM
Antimony	ND	5.0		mg/Kg	2	2/8/2012 8:19:16 AM
Arsenic	1.9	5.0	J	mg/Kg	2	2/8/2012 8:19:16 AM
Barium	260	1.0		mg/Kg	10	2/13/2012 7:24:14 AM
Beryllium	0.56	0.30		mg/Kg	2	2/8/2012 8:19:16 AM
Boron	8.0	4.0		mg/Kg	2	2/8/2012 8:19:16 AM
Cadmium	ND	0.20		mg/Kg	2	2/8/2012 8:19:16 AM
Chromium	8.4	0.60		mg/Kg	2	2/8/2012 8:19:16 AM
Cobalt	5.3	0.60		mg/Kg	2	2/8/2012 8:19:16 AM
Copper	8.7	0.60		mg/Kg	2	2/8/2012 8:19:16 AM
Iron	18,000	500		mg/Kg	500	3/18/2012 12:38:04 PM
Lead	3.2	0.50		mg/Kg	2	2/8/2012 8:19:16 AM
Manganese	280	1.0		mg/Kg	10	3/16/2012 8:59:36 AM
Molybdenum	0.70	0.80	J	mg/Kg	2	2/8/2012 8:19:16 AM
Nickel	7.4	1.0		mg/Kg	2	2/8/2012 8:19:16 AM
Selenium	ND	5.0		mg/Kg	2	2/8/2012 8:19:16 AM
Silver	ND	0.50		mg/Kg	2	2/8/2012 8:19:16 AM
Thallium	ND	5.0		mg/Kg	2	2/8/2012 8:19:16 AM
Uranium	ND	10		mg/Kg	2	2/8/2012 8:19:16 AM
Vanadium	30	5.0		mg/Kg	2	2/8/2012 8:19:16 AM
Zinc	28	5.0		mg/Kg	2	2/8/2012 8:19:16 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-2 (0-0.5')
Project: RCRA Background Investigation **Collection Date:** 1/27/2012 2:05:00 PM
Lab ID: 1201885-003 **Matrix:** SOIL **Received Date:** 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	ND	1.5		mg/Kg	5	2/1/2012 3:45:29 PM
Chloride	ND	7.5		mg/Kg	5	2/1/2012 3:45:29 PM
Sulfate	2.4	7.5	J	mg/Kg	5	2/1/2012 3:45:29 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.0095	0.033	J	mg/kg	1	2/2/2012 10:18:12 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	14,000	1,500		mg/Kg	500	2/10/2012 6:56:35 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 8:37:17 AM
Arsenic	1.4	2.5	J	mg/Kg	1	2/8/2012 8:37:17 AM
Barium	94	0.20		mg/Kg	2	2/8/2012 8:39:28 AM
Beryllium	0.42	0.15		mg/Kg	1	2/8/2012 8:37:17 AM
Boron	5.4	2.0		mg/Kg	1	2/8/2012 8:37:17 AM
Cadmium	0.040	0.10	J	mg/Kg	1	2/8/2012 8:37:17 AM
Chromium	6.1	0.30		mg/Kg	1	2/8/2012 8:37:17 AM
Cobalt	3.4	0.30		mg/Kg	1	2/8/2012 8:37:17 AM
Copper	5.4	0.30		mg/Kg	1	2/8/2012 8:37:17 AM
Iron	13,000	500		mg/Kg	500	3/18/2012 12:40:09 PM
Lead	2.8	0.25		mg/Kg	1	2/8/2012 8:37:17 AM
Manganese	270	0.97		mg/Kg	10	3/16/2012 9:09:46 AM
Molybdenum	0.28	0.40	J	mg/Kg	1	2/8/2012 8:37:17 AM
Nickel	4.8	0.50		mg/Kg	1	2/8/2012 8:37:17 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 8:37:17 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 8:37:17 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 8:37:17 AM
Uranium	1.0	5.0	J	mg/Kg	1	2/8/2012 8:37:17 AM
Vanadium	17	2.5		mg/Kg	1	2/8/2012 8:37:17 AM
Zinc	20	2.5		mg/Kg	1	2/8/2012 8:37:17 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: RCRA Background Investigation
Lab ID: 1201885-004 **Matrix:** SOIL

Client Sample ID: BK-2 (1.5-2.0')
Collection Date: 1/27/2012 2:10:00 PM
Received Date: 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	8.6	1.5		mg/Kg	5	2/1/2012 4:20:17 PM
Chloride	ND	7.5		mg/Kg	5	2/1/2012 4:20:17 PM
Sulfate	17	7.5		mg/Kg	5	2/1/2012 4:20:17 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.016	0.033	J	mg/kg	1	2/2/2012 10:19:59 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	26,000	3,000		mg/Kg	1000	2/13/2012 7:29:38 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 8:41:38 AM
Arsenic	3.0	2.5		mg/Kg	1	2/8/2012 8:41:38 AM
Barium	250	1.0		mg/Kg	10	2/13/2012 7:26:06 AM
Beryllium	0.64	0.15		mg/Kg	1	2/8/2012 8:41:38 AM
Boron	8.2	4.0		mg/Kg	2	2/8/2012 8:43:43 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 8:41:38 AM
Chromium	9.3	0.30		mg/Kg	1	2/8/2012 8:41:38 AM
Cobalt	4.8	0.30		mg/Kg	1	2/8/2012 8:41:38 AM
Copper	8.8	0.30		mg/Kg	1	2/8/2012 8:41:38 AM
Iron	19,000	500		mg/Kg	500	3/18/2012 12:42:13 PM
Lead	2.4	0.25		mg/Kg	1	2/8/2012 8:41:38 AM
Manganese	290	1.0		mg/Kg	10	3/16/2012 9:13:50 AM
Molybdenum	0.37	0.40	J	mg/Kg	1	2/8/2012 8:41:38 AM
Nickel	7.6	0.50		mg/Kg	1	2/8/2012 8:41:38 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 8:41:38 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 8:41:38 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 8:41:38 AM
Uranium	ND	5.0		mg/Kg	1	2/8/2012 8:41:38 AM
Vanadium	29	2.5		mg/Kg	1	2/8/2012 8:41:38 AM
Zinc	30	2.5		mg/Kg	1	2/8/2012 8:41:38 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-3 (0-0.5')
Project: RCRA Background Investigation **Collection Date:** 1/27/2012 2:30:00 PM
Lab ID: 1201885-005 **Matrix:** SOIL **Received Date:** 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	1.6	1.5		mg/Kg	5	2/1/2012 4:55:06 PM
Chloride	17	7.5		mg/Kg	5	2/1/2012 4:55:06 PM
Sulfate	5.8	7.5	J	mg/Kg	5	2/1/2012 4:55:06 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.011	0.033	J	mg/kg	1	2/2/2012 10:21:44 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	23,000	1,500		mg/Kg	500	2/10/2012 7:12:47 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 8:45:57 AM
Arsenic	3.1	2.5		mg/Kg	1	2/8/2012 8:45:57 AM
Barium	93	0.20		mg/Kg	2	2/8/2012 8:48:12 AM
Beryllium	0.61	0.15		mg/Kg	1	2/8/2012 8:45:57 AM
Boron	8.2	4.0		mg/Kg	2	2/8/2012 8:48:12 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 8:45:57 AM
Chromium	8.5	0.30		mg/Kg	1	2/8/2012 8:45:57 AM
Cobalt	4.1	0.30		mg/Kg	1	2/8/2012 8:45:57 AM
Copper	6.7	0.30		mg/Kg	1	2/8/2012 8:45:57 AM
Iron	15,000	490		mg/Kg	500	3/16/2012 9:27:35 AM
Lead	2.4	0.25		mg/Kg	1	2/8/2012 8:45:57 AM
Manganese	240	0.97		mg/Kg	10	3/16/2012 9:17:55 AM
Molybdenum	0.33	0.40	J	mg/Kg	1	2/8/2012 8:45:57 AM
Nickel	6.0	0.50		mg/Kg	1	2/8/2012 8:45:57 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 8:45:57 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 8:45:57 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 8:45:57 AM
Uranium	1.4	5.0	J	mg/Kg	1	2/8/2012 8:45:57 AM
Vanadium	25	2.5		mg/Kg	1	2/8/2012 8:45:57 AM
Zinc	26	2.5		mg/Kg	1	2/8/2012 8:45:57 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-3 (1.5-2.0')
Project: RCRA Background Investigation **Collection Date:** 1/27/2012 2:35:00 PM
Lab ID: 1201885-006 **Matrix:** SOIL **Received Date:** 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	7.5	6.0		mg/Kg	20	2/1/2012 6:22:09 PM
Chloride	420	30		mg/Kg	20	2/1/2012 6:22:09 PM
Sulfate	7,600	30	E	mg/Kg	20	2/1/2012 6:22:09 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.012	0.033	J	mg/kg	1	2/2/2012 10:23:29 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	11,000	1,500		mg/Kg	500	2/10/2012 7:18:34 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 8:50:10 AM
Arsenic	3.0	2.5		mg/Kg	1	2/8/2012 8:50:10 AM
Barium	140	0.50		mg/Kg	5	2/10/2012 7:16:26 AM
Beryllium	0.38	0.15		mg/Kg	1	2/8/2012 8:50:10 AM
Boron	12	2.0		mg/Kg	1	2/8/2012 8:50:10 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 8:50:10 AM
Chromium	5.2	0.30		mg/Kg	1	2/8/2012 8:50:10 AM
Cobalt	2.9	0.30		mg/Kg	1	2/8/2012 8:50:10 AM
Copper	5.3	0.30		mg/Kg	1	2/8/2012 8:50:10 AM
Iron	8,400	200		mg/Kg	200	3/16/2012 9:31:59 AM
Lead	1.2	0.25		mg/Kg	1	2/8/2012 8:50:10 AM
Manganese	130	0.98		mg/Kg	10	3/16/2012 9:29:53 AM
Molybdenum	0.31	0.40	J	mg/Kg	1	2/8/2012 8:50:10 AM
Nickel	4.2	0.50		mg/Kg	1	2/8/2012 8:50:10 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 8:50:10 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 8:50:10 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 8:50:10 AM
Uranium	ND	5.0		mg/Kg	1	2/8/2012 8:50:10 AM
Vanadium	17	2.5		mg/Kg	1	2/8/2012 8:50:10 AM
Zinc	14	2.5		mg/Kg	1	2/8/2012 8:50:10 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-4 (0-0.5')
Project: RCRA Background Investigation **Collection Date:** 1/27/2012 2:40:00 PM
Lab ID: 1201885-007 **Matrix:** SOIL **Received Date:** 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	0.73	1.5	J	mg/Kg	5	2/1/2012 7:14:23 PM
Chloride	ND	7.5		mg/Kg	5	2/1/2012 7:14:23 PM
Sulfate	1.7	7.5	J	mg/Kg	5	2/1/2012 7:14:23 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.011	0.033	J	mg/kg	1	2/2/2012 10:28:45 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	17,000	1,500		mg/Kg	500	2/10/2012 7:20:34 AM
Antimony	0.54	2.5	J	mg/Kg	1	2/8/2012 9:04:21 AM
Arsenic	2.4	2.5	J	mg/Kg	1	2/8/2012 9:04:21 AM
Barium	96	0.20		mg/Kg	2	2/8/2012 9:06:31 AM
Beryllium	0.48	0.15		mg/Kg	1	2/8/2012 9:04:21 AM
Boron	5.0	2.0		mg/Kg	1	2/8/2012 9:04:21 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 9:04:21 AM
Chromium	6.8	0.30		mg/Kg	1	2/8/2012 9:04:21 AM
Cobalt	3.2	0.30		mg/Kg	1	2/8/2012 9:04:21 AM
Copper	5.1	0.30		mg/Kg	1	2/8/2012 9:04:21 AM
Iron	13,000	480		mg/Kg	500	3/16/2012 9:43:16 AM
Lead	1.7	0.25		mg/Kg	1	2/8/2012 9:04:21 AM
Manganese	200	0.95		mg/Kg	10	3/16/2012 9:41:20 AM
Molybdenum	0.28	0.40	J	mg/Kg	1	2/8/2012 9:04:21 AM
Nickel	4.9	0.50		mg/Kg	1	2/8/2012 9:04:21 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:04:21 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:04:21 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:04:21 AM
Uranium	1.1	5.0	J	mg/Kg	1	2/8/2012 9:04:21 AM
Vanadium	20	2.5		mg/Kg	1	2/8/2012 9:04:21 AM
Zinc	21	2.5		mg/Kg	1	2/8/2012 9:04:21 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: RCRA Background Investigation
Lab ID: 1201885-008 **Matrix:** SOIL

Client Sample ID: BK-4 (1.5-2.0')
Collection Date: 1/27/2012 2:45:00 PM
Received Date: 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	6.5	1.5		mg/Kg	5	2/1/2012 7:49:12 PM
Chloride	13	7.5		mg/Kg	5	2/1/2012 7:49:12 PM
Sulfate	3.6	7.5	J	mg/Kg	5	2/1/2012 7:49:12 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.014	0.033	J	mg/kg	1	2/2/2012 10:30:30 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	17,000	1,500		mg/Kg	500	2/10/2012 7:24:39 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 9:08:43 AM
Arsenic	2.6	2.5		mg/Kg	1	2/8/2012 9:08:43 AM
Barium	160	0.50		mg/Kg	5	2/10/2012 7:22:34 AM
Beryllium	0.42	0.15		mg/Kg	1	2/8/2012 9:08:43 AM
Boron	5.1	2.0		mg/Kg	1	2/8/2012 9:08:43 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 9:08:43 AM
Chromium	6.1	0.30		mg/Kg	1	2/8/2012 9:08:43 AM
Cobalt	3.9	0.30		mg/Kg	1	2/8/2012 9:08:43 AM
Copper	6.5	0.30		mg/Kg	1	2/8/2012 9:08:43 AM
Iron	14,000	480		mg/Kg	500	3/16/2012 9:47:30 AM
Lead	2.2	0.25		mg/Kg	1	2/8/2012 9:08:43 AM
Manganese	280	0.96		mg/Kg	10	3/16/2012 9:45:28 AM
Molybdenum	0.24	0.40	J	mg/Kg	1	2/8/2012 9:08:43 AM
Nickel	5.2	0.50		mg/Kg	1	2/8/2012 9:08:43 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:08:43 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:08:43 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:08:43 AM
Uranium	ND	5.0		mg/Kg	1	2/8/2012 9:08:43 AM
Vanadium	23	2.5		mg/Kg	1	2/8/2012 9:08:43 AM
Zinc	20	2.5		mg/Kg	1	2/8/2012 9:08:43 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: RCRA Background Investigation
Lab ID: 1201885-009 **Matrix:** SOIL

Client Sample ID: BK-5 (0-0.5')
Collection Date: 1/27/2012 3:00:00 PM
Received Date: 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	0.49	1.5	J	mg/Kg	5	2/1/2012 8:24:02 PM
Chloride	ND	7.5		mg/Kg	5	2/1/2012 8:24:02 PM
Sulfate	4.0	7.5	J	mg/Kg	5	2/1/2012 8:24:02 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.013	0.033	J	mg/kg	1	2/2/2012 10:32:16 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	18,000	1,500		mg/Kg	500	2/13/2012 7:33:40 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 9:13:14 AM
Arsenic	2.6	2.5		mg/Kg	1	2/8/2012 9:13:14 AM
Barium	140	0.50		mg/Kg	5	2/10/2012 7:26:42 AM
Beryllium	0.53	0.15		mg/Kg	1	2/8/2012 9:13:14 AM
Boron	6.4	4.0		mg/Kg	2	2/8/2012 9:15:27 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 9:13:14 AM
Chromium	7.5	0.30		mg/Kg	1	2/8/2012 9:13:14 AM
Cobalt	4.1	0.30		mg/Kg	1	2/8/2012 9:13:14 AM
Copper	6.5	0.30		mg/Kg	1	2/8/2012 9:13:14 AM
Iron	18,000	500		mg/Kg	500	3/16/2012 9:51:34 AM
Lead	2.4	0.25		mg/Kg	1	2/8/2012 9:13:14 AM
Manganese	290	1.0		mg/Kg	10	3/16/2012 9:49:43 AM
Molybdenum	0.25	0.40	J	mg/Kg	1	2/8/2012 9:13:14 AM
Nickel	6.1	0.50		mg/Kg	1	2/8/2012 9:13:14 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:13:14 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:13:14 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:13:14 AM
Uranium	0.84	5.0	J	mg/Kg	1	2/8/2012 9:13:14 AM
Vanadium	23	2.5		mg/Kg	1	2/8/2012 9:13:14 AM
Zinc	25	2.5		mg/Kg	1	2/8/2012 9:13:14 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: RCRA Background Investigation
Lab ID: 1201885-010 **Matrix:** SOIL

Client Sample ID: BK-5 (1.5-2.0')
Collection Date: 1/27/2012 3:05:00 PM
Received Date: 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	5.0	1.5		mg/Kg	5	2/1/2012 8:58:52 PM
Chloride	170	7.5		mg/Kg	5	2/1/2012 8:58:52 PM
Sulfate	28	7.5		mg/Kg	5	2/1/2012 8:58:52 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.015	0.033	J	mg/kg	1	2/2/2012 10:34:02 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	15,000	1,500		mg/Kg	500	2/13/2012 7:35:43 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 9:17:26 AM
Arsenic	2.2	2.5	J	mg/Kg	1	2/8/2012 9:17:26 AM
Barium	390	1.0		mg/Kg	10	2/10/2012 7:40:15 AM
Beryllium	0.52	0.15		mg/Kg	1	2/8/2012 9:17:26 AM
Boron	7.4	4.0		mg/Kg	2	2/8/2012 9:19:32 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 9:17:26 AM
Chromium	7.9	0.30		mg/Kg	1	2/8/2012 9:17:26 AM
Cobalt	4.8	0.30		mg/Kg	1	2/8/2012 9:17:26 AM
Copper	7.8	0.30		mg/Kg	1	2/8/2012 9:17:26 AM
Iron	18,000	480		mg/Kg	500	3/16/2012 10:03:39 AM
Lead	3.2	0.25		mg/Kg	1	2/8/2012 9:17:26 AM
Manganese	290	0.95		mg/Kg	10	3/16/2012 10:01:46 AM
Molybdenum	0.37	0.40	J	mg/Kg	1	2/8/2012 9:17:26 AM
Nickel	6.8	0.50		mg/Kg	1	2/8/2012 9:17:26 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:17:26 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:17:26 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:17:26 AM
Uranium	ND	5.0		mg/Kg	1	2/8/2012 9:17:26 AM
Vanadium	27	2.5		mg/Kg	1	2/8/2012 9:17:26 AM
Zinc	29	2.5		mg/Kg	1	2/8/2012 9:17:26 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-6 (0-0.5')
Project: RCRA Background Investigation **Collection Date:** 1/27/2012 3:15:00 PM
Lab ID: 1201885-011 **Matrix:** SOIL **Received Date:** 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	0.79	1.5	J	mg/Kg	5	2/1/2012 9:33:40 PM
Chloride	ND	7.5		mg/Kg	5	2/1/2012 9:33:40 PM
Sulfate	1.4	7.5	J	mg/Kg	5	2/1/2012 9:33:40 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.0078	0.033	J	mg/kg	1	2/2/2012 10:35:49 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	12,000	1,500		mg/Kg	500	2/13/2012 7:37:43 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 9:22:01 AM
Arsenic	1.9	2.5	J	mg/Kg	1	2/8/2012 9:22:01 AM
Barium	98	0.20		mg/Kg	2	2/8/2012 9:39:12 AM
Beryllium	0.40	0.15		mg/Kg	1	2/8/2012 9:22:01 AM
Boron	4.2	2.0		mg/Kg	1	2/8/2012 9:22:01 AM
Cadmium	0.028	0.10	J	mg/Kg	1	2/8/2012 9:22:01 AM
Chromium	5.7	0.30		mg/Kg	1	2/8/2012 9:22:01 AM
Cobalt	3.2	0.30		mg/Kg	1	2/8/2012 9:22:01 AM
Copper	4.6	0.30		mg/Kg	1	2/8/2012 9:22:01 AM
Iron	12,000	500		mg/Kg	500	3/18/2012 12:44:17 PM
Lead	2.5	0.25		mg/Kg	1	2/8/2012 9:22:01 AM
Manganese	250	0.97		mg/Kg	10	3/16/2012 10:08:06 AM
Molybdenum	0.27	0.40	J	mg/Kg	1	2/8/2012 9:22:01 AM
Nickel	4.5	0.50		mg/Kg	1	2/8/2012 9:22:01 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:22:01 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:22:01 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:22:01 AM
Uranium	0.68	5.0	J	mg/Kg	1	2/8/2012 9:22:01 AM
Vanadium	19	2.5		mg/Kg	1	2/8/2012 9:22:01 AM
Zinc	19	2.5		mg/Kg	1	2/8/2012 9:22:01 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-6 (1.5-2.0')
Project: RCRA Background Investigation **Collection Date:** 1/27/2012 3:20:00 PM
Lab ID: 1201885-012 **Matrix:** SOIL **Received Date:** 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	5.7	1.5		mg/Kg	5	2/1/2012 10:43:18 PM
Chloride	ND	7.5		mg/Kg	5	2/1/2012 10:43:18 PM
Sulfate	7.4	7.5	J	mg/Kg	5	2/1/2012 10:43:18 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.016	0.033	J	mg/kg	1	2/2/2012 10:37:36 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	15,000	1,500		mg/Kg	500	2/13/2012 7:49:17 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 9:41:24 AM
Arsenic	2.7	2.5		mg/Kg	1	2/8/2012 9:41:24 AM
Barium	150	0.50		mg/Kg	5	2/10/2012 7:49:54 AM
Beryllium	0.47	0.15		mg/Kg	1	2/8/2012 9:41:24 AM
Boron	5.5	2.0		mg/Kg	1	2/8/2012 9:41:24 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 9:41:24 AM
Chromium	6.5	0.30		mg/Kg	1	2/8/2012 9:41:24 AM
Cobalt	3.9	0.30		mg/Kg	1	2/8/2012 9:41:24 AM
Copper	7.2	0.30		mg/Kg	1	2/8/2012 9:41:24 AM
Iron	13,000	480		mg/Kg	500	3/16/2012 10:13:54 AM
Lead	2.2	0.25		mg/Kg	1	2/8/2012 9:41:24 AM
Manganese	210	0.97		mg/Kg	10	3/16/2012 10:12:02 AM
Molybdenum	0.28	0.40	J	mg/Kg	1	2/8/2012 9:41:24 AM
Nickel	5.9	0.50		mg/Kg	1	2/8/2012 9:41:24 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:41:24 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:41:24 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:41:24 AM
Uranium	ND	5.0		mg/Kg	1	2/8/2012 9:41:24 AM
Vanadium	22	2.5		mg/Kg	1	2/8/2012 9:41:24 AM
Zinc	21	2.5		mg/Kg	1	2/8/2012 9:41:24 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: RCRA Background Investigation
Lab ID: 1201885-013 **Matrix:** SOIL

Client Sample ID: BK-7 (0-0.5')
Collection Date: 1/27/2012 3:30:00 PM
Received Date: 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	ND	1.5		mg/Kg	5	2/1/2012 11:18:07 PM
Chloride	ND	7.5		mg/Kg	5	2/1/2012 11:18:07 PM
Sulfate	ND	7.5		mg/Kg	5	2/1/2012 11:18:07 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.012	0.033	J	mg/kg	1	2/2/2012 10:39:24 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	12,000	1,500		mg/Kg	500	2/13/2012 7:51:19 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 9:46:02 AM
Arsenic	3.2	2.5		mg/Kg	1	2/8/2012 9:46:02 AM
Barium	140	0.50		mg/Kg	5	2/10/2012 7:54:00 AM
Beryllium	0.40	0.15		mg/Kg	1	2/8/2012 9:46:02 AM
Boron	4.3	2.0		mg/Kg	1	2/8/2012 9:46:02 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 9:46:02 AM
Chromium	5.8	0.30		mg/Kg	1	2/8/2012 9:46:02 AM
Cobalt	3.2	0.30		mg/Kg	1	2/8/2012 9:46:02 AM
Copper	5.5	0.30		mg/Kg	1	2/8/2012 9:46:02 AM
Iron	11,000	490		mg/Kg	500	3/16/2012 10:17:59 AM
Lead	2.4	0.25		mg/Kg	1	2/8/2012 9:46:02 AM
Manganese	200	0.98		mg/Kg	10	3/16/2012 10:16:07 AM
Molybdenum	0.27	0.40	J	mg/Kg	1	2/8/2012 9:46:02 AM
Nickel	4.6	0.50		mg/Kg	1	2/8/2012 9:46:02 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:46:02 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:46:02 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:46:02 AM
Uranium	0.48	5.0	J	mg/Kg	1	2/8/2012 9:46:02 AM
Vanadium	19	2.5		mg/Kg	1	2/8/2012 9:46:02 AM
Zinc	19	2.5		mg/Kg	1	2/8/2012 9:46:02 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-7 (1.5-2.0')
Project: RCRA Background Investigation **Collection Date:** 1/27/2012 3:35:00 PM
Lab ID: 1201885-014 **Matrix:** SOIL **Received Date:** 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	2.9	1.5		mg/Kg	5	2/1/2012 11:52:55 PM
Chloride	ND	7.5		mg/Kg	5	2/1/2012 11:52:55 PM
Sulfate	10	7.5		mg/Kg	5	2/1/2012 11:52:55 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.013	0.033	J	mg/kg	1	2/2/2012 10:41:11 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	17,000	1,500		mg/Kg	500	2/13/2012 7:53:19 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 9:50:14 AM
Arsenic	2.5	2.5		mg/Kg	1	2/8/2012 9:50:14 AM
Barium	760	2.0		mg/Kg	20	2/10/2012 7:58:10 AM
Beryllium	0.51	0.15		mg/Kg	1	2/8/2012 9:50:14 AM
Boron	6.4	4.0		mg/Kg	2	2/8/2012 9:52:22 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 9:50:14 AM
Chromium	7.5	0.30		mg/Kg	1	2/8/2012 9:50:14 AM
Cobalt	4.4	0.30		mg/Kg	1	2/8/2012 9:50:14 AM
Copper	7.5	0.30		mg/Kg	1	2/8/2012 9:50:14 AM
Iron	16,000	490		mg/Kg	500	3/16/2012 10:31:29 AM
Lead	2.8	0.25		mg/Kg	1	2/8/2012 9:50:14 AM
Manganese	260	0.99		mg/Kg	10	3/16/2012 10:20:14 AM
Molybdenum	0.31	0.40	J	mg/Kg	1	2/8/2012 9:50:14 AM
Nickel	6.6	0.50		mg/Kg	1	2/8/2012 9:50:14 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:50:14 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:50:14 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:50:14 AM
Uranium	ND	5.0		mg/Kg	1	2/8/2012 9:50:14 AM
Vanadium	24	2.5		mg/Kg	1	2/8/2012 9:50:14 AM
Zinc	24	2.5		mg/Kg	1	2/8/2012 9:50:14 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: RCRA Background Investigation
Lab ID: 1201885-015 **Matrix:** SOIL

Client Sample ID: BK-8 (0-0.5')
Collection Date: 1/27/2012 3:50:00 PM
Received Date: 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	0.85	1.5	J	mg/Kg	5	2/2/2012 12:27:44 AM
Chloride	ND	7.5		mg/Kg	5	2/2/2012 12:27:44 AM
Sulfate	4.0	7.5	J	mg/Kg	5	2/2/2012 12:27:44 AM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.0089	0.033	J	mg/kg	1	2/2/2012 10:43:08 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	9,700	600		mg/Kg	200	2/13/2012 7:55:20 AM
Antimony	0.57	2.5	J	mg/Kg	1	2/8/2012 9:54:25 AM
Arsenic	1.6	2.5	J	mg/Kg	1	2/8/2012 9:54:25 AM
Barium	150	0.50		mg/Kg	5	2/10/2012 8:09:39 AM
Beryllium	0.33	0.15		mg/Kg	1	2/8/2012 9:54:25 AM
Boron	4.0	2.0		mg/Kg	1	2/8/2012 9:54:25 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 9:54:25 AM
Chromium	4.6	0.30		mg/Kg	1	2/8/2012 9:54:25 AM
Cobalt	2.7	0.30		mg/Kg	1	2/8/2012 9:54:25 AM
Copper	4.0	0.30		mg/Kg	1	2/8/2012 9:54:25 AM
Iron	8,700	200		mg/Kg	200	3/16/2012 10:35:37 AM
Lead	2.3	0.25		mg/Kg	1	2/8/2012 9:54:25 AM
Manganese	180	1.0		mg/Kg	10	3/16/2012 10:33:47 AM
Molybdenum	0.22	0.40	J	mg/Kg	1	2/8/2012 9:54:25 AM
Nickel	3.7	0.50		mg/Kg	1	2/8/2012 9:54:25 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 9:54:25 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 9:54:25 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 9:54:25 AM
Uranium	ND	5.0		mg/Kg	1	2/8/2012 9:54:25 AM
Vanadium	15	2.5		mg/Kg	1	2/8/2012 9:54:25 AM
Zinc	15	2.5		mg/Kg	1	2/8/2012 9:54:25 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-8 (1.5-2.0')
Project: RCRA Background Investigation **Collection Date:** 1/27/2012 3:55:00 PM
Lab ID: 1201885-016 **Matrix:** SOIL **Received Date:** 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	12	6.0		mg/Kg	20	2/2/2012 1:19:58 AM
Chloride	540	30		mg/Kg	20	2/2/2012 1:19:58 AM
Sulfate	10,000	30	E	mg/Kg	20	2/2/2012 1:19:58 AM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	ND	0.033		mg/kg	1	2/2/2012 10:44:54 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	20,000	1,500		mg/Kg	500	2/13/2012 7:57:23 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 10:11:44 AM
Arsenic	2.9	2.5		mg/Kg	1	2/8/2012 10:11:44 AM
Barium	480	1.0		mg/Kg	10	2/10/2012 8:13:32 AM
Beryllium	0.67	0.15		mg/Kg	1	2/8/2012 10:11:44 AM
Boron	9.9	2.0		mg/Kg	1	2/8/2012 10:11:44 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 10:11:44 AM
Chromium	8.3	0.30		mg/Kg	1	2/8/2012 10:11:44 AM
Cobalt	4.1	0.30		mg/Kg	1	2/8/2012 10:11:44 AM
Copper	5.2	0.30		mg/Kg	1	2/8/2012 10:11:44 AM
Iron	13,000	480		mg/Kg	500	3/16/2012 10:41:52 AM
Lead	1.4	0.25		mg/Kg	1	2/8/2012 10:11:44 AM
Manganese	360	0.96		mg/Kg	10	3/16/2012 10:39:52 AM
Molybdenum	0.90	0.40		mg/Kg	1	2/8/2012 10:11:44 AM
Nickel	5.4	0.50		mg/Kg	1	2/8/2012 10:11:44 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 10:11:44 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 10:11:44 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 10:11:44 AM
Uranium	ND	5.0		mg/Kg	1	2/8/2012 10:11:44 AM
Vanadium	24	2.5		mg/Kg	1	2/8/2012 10:11:44 AM
Zinc	21	2.5		mg/Kg	1	2/8/2012 10:11:44 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-7 (0-0.5') DUP
Project: RCRA Background Investigation **Collection Date:** 1/27/2012 3:30:00 PM
Lab ID: 1201885-017 **Matrix:** SOIL **Received Date:** 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	ND	1.5		mg/Kg	5	2/2/2012 9:44:52 AM
Chloride	ND	7.5		mg/Kg	5	2/2/2012 9:44:52 AM
Sulfate	1.4	7.5	J	mg/Kg	5	2/2/2012 9:44:52 AM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	0.011	0.033	J	mg/kg	1	2/2/2012 10:50:11 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	11,000	1,500		mg/Kg	500	2/13/2012 7:59:30 AM
Antimony	ND	2.5		mg/Kg	1	2/8/2012 10:16:01 AM
Arsenic	2.2	2.5	J	mg/Kg	1	2/8/2012 10:16:01 AM
Barium	160	0.50		mg/Kg	5	2/10/2012 8:20:00 AM
Beryllium	0.36	0.15		mg/Kg	1	2/8/2012 10:16:01 AM
Boron	4.0	2.0		mg/Kg	1	2/8/2012 10:16:01 AM
Cadmium	ND	0.10		mg/Kg	1	2/8/2012 10:16:01 AM
Chromium	5.3	0.30		mg/Kg	1	2/8/2012 10:16:01 AM
Cobalt	3.0	0.30		mg/Kg	1	2/8/2012 10:16:01 AM
Copper	5.1	0.30		mg/Kg	1	2/8/2012 10:16:01 AM
Iron	12,000	500		mg/Kg	500	3/18/2012 12:46:41 PM
Lead	2.7	0.25		mg/Kg	1	2/8/2012 10:16:01 AM
Manganese	200	0.99		mg/Kg	10	3/16/2012 10:43:55 AM
Molybdenum	0.23	0.40	J	mg/Kg	1	2/8/2012 10:16:01 AM
Nickel	4.3	0.50		mg/Kg	1	2/8/2012 10:16:01 AM
Selenium	ND	2.5		mg/Kg	1	2/8/2012 10:16:01 AM
Silver	ND	0.25		mg/Kg	1	2/8/2012 10:16:01 AM
Thallium	ND	2.5		mg/Kg	1	2/8/2012 10:16:01 AM
Uranium	0.37	5.0	J	mg/Kg	1	2/8/2012 10:16:01 AM
Vanadium	17	2.5		mg/Kg	1	2/8/2012 10:16:01 AM
Zinc	18	2.5		mg/Kg	1	2/8/2012 10:16:01 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-EB-012712
Project: RCRA Background Investigation **Collection Date:** 1/27/2012 4:25:00 PM
Lab ID: 1201885-018 **Matrix:** AQUEOUS **Received Date:** 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **RAG**
Aluminum	ND	0.020		mg/L	1	2/10/2012 3:10:48 PM
Barium	ND	0.0020		mg/L	1	2/10/2012 3:10:48 PM
Beryllium	ND	0.0020		mg/L	1	2/10/2012 3:10:48 PM
Boron	ND	0.040		mg/L	1	2/10/2012 3:10:48 PM
Cadmium	ND	0.0020		mg/L	1	2/10/2012 3:10:48 PM
Chromium	0.00077	0.0060	J	mg/L	1	2/10/2012 3:10:48 PM
Cobalt	0.00059	0.0060	J	mg/L	1	2/10/2012 3:10:48 PM
Copper	ND	0.0060		mg/L	1	2/10/2012 3:10:48 PM
Iron	ND	0.020		mg/L	1	2/13/2012 2:57:17 PM
Lead	ND	0.0050		mg/L	1	2/10/2012 3:10:48 PM
Manganese	0.00085	0.0020	J	mg/L	1	2/10/2012 3:10:48 PM
Molybdenum	ND	0.0080		mg/L	1	2/10/2012 3:10:48 PM
Nickel	ND	0.010		mg/L	1	2/10/2012 3:10:48 PM
Silver	ND	0.0050		mg/L	1	2/10/2012 3:10:48 PM
Vanadium	ND	0.050		mg/L	1	2/10/2012 3:10:48 PM
Zinc	0.081	0.010		mg/L	1	2/13/2012 2:57:17 PM
EPA METHOD 200.7: TOTAL METALS						Analyst: **RAG**
Aluminum	0.042	0.020		mg/L	1	2/6/2012 7:27:52 PM
Barium	0.0010	0.0020	J	mg/L	1	2/6/2012 7:27:52 PM
Beryllium	ND	0.0020		mg/L	1	2/6/2012 7:27:52 PM
Boron	0.0036	0.040	J	mg/L	1	2/6/2012 7:27:52 PM
Cadmium	ND	0.0020		mg/L	1	2/6/2012 7:27:52 PM
Chromium	0.00093	0.0060	J	mg/L	1	2/6/2012 7:27:52 PM
Cobalt	ND	0.0060		mg/L	1	2/6/2012 7:27:52 PM
Copper	0.0045	0.0060	J	mg/L	1	2/6/2012 7:27:52 PM
Iron	0.063	0.020		mg/L	1	2/6/2012 7:27:52 PM
Lead	ND	0.0050		mg/L	1	2/6/2012 7:27:52 PM
Manganese	0.00097	0.0020	J	mg/L	1	2/6/2012 7:27:52 PM
Molybdenum	ND	0.0080		mg/L	1	2/6/2012 7:27:52 PM
Nickel	0.00063	0.010	J	mg/L	1	2/6/2012 7:27:52 PM
Silver	ND	0.0050		mg/L	1	2/6/2012 7:27:52 PM
Vanadium	ND	0.050		mg/L	1	2/6/2012 7:27:52 PM
Zinc	0.0099	0.010	J	mg/L	1	2/6/2012 7:27:52 PM
EPA 200.8: DISSOLVED METALS						Analyst: **SNV**
Antimony	ND	0.0010		mg/L	1	2/7/2012 3:11:22 PM
Arsenic	ND	0.0010		mg/L	1	2/7/2012 3:11:22 PM
Selenium	ND	0.0010		mg/L	1	2/7/2012 3:11:22 PM
Thallium	ND	0.0010		mg/L	1	2/7/2012 3:11:22 PM
Uranium	ND	0.0010		mg/L	1	2/8/2012 10:52:35 AM
200.8 ICPMS METALS:TOTAL						Analyst: **SNV**

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-EB-012712
Project: RCRA Background Investigation **Collection Date:** 1/27/2012 4:25:00 PM
Lab ID: 1201885-018 **Matrix:** AQUEOUS **Received Date:** 1/31/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
200.8 ICPMS METALS:TOTAL						Analyst: **SNV**
Antimony	ND	0.0025		mg/L	2.5	2/6/2012 2:54:16 PM
Arsenic	ND	0.0025		mg/L	2.5	2/6/2012 2:54:16 PM
Selenium	ND	0.0025		mg/L	2.5	2/6/2012 2:54:16 PM
Thallium	ND	0.0025		mg/L	2.5	2/6/2012 2:54:16 PM
Uranium	ND	0.0025		mg/L	2.5	2/6/2012 2:54:16 PM
EPA METHOD 245.1: MERCURY						Analyst: **JLF**
Mercury	0.000050	0.00020	J	mg/L	1	2/6/2012 3:41:25 PM

Qualifiers:

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

CASE NARRATIVE February 22, 2012

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com *FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM*

Project Tracking No.: 1201885
Anatek Batch: 120201021

Project Summary: Seventeen (17) soil samples were received on 2/1/2012 for Total Cyanide (EPA 335.4) analysis. All samples were received with the appropriate chain of custody. Samples were received at 5.7C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1201885-001B BK-1 (0-0.5')	120201021-001	EPA 335.4
1201885-002B BK-1 (1.5-2.0')	120201021-002	EPA 335.4
1201885-003B BK-2 (0-0.5')	120201021-003	EPA 335.4
1201885-004B BK-2 (1.5-2.0')	120201021-004	EPA 335.4
1201885-005B BK-3 (0-0.5')	120201021-005	EPA 335.4
1201885-006B BK-3 (1.5-2.0')	120201021-006	EPA 335.4
1201885-007B BK-4 (0-0.5')	120201021-007	EPA 335.4
1201885-008B BK-4 (1.5-2.0')	120201021-008	EPA 335.4
1201885-009B BK-5 (0-0.5')	120201021-009	EPA 335.4
1201885-010B BK-5 (1.5-2.0'	120201021-010	EPA 335.4
1201885-011B BK-6 (0-0.5')	120201021-011	EPA 335.4
1201885-012B BK-6 (1.5-2.0')	120201021-012	EPA 335.4
1201885-013B BK-7 (0-0.5')	120201021-013	EPA 335.4
1201885-014B BK-7 (1.5-2.0')	120201021-014	EPA 335.4
1201885-015B BK-8 (0-0.5')	120201021-015	EPA 335.4
1201885-016B BK-8 (1.5-2.0'	120201021-016	EPA 335.4
1201885-017B BK-7 (0-0.5') DUP	120201021-017	EPA 335.4

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Y	NA
Tune(s) Valid?	NA	NA
Internal Standard Responses Valid?	NA	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

1. Holding Time Requirements

No problems encountered.

2. GC/MS Tune Requirements

N/A

3. **Calibration Requirements**

No problems encountered.

4. **Surrogate Recovery Requirements**

N/A.

5. **QC Sample (LCS/MS/MSD) Recovery Requirements**

No problems encountered.

6. **Method Blank Requirements**

No problems encountered.

7. **Internal Standard(s) Response Requirements**

No problems encountered.

8. **Comments**

None.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by: John W. Coll

Anatek Labs, Inc.

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D	**Project Name:**	1201885
	ALBUQUERQUE, NM 87109		
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-001	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-001B / BK-1 (0-0.5)	**Sampling Time**	1:30 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	12.2	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-002	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-002B / BK-1 (1.5-2.0)	**Sampling Time**	1:34 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	4.5	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-003	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012 10:37 AM
Client Sample ID	1201885-003B / BK-2 (0-0.5)	**Sampling Time**	2:05 PM		
Matrix	Soil	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	9.4	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-004	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-004B / BK-2 (1.5-2.0)	**Sampling Time**	2:10 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	7	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-005	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-005B / BK-3 (0-0.5)	**Sampling Time**	2:30 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	10.6	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-006	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM	
Client Sample ID	1201885-006B / BK-3 (1.5-2.0)	**Sampling Time**	2:05 PM				
Matrix	Soil	**Sample Location**					
Comments							

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	4.2	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-007	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-007B / BK-4 (0-0.5)	**Sampling Time**	2:40 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	21.8	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-008	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-008B / BK-4 (1.5-2.0)	**Sampling Time**	2:45 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	3.6	Percent		2/14/2012	CRW	%moisture	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-009	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-009B / BK-5 (0-0.5)	**Sampling Time**	3:00 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	14.3	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-010	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-010B / BK-5 (1.5-2.0)	**Sampling Time**	3:05 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	4.4	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-011	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-011B / BK-6 (0-0.5)	**Sampling Time**	3:15 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	10.6	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-012	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-012B / BK-6 (1.5-2.0)	**Sampling Time**	3:20 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	4.1	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-013	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM	
Client Sample ID	1201885-013B / BK-7 (0-0.5)	**Sampling Time**	3:30 PM				
Matrix	Soil	**Sample Location**					
Comments							

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	9.5	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-014	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-014B / BK-7 (1.5-2.0)	**Sampling Time**	3:35 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	5.2	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-015	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-015B / BK-8 (0-0.5)	**Sampling Time**	3:50 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	7.4	Percent		2/14/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-016	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-016B / BK-8 (1.5-2.0)	**Sampling Time**	3:55 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	8.7	Percent		2/14/2012	CRW	%moisture	

Anatek Labs, Inc.

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

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120201021-017	**Sampling Date**	1/27/2012	**Date/Time Received**	2/1/2012	10:37 AM
Client Sample ID	1201885-017B / BK-7 (0-0.5) DUP	**Sampling Time**	3:30 PM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/9/2012	CRW	EPA 335.4	
%moisture	9.6	Percent		2/14/2012	CRW	%moisture	

Authorized Signature

John Coddington, Lab Manager

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

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

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120201021
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1201885
Attn:	ANDY FREEMAN		

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Cyanide	0.548	mg/kg	0.5	109.6	80-120	2/9/2012	2/9/2012
Cyanide	0.524	mg/kg	0.5	104.8	80-120	2/9/2012	2/9/2012

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
120201021-016	Cyanide	ND	14.6	mg/kg	13.7	106.6	60-140	2/9/2012	2/9/2012
120201021-002	Cyanide	ND	14.1	mg/kg	13	108.5	60-140	2/9/2012	2/9/2012

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide	14.9	mg/kg	13.7	108.8	2.0	0-25	2/9/2012	2/9/2012
Cyanide	14.0	mg/kg	13	107.7	0.7	0-25	2/9/2012	2/9/2012

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide	ND	mg/Kg	0.3	2/9/2012	2/9/2012
Cyanide	ND	mg/Kg	0.3	2/9/2012	2/9/2012

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

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C586
Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

Anatek Labs, Inc.

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Login Report

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

Order ID: 120201021
Order Date: 2/1/2012

Contact Name: ANDY FREEMAN
Project Name: 1201885
Comment:

Sample #: 120201021-001 **Customer Sample #:** 1201885-001B / BK-1 (0-0.5)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	***Normal (6-10 Days)***

Sample #: 120201021-002 **Customer Sample #:** 1201885-002B / BK-1 (1.5-2.0)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	***Normal (6-10 Days)***

Sample #: 120201021-003 **Customer Sample #:** 1201885-003B / BK-2 (0-0.5)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	***Normal (6-10 Days)***

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

Order ID: 120201021
Order Date: 2/1/2012

Contact Name: ANDY FREEMAN
Project Name: 1201885
Comment:

Sample #: 120201021-004 **Customer Sample #:** 1201885-004B / BK-2 (1.5-2.0)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	Normal (6-10 Days)
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	Normal (6-10 Days)

Sample #: 120201021-005 **Customer Sample #:** 1201885-005B / BK-3 (0-0.5)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	Normal (6-10 Days)
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	Normal (6-10 Days)

Sample #: 120201021-006 **Customer Sample #:** 1201885-006B / BK-3 (1.5-2.0)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	Normal (6-10 Days)
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	Normal (6-10 Days)

Sample #: 120201021-007 **Customer Sample #:** 1201885-007B / BK-4 (0-0.5)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	Normal (6-10 Days)
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	Normal (6-10 Days)

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

Order ID: 120201021
Order Date: 2/1/2012

Contact Name: ANDY FREEMAN
Project Name: 1201885

Comment:

Sample #: 120201021-008 **Customer Sample #:** 1201885-008B / BK-4 (1.5-2.0)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	***Normal (6-10 Days)***

Sample #: 120201021-009 **Customer Sample #:** 1201885-009B / BK-5 (0-0.5)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	***Normal (6-10 Days)***

Sample #: 120201021-010 **Customer Sample #:** 1201885-010B / BK-5 (1.5-2.0)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	***Normal (6-10 Days)***

Sample #: 120201021-011 **Customer Sample #:** 1201885-011B / BK-6 (0-0.5)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	***Normal (6-10 Days)***

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

Order ID: 120201021
Order Date: 2/1/2012

Contact Name: ANDY FREEMAN
Project Name: 1201885
Comment:

Sample #: 120201021-012 **Customer Sample #:** 1201885-012B / BK-6 (1.5-2.0)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	***Normal (6-10 Days)***

Sample #: 120201021-013 **Customer Sample #:** 1201885-013B / BK-7 (0-0.5)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	***Normal (6-10 Days)***

Sample #: 120201021-014 **Customer Sample #:** 1201885-014B / BK-7 (1.5-2.0)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	***Normal (6-10 Days)***

Sample #: 120201021-015 **Customer Sample #:** 1201885-015B / BK-8 (0-0.5)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	***Normal (6-10 Days)***

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

Order ID: 120201021
Order Date: 2/1/2012

Contact Name: ANDY FREEMAN

Project Name: 1201885

Comment:

Sample #: 120201021-016 **Customer Sample #:** 1201885-016B / BK-8 (1.5-2.0)

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	***Normal (6-10 Days)***

Sample #: 120201021-017 **Customer Sample #:** 1201885-017B / BK-7 (0-0.5) DUP

Recv'd: ☑ **Collector:** **Date Collected:** 1/27/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/1/2012 10:37:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/13/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/13/2012	***Normal (6-10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	5.7
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 2

120201 021 HALL Last Due 2/13/2012
1st SAMP 1/27/2012 1st RCVD 2/1/2012
1201885

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

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1201885-001B	BK-1 (0-0.5')	4OZGU	Soil	1/27/2012 1:30:00 PM	1	TOTAL CYANIDE
2	1201885-002B	BK-1 (1.5-2.0')	4OZGU	Soil	1/27/2012 1:34:00 PM	1	TOTAL CYANIDE MWBS
3	1201885-003B	BK-2 (0-0.5')	4OZGU	Soil	1/27/2012 2:05:00 PM	1	TOTAL CYANIDE
4	1201885-004B	BK-2 (1.5-2.0')	4OZGU	Soil	1/27/2012 2:10:00 PM	1	TOTAL CYANIDE
5	1201885-005B	BK-3 (0-0.5')	4OZGU	Soil	1/27/2012 2:30:00 PM	1	TOTAL CYANIDE
6	1201885-006B	BK-3 (1.5-2.0')	4OZGU	Soil	1/27/2012 2:35:00 PM	1	TOTAL CYANIDE
7	1201885-007B	BK-4 (0-0.5')	4OZGU	Soil	1/27/2012 2:40:00 PM	1	TOTAL CYANIDE
8	1201885-008B	BK-4 (1.5-2.0')	4OZGU	Soil	1/27/2012 2:45:00 PM	1	TOTAL CYANIDE
9	1201885-009B	BK-5 (0-0.5')	4OZGU	Soil	1/27/2012 3:00:00 PM	1	TOTAL CYANIDE
10	1201885-010B	BK-5 (1.5-2.0')	4OZGU	Soil	1/27/2012 3:05:00 PM	1	TOTAL CYANIDE
11	1201885-011B	BK-6 (0-0.5')	4OZGU	Soil	1/27/2012 3:15:00 PM	1	TOTAL CYANIDE
12	1201885-012B	BK-6 (1.5-2.0')	4OZGU	Soil	1/27/2012 3:20:00 PM	1	TOTAL CYANIDE
13	1201885-013B	BK-7 (0-0.5')	4OZGU	Soil	1/27/2012 3:30:00 PM	1	TOTAL CYANIDE

SPECIAL INSTRUCTIONS / COMMENTS:

[redacted] lease include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By:	Date: 1/31/2012	Time: 2:43 PM	Received By:	Date:	
Relinquished By:	Date:	Time:	Received By:	Date:	
Relinquished By:	Date:	Time:	Received By:	Date:	

TAT: Standard RUSH Next BD 2nd BD 3

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 5.7 °C
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ICE / ICE-PACKS PRESENT: Y
- CUSTODY SEALS PRESENT: Y
- PRESERVATIVES: —
- NUMBER OF CONTAINERS: 17 SHIPPED VIA: F
- DATE & TIME: 2-1-12 10:37 INSPECTED BY: BT

ONLINE:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECOR... AGE: 2 OF: 2

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

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

FAX:	(208) 882-9246
EMAIL:	

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
14	1201885-014B	BK-7 (1.5-2.0')	4OZGU	Soil	1/27/2012 3:35:00 PM	1	TOTAL CYANIDE
15	1201885-015B	BK-8 (0-0.5')	4OZGU	Soil	1/27/2012 3:50:00 PM	1	TOTAL CYANIDE
16	1201885-016B	BK-8 (1.5-2.0')	4OZGU	Soil	1/27/2012 3:55:00 PM	1	TOTAL CYANIDE
17	1201885-017B	BK-7 (0-0.5') DUP	4OZGU	Soil	1/27/2012 3:30:00 PM	1	TOTAL CYANIDE
18						0	
19						0	
20						0	

SPECIAL INSTRUCTIONS / COMMENTS:

[redacted] lease include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By:		Date: 1/31/2012	Time: 2:43 PM	Received By:		Date:	Time:
Relinquished By:		Date:	Time:	Received By:		Date:	Time:
Relinquished By:		Date:	Time:	Received By:		Date:	Time:

TAT: Standard RUSH Next BD 2nd BD 3rd BD

REPORT TRANSMITTAL DESIRED:
HARDCOPY (extra cost) FAX EMAIL ONLINE

FOR LAB USE ONLY
Temp of samples: °C Attempt to Cool ?
Comments:

CYANIDE EXTRACTION BENCHSHEET SW 846

Instrument names & IDs: Denver A-160 balance; Alpchem FIA

Date	SAMPLE #	% Solids	Sample Amt (g)	H2O (mL)	Final Volume	Multiplier	Chemist
1/31/12	120125012-1	10.0	10.11	250	250	24.7	CMW
	120126014-1	9.5	10.14			26.0	
	120131027-1	91.8	10.04			27.1	
	-2	92.2	9.98			27.2	
	29-1	88.5	10.03			28.7	
	-2	88.9	10.18			27.6	
	-3	87.7	9.98			28.6	
	-4	90.7	9.99			27.6	
	-5	86.4	10.06			28.8	
	-6	91.2	10.12			27.1	
	-7	96.9	10.07			25.6	
	-8	94.8	10.11			26.1	
2/1/12	120131030-1	96.3	9.98	250	250	26.0	CMW
	-2	96.8	10.04			25.7	
	-3	97.1	10.08			25.5	
	-4	90.7	10.02			27.5	
	-5	92.1	10.03			27.1	
	-6	89.8	10.12			27.5	
	-7	95.1	10.02			26.2	
	-8	91.0	10.00			27.5	
	-9	91.4	10.00			27.4	
	-10	91.1	10.02			27.4	
2/2/12	120131030-11	91.9	10.02	250	250	27.1	CMW
	-12	93.5	10.00			26.7	
	-13	93.4	10.06			26.6	
	-14	93.0	10.02			26.8	
	-15	92.8	10.01			26.9	
	-16	92.4	10.03			27.0	
	-17	97.0	10.14			25.3	
	-18	92.1	10.07			27.0	
	31-1	96.8	10.06			25.7	
	-2	94.3	10.03			26.6	
2/6/12	120710102-1	87.8	10.02	250	250	28.4	CMW
	-2	95.5	10.05			26.0	
	-3	90.6	9.97			27.7	
	-4	93.0	10.04			26.8	
	-5	87.4	10.00			~~27.0~~ 28.0	
	-6	95.8	10.05			26.0	
	-7	78.2	10.01			31.9	
	-8	96.3	10.03			25.9	
	-9	85.7	9.99			29.2	
	-10	95.6	9.98			26.2	
	120126025-1	67.2	10.01			37.2	
	120202028-1	91.0	10.02			27.4	

CYANIDE EXTRACTION BENCHSHEET SW 846

Instrument names & IDs: Denver A-160 balance; Alpchem FIA

Date	SAMPLE #	% Solids	Sample Amt (g)	H2O (mL)	Final Volume	Multiplier	Chemist
2/7/12	1202010211	89.4	10.03	250	250	27.9	CMW
	-12	95.9	10.00			26.1	
	-13	98.5	10.02			25.6	
	-14	94.8	10.07			26.2	
	-15	92.6	10.03			26.9	
	-16	91.3	10.01			27.4	
	-17	90.4	10.11			27.4	
2/8/12	1202010191	91.8	10.00	250	250	27.2	CMW
	-2	93.7	10.02			26.6	
	1207010271	93.0	10.01			26.9	
	-2	89.4	10.18			27.5	
2/8/12	1202010193	96.7	10.00	250	250	25.9	CMW
	-4	96.6	5.01	125	125	25.8	
	-5	94.6	5.00			26.4	
	-6	94.5	5.05			26.2	
	-7	94.8	5.10			25.9	
	-8	94.9	5.02			26.2	
	-9	97.2	4.99			25.8	
	-10	92.4	5.01			27.0	
	-11	94.3	5.00			26.5	
	1202020311	15.0	5.00			167	
2/10/12	1202070141	95.4	10.04	250	250	26.1	CMW
	1202070171	89.4	10.04			27.9	
	-2	92.2	10.00			27.1	
	-3	96.7	10.03			25.8	
	-4	94.9	10.00			26.3	
	-5	95.3	10.01			26.2	
	-6	95.5	10.09			25.9	
	-7	90.3	9.99			27.7	
	-8	90.2	10.05			27.6	
	1202070271	88.9	10.03			28.0	
	-2	92.7	10.01			26.9	
	-3	87.0	10.03			28.6	
	-4	90.4	10.01			27.6	
	-5	93.0	10.07			26.7	
	-6	89.0	10.07			27.6	
	-7	88.8	10.00			28.2	
	-8	92.9	10.03			26.8	

Total Cyanide by Semi-Automated Colorimetry
Method: EPA 335.4\SM-4500-CN-E
'stillation Bench Sheet

Weak Acid Dissociable Cyanide by
SM 4500-CN-I (check WAD column)

Total Cyanide MS/MSD/LCS Soln: M825-01 Exp: 1/4/2013
Free Cyanide MS/MSD/LCS Soln: M824-05 Exp: 12/28/2012

Method requirements: All QC +/- 10%
Equipment: Midi-vap
Instrument: ALPCHEM FIA 3000
Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	120131030-18	soil extr.	NaOH	50mL	27.0	same		
2	12020102I-1	"	"	"	28.4	"		
3	-2	"	"	"	26.0	"		
4	-2ms	"	"	"	"	"	1mL	
5	-2msd	"	"	"	"	"	"	
6	-LCS	"	"	"	1x	"	"	
7	-BL	"	"	"	"	"		
8	-3	"	"	"	27.7	"		
9	-4	"	"	"	26.8	"		
10	-5	"	"	"	28.0	"		
11	12020102I-6	soil extr.	NaOH	50mL	26.0	same		
	-7	"	"	"	31.9	"		
13	-8	"	"	"	25.9	"		
14	-9	"	"	"	29.2	"		
15	-10	"	"	"	26.2	"		
16	-11	"	"	"	27.9	"		
17	-12	"	"	"	26.1	"		
18	-13	"	"	"	27.6	"		
19	-14	"	"	"	26.2	"		
20	-15	"	"	"	26.9	"		

* If soils this calculation is taken from cyanide extraction bench sheet.

** If soils, mLs of extract used for distillation.

Extraction Reagents:	Reagent #:
methyl red indicator	A041-03
18 N H_2SO_4	A043-08
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% $MgCl_2$	A043-06

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

Distillation Initials/Date Distilled: CMW 2/8/12

Analyst Initials/Date Analyzed: CMW 2/9/12

Total Cyanide by Semi-Automated Colorimetry
Method: EPA 335.4\SM-4500-CN-E
Distillation Bench Sheet

Weak Acid Dissociable Cyanide by
SM 4500-CN-I (check WAD column)

Total Cyanide MS/MSD/LCS Soln: ~~M826-01~~ M838-03 ~~Exp: 1/4/2013~~ exp: 2/9/2013
Free Cyanide MS/MSD/LCS Soln: M824-05 Exp: 12/28/2012

Method requirements: All QC +/- 10%
Equipment: Midi-vap
Instrument: ALPCHEM FIA 3000
Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	120201021-16	soil epa	NaOH	50mL	27.4	same		
2	-16ms	"	"	"	"	"	1mL	
3	-16msd	"	"	"	"	"	"	
4	-LCS	"	"	"	1x	"	"	
5	-BL	"	"	"	"	"		
6	-17	"	"	"	27.4	"		
7	120201019-1	"	"	"	27.2	"		
8	-2	"	"	"	26.6	"		
9	120202027-1	"	"	"	26.9	"		
10	-2	"	"	"	27.5	"		
11	120201019-3	soil epa	NaOH	50mL	25.9	same		
12	-4	"	"	"	25.8	"		
13	-5	"	"	"	26.4	"		
14	-6	"	"	"	26.2	"		
15	-7	"	"	"	25.9	"		
16	-8	"	"	"	26.2	"		
17	-9	"	"	"	25.8	"		
18	-10	"	"	"	27.0	"		
19	-11	"	"	"	26.5	"		
20	120202031-1	"	"	"	167	"		

* If soils this calculation is taken from cyanide extraction bench sheet.

** If soils, mLs of extract used for distillation.

Extraction Reagents:	Reagent #:
methyl red indicator	A041-03
1.8 N H_2SO_4	A043-08 A043-10
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% $MgCl_2$	A043-06

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

Distillation Initials/Date Distilled: CMW 2/9/12

Analyst Initials/Date Analyzed: CMW 2/9/12

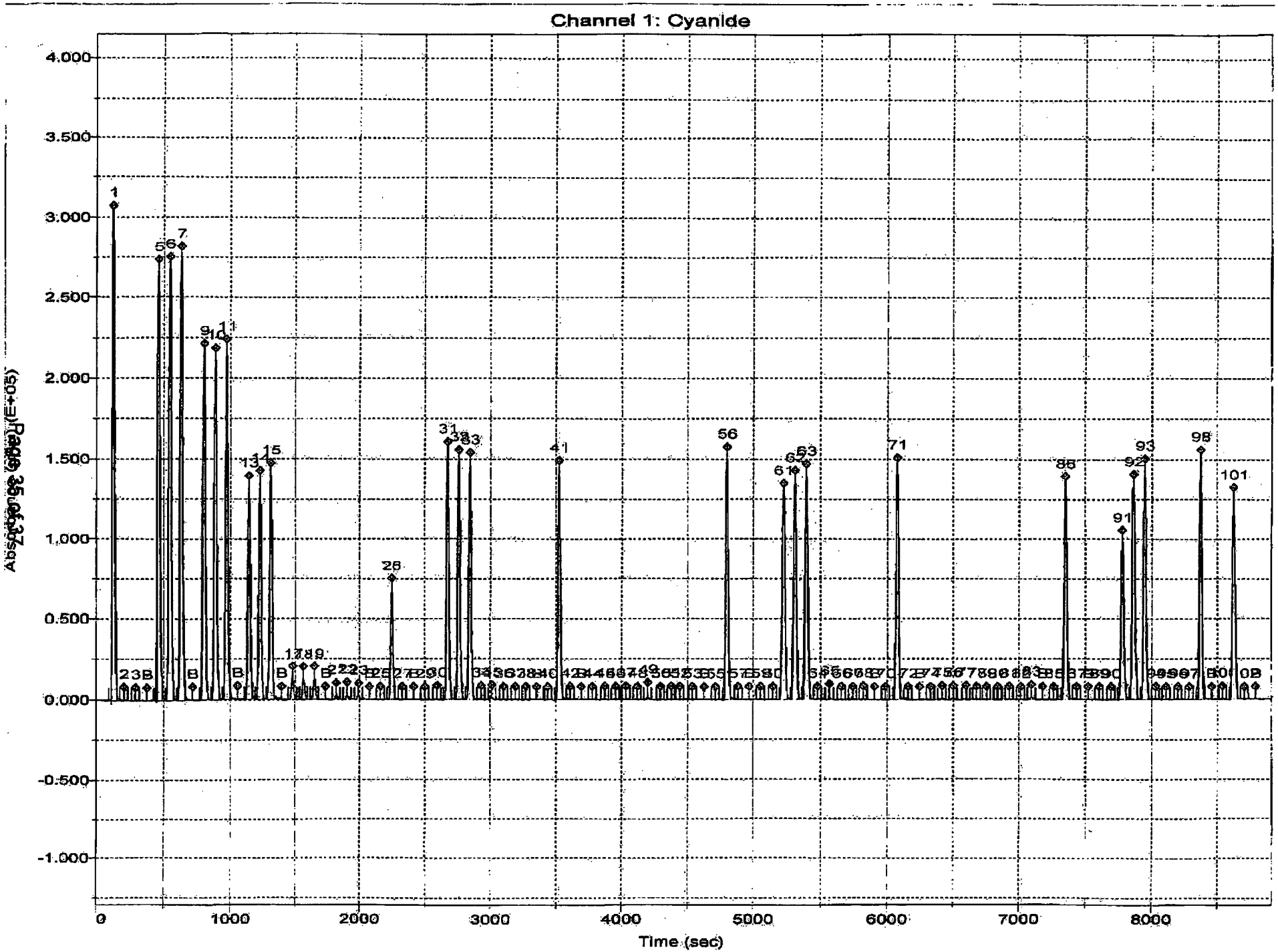
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Date: February 09, 2012
Operator: CRW \20208FIACNS \20209FIACNS

	ak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
1		2	Sync	SYNC	1	1	5390600	0.922962
2		0	Carryover	CO	1	1	13123	0.005170
3		0	Carryover	CO	1	1	1186	0.003133
B		0	Baseline	RB	1	1	-1111	0.002741
5		2	Cal 1.00 ppm	C	1	1	5834096	0.998655
6		2	Cal 1.00 ppm	C	1	1	5848290	1.001078
7		2	Cal 1.00 ppm	C	1	1	5845756	1.000646
B		0	Baseline	RB	1	1	996	0.003100
9		3	Cal 0.80 ppm	C	1	1	4595277	0.787222
10		3	Cal 0.80 ppm	C	1	1	4652028	0.796908
11		3	Cal 0.80 ppm	C	1	1	4693766	0.804031
B		0	Baseline	RB	1	1	-5784	0.001943
13		4	Cal 0.50 ppm	C	1	1	2914050	0.500281
14		4	Cal 0.50 ppm	C	1	1	2920794	0.501432
15		4	Cal 0.50 ppm	C	1	1	2940328	0.504766
B		0	Baseline	RB	1	1	-1799	0.002623
17		5	Cal 0.05 ppm	C	1	1	249151	0.045454
18		5	Cal 0.05 ppm	C	1	1	258617	0.047069
19		5	Cal 0.05 ppm	C	1	1	254447	0.046357
B		0	Baseline	RB	1	1	-2882	0.002438
21		6	Cal 0.01 ppm	C	1	1	41520	0.010017
22		6	Cal 0.01 ppm	C	1	1	43883	0.010420
23		6	Cal 0.01 ppm	C	1	1	42615	0.010203
B		0	Baseline	RB	1	1	-1211	0.002723
25		1	Blank	BLNK	1	1	1633	0.003209
26		7	ICV 0.25 ppm	CCV	1	1	1492641	0.257684
27		1	Blank	BLNK	1	1	1020	0.003104
B		0	Baseline	RB	1	1	1066	0.003112
29		8	120201021-BL S	U	1	1	-1516	0.002671
30		9	120201021-002	U	26	1	5024	0.098475
		10	120201021-002MS	U	26	1	3152872	14.067086
		11	120201021-002MSD	U	26	1	3132856	13.978266
33		12	120201021-LCS	U	1	1	3051385	0.523721
34		13	120201021-001	U	28.4	1	13771	0.149965
35		14	120201021-003	U	27.7	1	22660	0.188294
36		15	120201021-004	U	26.8	1	6242	0.107080
37		16	120201021-005	U	28	1	4657	0.104299
38		17	120131031-018	U	27	1	7313	0.112813
B		0	Baseline	RB	1	1	698	0.003049
40		1	Blank	BLNK	1	1	362	0.002992
41		4	CCV 0.5 ppm	CCV	1	1	2924401	0.502048
42		1	Blank	BLNK	1	1	2697	0.003390
B		0	Read Baseline	RB	1	1	-507	0.002844
44		18	120201021-006	U	26	1	-4678	0.055426
45		19	120201021-007	U	31.9	1	257	0.094867
46		20	120201021-008	U	25.9	1	5408	0.099798
47		21	120201021-009	U	29.2	1	6119	0.116057
48		22	120201021-010	U	26.2	1	2261	0.086879
49		23	120201021-011	U	27.9	1	26002	0.205568
50		24	120201021-012	U	26.1	1	-5326	0.052752
51		25	120201021-013	U	27.6	1	1812	0.089407
52		26	120201021-014	U	26.2	1	1717	0.084448
53		27	120201021-015	U	26.9	1	2772	0.091548
B		0	Baseline	RB	1	1	-1401	0.002691
55		1	Blank	BLNK	1	1	-2418	0.002517
56		4	CCV 0.5 ppm	CCV	1	1	2989289	0.513122
57		1	Blank	BLNK	1	1	1858	0.003247
B		0	Read Baseline	RB	1	1	-2480	0.002507
59		28	120201021-BL S	U	1	1	3007	0.003443
60		29	120201021-016	U	27.4	1	669	0.083415
61		30	120201021-016MS	U	27.4	1	3109539	14.621899
62		31	120201021-016MSD	U	27.4	1	3159403	14.855085
		32	120201021-LCS	U	1	1	3195121	0.548252
		33	120201021-017	U	27.4	1	844	0.084231
65		34	120202027-001	U	26.9	1	6422	0.108303
66		35	120202027-002	U	27.5	1	-4496	0.059477

Peak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)	
67	36	120201019-001	U	27.2	1	-1695	0.071828	
68	37	120201019-002	U	26.6	1	1626	0.085325	
B	0	Baseline	RB	1	1	-3581	0.002319	
70	1	Blank	BLNK	1	1	-2426	0.002516	
71	4	CCV 0.5 ppm	CCV	1	1	3002372	0.515355	
72	1	Blank	BLNK	1	1	-1646	0.002649	
B	0	Read Baseline	RB	1	1	-1297	0.002709	
74	38	120201019-003	U	25.9	1	77	0.076230	
75	39	120201019-004	U	25.8	1	11861	0.127826	
76	40	120201019-005	U	26.4	1	7043	0.109089	
77	41	120201019-006	U	26.2	1	7924	0.112200	
78	42	120201019-007	U	25.9	1	5897	0.101957	
79	43	120201019-008	U	26.2	1	492	0.078968	
80	44	120201019-009	U	25.8	1	-3643	0.059557	
81	45	120201019-010	U	27	1	4032	0.097694	
82	46	120201019-011	U	26.5	1	-1725	0.069845	
83	47	120202031-001	U	167	1	22796	1.139075	
B	0	Baseline	RB	1	1	-2335	0.002532	
85	1	Blank	BLNK	1	1	-2357	0.002528	
86	4	CCV 0.5 ppm	CCV	1	1	2972572	0.510269	
87	1	Blank	BLNK	1	1	3191	0.003475	
B	0	Read Baseline	RB	1	1	-810	0.002790	
89	48	120131002-BL F	U	1	1	-1957	0.002596	
90	49	120131002-001	U	1	1	-2802	0.002452	
91	50	120131002-001MS	U	1	1	2386461	0.410236	rerun
92	51	120131002-001MSD	U	1	1	3138382	0.538569	below
93	52	120131002-LCS	U	1	1	3237147	0.555425	
94	53		U	1	1	-3937	0.002258	
95	54		U	1	1	-2480	0.002507	
96	55		U	1	1	-2668	0.002475	
97	56		U	1	1	-6073	0.001894	
98	57	120131002-001MS	U	1	1	3113982	0.534404	MS
B	0	Baseline	RB	1	1	-433	0.002856	
100	1	Blank	BLNK	1	1	-128	0.002908	
101	4	CCV 0.5 ppm	CCV	1	1	3018840	0.518166	
102	1	Blank	BLNK	1	1	-2358	0.002528	
B	0	Read Baseline	RB	1	1	910	0.003085	

Peak	Cup	Flags
1	2	
2	0	
3	0	
4	0	BL
5	2	
6	2	
7	2	
8	0	BL
9	3	
10	3	
11	3	
12	0	BL
13	4	
14	4	
15	4	
16	0	BL
17	5	OL
18	5	
19	5	
20	0	BL
21	6	
22	6	OL
23	6	
24	0	BL
25	1	
26	7	
27	1	
28	0	BL
29	8	

Peak	Cup	Flags
30	9	
31	10	
	11	
	12	
	13	
35	14	
36	15	
37	16	
38	17	
B	0	BL
40	1	
41	4	
42	1	
B	0	BL
44	18	
45	19	
46	20	
47	21	
48	22	
49	23	
50	24	
51	25	
52	26	
53	27	
B	0	BL
55	1	
56	4	
57	1	
B	0	BL
59	28	
60	29	
61	30	
62	31	
63	32	
	33	
	34	
	35	
67	36	
68	37	
B	0	BL
70	1	
71	4	
72	1	
B	0	BL
74	38	
75	39	
76	40	
77	41	
78	42	
79	43	
80	44	
81	45	
82	46	
83	47	
B	0	BL
85	1	
86	4	
87	1	
B	0	BL
89	48	
90	49	
91	50	
92	51	
93	52	
94	53	
95	54	
96	55	
	56	
	57	
B	0	BL
100	1	


Channel 1: Cyanide
Absorbance (E+05)
Time (sec)
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
-0.500
-1.000
0
1000
2000
3000
4000
5000
6000
7000
8000

File name: T:\DATA1\FLOW4\2012\EPA335.4\020912CM.RST
Date: February 09, 2012
Operator: CRW

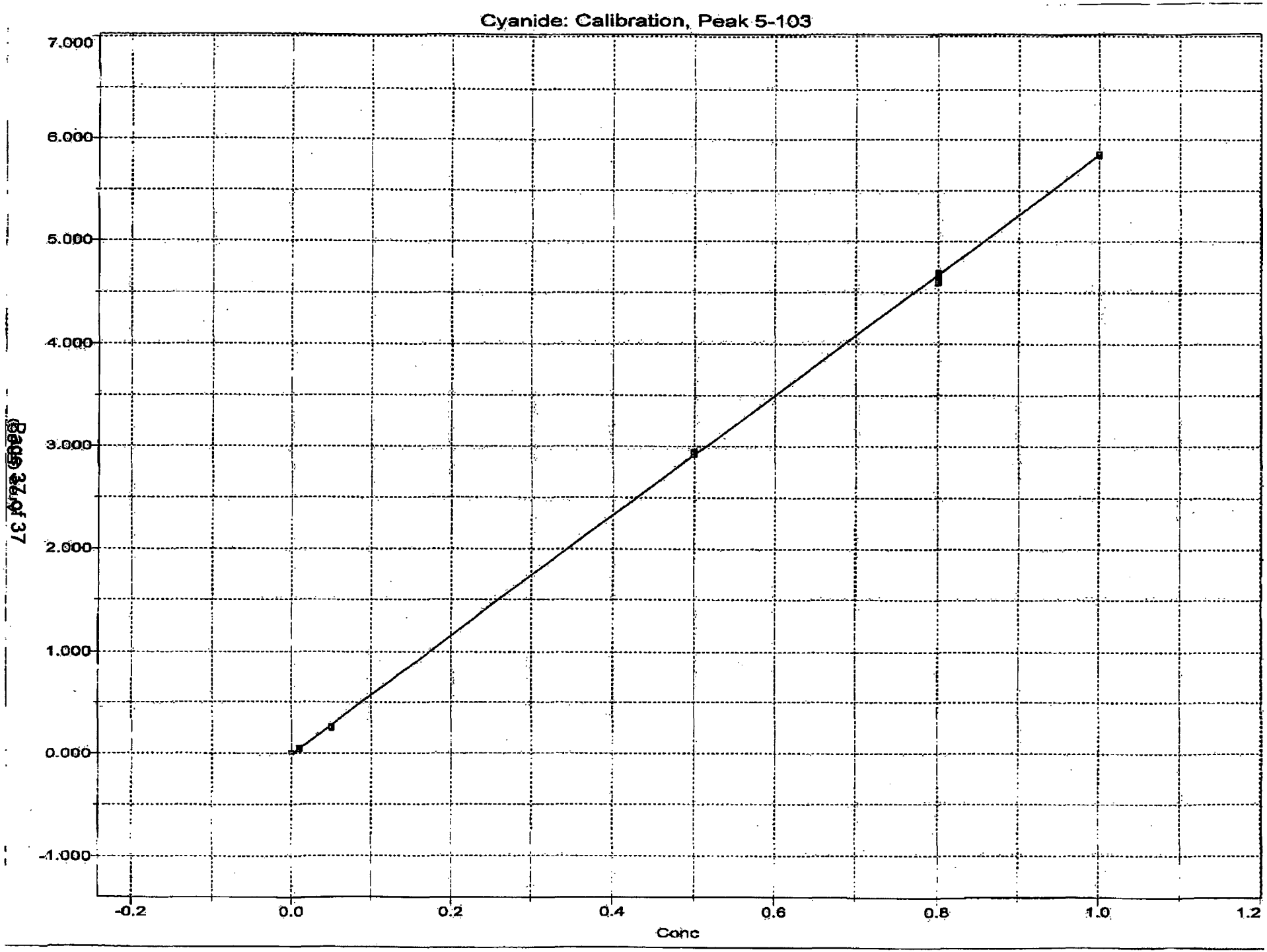
	Name	Conc	Area
*	Cal 1.00 ppm	1.000000	5834096.000000
*	Cal 1.00 ppm	1.000000	5848289.500000
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*	Cal 0.80 ppm	0.800000	4595277.000000
*	Cal 0.80 ppm	0.800000	4652028.000000
*	Cal 0.80 ppm	0.800000	4693766.500000
*	Cal 0.50 ppm	0.500000	2914049.750000
*	Cal 0.50 ppm	0.500000	2920793.500000
*	Cal 0.50 ppm	0.500000	2940328.000000
*	Cal 0.05 ppm	0.050000	249151.046875
*	Cal 0.05 ppm	0.050000	258617.031250
*	Cal 0.05 ppm	0.050000	254446.984375
*	Cal 0.01 ppm	0.010000	41520.464844
*	Cal 0.01 ppm	0.010000	43883.496094
*	Cal 0.01 ppm	0.010000	42615.242188

Calib Coef:
y=bx+a
a: (intercept) -1.7168e+04
b: 5.8591e+06

Corr Coef: 0.999948

Carryover: 0.243%

No Drift Peaks


Cyanide: Calibration, Peak 5-103
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Conc

QC SUMMARY REPORT

WO#: **1201885**

ll Environmental Analysis Laboratory, Inc.

13-Apr-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R901**	RunNo: **901**
Prep Date:	Analysis Date: **2/10/2012**	SeqNo: **25640** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Barium	ND	0.0020								
Beryllium	ND	0.0020								
Boron	ND	0.040								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Cobalt	ND	0.0060								
Copper	ND	0.0060								
Lead	ND	0.0050								
Manganese	ND	0.0020								
Molybdenum	ND	0.0080								
Nickel	ND	0.010								
Silver	ND	0.0050								
Vanadium	ND	0.050								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
ent ID: **LCSW**	Batch ID: **R901**	RunNo: **901**
ep Date:	Analysis Date: **2/10/2012**	SeqNo: **25641** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.56	0.020	0.5000	0	112	85	115			
Barium	0.49	0.0020	0.5000	0	97.5	85	115			
Beryllium	0.50	0.0020	0.5000	0	101	85	115			
Boron	0.51	0.040	0.5000	0	103	85	115			
Cadmium	0.49	0.0020	0.5000	0	98.9	85	115			
Chromium	0.49	0.0060	0.5000	0	98.3	85	115			
Cobalt	0.47	0.0060	0.5000	0	94.1	85	115			
Copper	0.48	0.0060	0.5000	0	96.7	85	115			
Lead	0.48	0.0050	0.5000	0	96.2	85	115			
Manganese	0.48	0.0020	0.5000	0	95.5	85	115			
Molybdenum	0.51	0.0080	0.5000	0	101	85	115			
Nickel	0.47	0.010	0.5000	0	93.2	85	115			
Silver	0.10	0.0050	0.1000	0	100	85	115			
Vanadium	0.51	0.050	0.5000	0	102	85	115			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R921**	RunNo: **921**
Prep Date:	Analysis Date: **2/13/2012**	SeqNo: **26476** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.0032	0.020								J
Zinc	ND	0.010								

alifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1201885**

13-Apr-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R921**	RunNo: **921**
Prep Date:	Analysis Date: **2/13/2012**	SeqNo: **26477** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.49	0.020	0.5000	0.003150	98.2	85	115			
Zinc	0.50	0.010	0.5000	0	99.7	85	115			

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1201885**

ıll Environmental Analysis Laboratory, Inc.

13-Apr-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID **MB-551**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Total Metals**
Client ID: **PBW**	Batch ID: **551**	RunNo: **801**
Prep Date: **2/2/2012**	Analysis Date: **2/6/2012**	SeqNo: **22882** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Barium	ND	0.0020								
Beryllium	0.00014	0.0020								J
Boron	ND	0.040								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Cobalt	0.00059	0.0060								J
Copper	ND	0.0060								
Iron	0.011	0.020								J
Lead	ND	0.0050								
Manganese	ND	0.0020								
Molybdenum	0.0024	0.0080								J
Nickel	ND	0.010								
Silver	ND	0.0050								
Vanadium	0.00086	0.050								J
Zinc	0.0013	0.010								J

ɪmple ID **LCS-551**	SampType: **LCS**	TestCode: **EPA Method 200.7: Total Metals**
Client ID: **LCSW**	Batch ID: **551**	RunNo: **801**
Prep Date: **2/2/2012**	Analysis Date: **2/6/2012**	SeqNo: **22883** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.56	0.020	0.5000	0	112	85	115			
Barium	0.49	0.0020	0.5000	0	97.4	85	115			
Beryllium	0.51	0.0020	0.5000	0.0001400	101	85	115			
Boron	0.50	0.040	0.5000	0	99.9	85	115			
Cadmium	0.49	0.0020	0.5000	0	98.3	85	115			
Chromium	0.49	0.0060	0.5000	0	97.1	85	115			
Cobalt	0.47	0.0060	0.5000	0.0005900	94.8	85	115			
Copper	0.49	0.0060	0.5000	0	97.8	85	115			
Iron	0.49	0.020	0.5000	0.01060	95.0	85	115			
Lead	0.49	0.0050	0.5000	0	97.3	85	115			
Manganese	0.48	0.0020	0.5000	0	95.7	85	115			
Molybdenum	0.51	0.0080	0.5000	0.002410	101	85	115			
Nickel	0.47	0.010	0.5000	0	93.5	85	115			
Silver	0.099	0.0050	0.1000	0	98.8	85	115			
Vanadium	0.51	0.050	0.5000	0.0008600	102	85	115			
Zinc	0.49	0.010	0.5000	0.001310	97.0	85	115			

ʻalifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1201885**

13-Apr-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R818**	RunNo: **818**
Prep Date:	Analysis Date: **2/7/2012**	SeqNo: **23440** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	0.0010								
Arsenic	ND	0.0010								
Cadmium	ND	0.0010								
Copper	ND	0.0010								
Lead	ND	0.0010								
Nickel	ND	0.0010								
Selenium	ND	0.0010								
Thallium	ND	0.0010								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R818**	RunNo: **818**
Prep Date:	Analysis Date: **2/7/2012**	SeqNo: **23451** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.022	0.0010	0.02500	0	87.5	85	115			
Arsenic	0.023	0.0010	0.02500	0	92.0	85	115			
Cadmium	0.023	0.0010	0.02500	0	92.6	85	115			
Copper	0.022	0.0010	0.02500	0	89.5	85	115			
Lead	0.022	0.0010	0.02500	0	86.4	85	115			
Nickel	0.023	0.0010	0.02500	0	90.1	85	115			
Selenium	0.025	0.0010	0.02500	0	100	85	115			
Thallium	0.022	0.0010	0.02500	0	86.8	85	115			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R841**	RunNo: **841**
Prep Date:	Analysis Date: **2/8/2012**	SeqNo: **24238** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Uranium	ND	0.0010								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R841**	RunNo: **841**
Prep Date:	Analysis Date: **2/8/2012**	SeqNo: **24239** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Uranium	0.025	0.0010	0.02500	0	99.3	85	115			

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1201885**

ıll Environmental Analysis Laboratory, Inc.

13-Apr-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID **MB-551**	SampType: **MBLK**	TestCode: **200.8 ICPMS Metals:Total**
Client ID: **PBW**	Batch ID: **551**	RunNo: **788**
Prep Date: **2/2/2012**	Analysis Date: **2/6/2012**	SeqNo: **22523** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Copper	ND	0.0025								
Antimony	ND	0.0025								
Arsenic	ND	0.0025								
Cadmium	ND	0.0025								
Lead	ND	0.0025								
Nickel	ND	0.0025								
Selenium	ND	0.0025								
Thallium	ND	0.0025								
Uranium	ND	0.0025								

ɔalifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1201885**

13-Apr-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID	MB-602	SampType:	MBLK	TestCode:	EPA Method 245.1: Mercury					
Client ID:	PBW	Batch ID:	602	RunNo:	789					
Prep Date:	2/6/2012	Analysis Date:	2/6/2012	SeqNo:	22439	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.000051	0.00020								J

Sample ID	LCS-602	SampType:	LCS	TestCode:	EPA Method 245.1: Mercury					
Client ID:	LCSW	Batch ID:	602	RunNo:	789					
Prep Date:	2/6/2012	Analysis Date:	2/6/2012	SeqNo:	22440	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0051	0.00020	0.005000	.00005124	101	80	120			

Sample ID	1201885-018AMS	SampType:	MS	TestCode:	EPA Method 245.1: Mercury					
Client ID:	BK-EB-012712	Batch ID:	602	RunNo:	789					
Prep Date:	2/6/2012	Analysis Date:	2/6/2012	SeqNo:	22442	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0053	0.00020	0.005000	.00004974	104	75	125			

Sample ID	1201885-018AMSD	SampType:	MSD	TestCode:	EPA Method 245.1: Mercury					
Client ID:	BK-EB-012712	Batch ID:	602	RunNo:	789					
Prep Date:	2/6/2012	Analysis Date:	2/6/2012	SeqNo:	22443	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0052	0.00020	0.005000	.00004974	103	75	125	0.661	20	

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1201885**

ıll Environmental Analysis Laboratory, Inc.

13-Apr-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID	MB-522	SampType:	MBLK	TestCode:	EPA Method 300.0: Anions					
Client ID:	PBS	Batch ID:	522	RunNo:	719					
Prep Date:	1/31/2012	Analysis Date:	2/1/2012	SeqNo:	20699	Units:	mg/Kg			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.30								
Chloride	ND	1.5								
Sulfate	ND	1.5								

Sample ID	LCS-522	SampType:	LCS	TestCode:	EPA Method 300.0: Anions					
Client ID:	LCSS	Batch ID:	522	RunNo:	719					
Prep Date:	1/31/2012	Analysis Date:	2/1/2012	SeqNo:	20700	Units:	mg/Kg			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.5	0.30	1.500	0	101	90	110			
Chloride	14	1.5	15.00	0	91.0	90	110			
Sulfate	28	1.5	30.00	0	94.3	90	110			

ıalifiers:

ζ	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
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1201885**

13-Apr-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID	MB-545	SampType:	MBLK		TestCode:	EPA Method 7471: Mercury				
Client ID:	PBS	Batch ID:	545		RunNo:	717				
Prep Date:	2/2/2012	Analysis Date:	2/2/2012		SeqNo:	20502	Units:	mg/kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.033								

Sample ID	LCS-545	SampType:	LCS		TestCode:	EPA Method 7471: Mercury				
Client ID:	LCSS	Batch ID:	545		RunNo:	717				
Prep Date:	2/2/2012	Analysis Date:	2/2/2012		SeqNo:	20503	Units:	mg/kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.17	0.033	0.1667	0	104	80	120			

Sample ID	1201885-001AMS	SampType:	MS		TestCode:	EPA Method 7471: Mercury				
Client ID:	BK-1 (0-0.5')	Batch ID:	545		RunNo:	717				
Prep Date:	2/2/2012	Analysis Date:	2/2/2012		SeqNo:	20505	Units:	mg/kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.18	0.033	0.1657	0.01196	102	75	125			

Sample ID	1201885-001AMSD	SampType:	MSD		TestCode:	EPA Method 7471: Mercury				
Client ID:	BK-1 (0-0.5')	Batch ID:	545		RunNo:	717				
Prep Date:	2/2/2012	Analysis Date:	2/2/2012		SeqNo:	20506	Units:	mg/kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.18	0.033	0.1659	0.01196	98.7	75	125	3.22	20	

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1201885**

ıll Environmental Analysis Laboratory, Inc.

13-Apr-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID **MB-529**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **PBS**	Batch ID: **529**	RunNo: **833**
Prep Date: **2/1/2012**	Analysis Date: **2/8/2012**	SeqNo: **23909** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.53	3.0								J
Antimony	ND	2.5								
Arsenic	ND	2.5								
Barium	ND	0.10								
Beryllium	ND	0.15								
Cadmium	ND	0.10								
Chromium	ND	0.30								
Copper	0.14	0.30								J
Lead	ND	0.25								
Molybdenum	ND	0.40								
Nickel	0.10	0.50								J
Selenium	1.4	2.5								J
Silver	ND	0.25								
Thallium	ND	2.5								
Uranium	ND	5.0								
Vanadium	ND	2.5								
	ND	2.5								

Sample ID **LCS-529**	SampType: **LCS**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **LCSS**	Batch ID: **529**	RunNo: **833**
Prep Date: **2/1/2012**	Analysis Date: **2/8/2012**	SeqNo: **23910** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	28	3.0	25.00	0.5285	110	80	120			
Antimony	25	2.5	25.00	0	102	80	120			
Arsenic	24	2.5	25.00	0	96.5	80	120			
Barium	24	0.10	25.00	0	96.9	80	120			
Beryllium	25	0.15	25.00	0	100	80	120			
Cadmium	24	0.10	25.00	0	96.4	80	120			
Chromium	24	0.30	25.00	0	96.9	80	120			
Copper	25	0.30	25.00	0.1390	101	80	120			
Lead	24	0.25	25.00	0	95.8	80	120			
Molybdenum	25	0.40	25.00	0	101	80	120			
Nickel	23	0.50	25.00	0.1040	93.0	80	120			
Selenium	24	2.5	25.00	1.362	91.1	80	120			
Silver	4.9	0.25	5.000	0	97.9	80	120			
Thallium	24	2.5	25.00	0	97.5	80	120			
Uranium	25	5.0	25.00	0	98.2	80	120			
Vanadium	25	2.5	25.00	0	101	80	120			
Zinc	24	2.5	25.00	0	97.1	80	120			

ıalifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1201885**

13-Apr-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID	1201885-002AMS	SampType:	MS		TestCode:	EPA Method 6010B: Soil Metals				
Client ID:	BK-1 (1.5-2.0')	Batch ID:	529		RunNo:	833				
Prep Date:	2/1/2012	Analysis Date:	2/8/2012		SeqNo:	23957	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	7.9	5.0	24.68	0	32.1	75	125			S
Arsenic	24	5.0	24.68	1.894	91.1	75	125			
Beryllium	23	0.30	24.68	0.5638	91.8	75	125			
Cadmium	22	0.20	24.68	0	88.6	75	125			
Chromium	31	0.60	24.68	8.403	91.5	75	125			
Copper	32	0.60	24.68	8.672	94.4	75	125			
Lead	23	0.50	24.68	3.223	79.5	75	125			
Molybdenum	20	0.80	24.68	0.7050	77.2	75	125			
Nickel	27	1.0	24.68	7.398	80.2	75	125			
Selenium	17	5.0	24.68	0	67.7	75	125			S
Silver	4.4	0.50	4.936	0	88.4	75	125			
Thallium	ND	5.0	24.68	0	0	75	125			S
Uranium	22	10	24.68	0	90.1	75	125			
Vanadium	57	5.0	24.68	29.62	112	75	125			
Zinc	51	5.0	24.68	28.34	91.6	75	125			

Sample ID	1201885-002AMSD	SampType:	MSD		TestCode:	EPA Method 6010B: Soil Metals				
Client ID:	BK-1 (1.5-2.0')	Batch ID:	529		RunNo:	833				
Prep Date:	2/1/2012	Analysis Date:	2/8/2012		SeqNo:	23960	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	7.4	5.0	24.92	0	29.6	75	125	6.95	20	S
Arsenic	23	5.0	24.92	1.894	84.8	75	125	5.72	20	
Beryllium	21	0.30	24.92	0.5638	83.5	75	125	8.37	20	
Cadmium	21	0.20	24.92	0	82.5	75	125	6.22	20	
Chromium	29	0.60	24.92	8.403	81.8	75	125	7.37	20	
Copper	30	0.60	24.92	8.672	85.8	75	125	6.13	20	
Lead	22	0.50	24.92	3.223	74.6	75	125	4.69	20	S
Molybdenum	19	0.80	24.92	0.7050	72.4	75	125	5.20	20	S
Nickel	25	1.0	24.92	7.398	71.7	75	125	7.39	20	S
Selenium	17	5.0	24.92	0	67.3	75	125	0.411	20	S
Silver	4.1	0.50	4.984	0	81.5	75	125	7.14	20	
Thallium	ND	5.0	24.92	0	0	75	125	0	20	S
Uranium	19	10	24.92	0	78.0	75	125	13.5	20	
Vanadium	53	5.0	24.92	29.62	93.5	75	125	7.66	20	
Zinc	47	5.0	24.92	28.34	75.9	75	125	7.51	20	

Sample ID	MB-529	SampType:	MBLK		TestCode:	EPA Method 6010B: Soil Metals				
Client ID:	PBS	Batch ID:	529		RunNo:	836				
Prep Date:	2/1/2012	Analysis Date:	2/8/2012		SeqNo:	24025	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1201885**

ıll Environmental Analysis Laboratory, Inc.

13-Apr-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID	MB-529	SampType:	MBLK			TestCode:	EPA Method 6010B: Soil Metals			
Client ID:	PBS	Batch ID:	529			RunNo:	836			
Prep Date:	2/1/2012	Analysis Date:	2/8/2012			SeqNo:	24025	Units:	mg/Kg	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.15	2.0								J

Sample ID	LCS-529	SampType:	LCS			TestCode:	EPA Method 6010B: Soil Metals			
Client ID:	LCSS	Batch ID:	529			RunNo:	836			
Prep Date:	2/1/2012	Analysis Date:	2/8/2012			SeqNo:	24026	Units:	mg/Kg	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	25	2.0	25.00	0.1460	97.7	80	120			

Sample ID	1201885-002AMS	SampType:	MS			TestCode:	EPA Method 6010B: Soil Metals			
Client ID:	BK-1 (1.5-2.0')	Batch ID:	529			RunNo:	836			
Prep Date:	2/1/2012	Analysis Date:	2/8/2012			SeqNo:	24037	Units:	mg/Kg	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	33	4.0	24.68	8.018	100	75	125			

Sample ID	1201885-002AMSD	SampType:	MSD			TestCode:	EPA Method 6010B: Soil Metals			
ent ID:	BK-1 (1.5-2.0')	Batch ID:	529			RunNo:	836			
Prep Date:	2/1/2012	Analysis Date:	2/8/2012			SeqNo:	24040	Units:	mg/Kg	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	31	4.0	24.92	8.018	91.4	75	125	6.16	20	

Sample ID	MB-529	SampType:	MBLK			TestCode:	EPA Method 6010B: Soil Metals			
Client ID:	PBS	Batch ID:	529			RunNo:	837			
Prep Date:	2/1/2012	Analysis Date:	2/8/2012			SeqNo:	24083	Units:	mg/Kg	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	ND	0.30								

Sample ID	LCS-529	SampType:	LCS			TestCode:	EPA Method 6010B: Soil Metals			
Client ID:	LCSS	Batch ID:	529			RunNo:	837			
Prep Date:	2/1/2012	Analysis Date:	2/8/2012			SeqNo:	24084	Units:	mg/Kg	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	24	0.30	25.00	0	94.5	80	120			

Sample ID	1201885-002AMS	SampType:	MS			TestCode:	EPA Method 6010B: Soil Metals			
Client ID:	BK-1 (1.5-2.0')	Batch ID:	529			RunNo:	837			
Prep Date:	2/1/2012	Analysis Date:	2/8/2012			SeqNo:	24116	Units:	mg/Kg	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	26	0.60	24.68	5.300	84.4	75	125			

alifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1201885**

13-Apr-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID	1201885-002AMSD	SampType:	MSD			TestCode:	EPA Method 6010B: Soil Metals			
Client ID:	BK-1 (1.5-2.0')	Batch ID:	529			RunNo:	837			
Prep Date:	2/1/2012	Analysis Date:	2/8/2012			SeqNo:	24119	Units:	mg/Kg	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	24	0.60	24.92	5.300	76.5	75	125	6.99	20	

Sample ID	MB-1105	SampType:	MBLK			TestCode:	EPA Method 6010B: Soil Metals			
Client ID:	PBS	Batch ID:	1105			RunNo:	1507			
Prep Date:	3/15/2012	Analysis Date:	3/16/2012			SeqNo:	42441	Units:	mg/Kg	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	1.0								
Manganese	ND	0.10								

Sample ID	LCS-1105	SampType:	LCS			TestCode:	EPA Method 6010B: Soil Metals			
Client ID:	LCSS	Batch ID:	1105			RunNo:	1507			
Prep Date:	3/15/2012	Analysis Date:	3/16/2012			SeqNo:	42442	Units:	mg/Kg	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	26	1.0	25.00	0	105	80	120			
Manganese	24	0.10	25.00	0	94.3	80	120			

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **Western Refining Southwest, Inc Bloomfield** Work Order Number: **1201885**

Received by/date: LM 1/31/12

Logged By: **Lindsay Mangin** 1/31/2012 9:30:00 AM

Completed By: **Lindsay Mangin** 1/31/2012 1:43:09 PM

Reviewed By: MG 1/31/12

Chain of Custody

1.	Were seals intact?	Yes ✔	No	Not Present
2.	Is Chain of Custody complete?	Yes ✔	No	Not Present
3.	How was the sample delivered?	UPS		

Log In

4.	Coolers are present? (see 19. for cooler specific information)	Yes ✔	No	NA
5.	Was an attempt made to cool the samples?	Yes ✔	No	NA
6.	Were all samples received at a temperature of >0° C to 6.0°C	Yes ✔	No	NA
7.	Sample(s) in proper container(s)?	Yes ✔	No	
8.	Sufficient sample volume for indicated test(s)?	Yes ✔	No	
9.	Are samples (except VOA and ONG) properly preserved?	Yes ✔	No	
10.	Was preservative added to bottles?	Yes	No ✔	NA
11.	VOA vials have zero headspace?	Yes	No	No VOA Vials ✔
12.	Were any sample containers received broken?	Yes	No ✔	
13.	Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ✔	No	# of preserved bottles checked for pH:
14.	Are matrices correctly identified on Chain of Custody?	Yes ✔	No	(<2 or >12 unless noted)
15.	Is it clear what analyses were requested?	Yes ✔	No	Adjusted?
16.	Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ✔	No	Checked by:

Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes No NA ✔

Person Notified: _____ Date: _____

By Whom: _____ Via: eMail Phone Fax In Person

Regarding: _____

Client Instructions: _____

18. Additional remarks:

RECEIVED ONLY HNO3 BOTTLES FOR THE GW SAMPLE.

19. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.8	Good	Yes			

1 of 2

Chain-of-Custody Record

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Client: Western Refining Southwest, Inc. Bloomfield Refinery

Mailing Address: 50 Road 4990 Bloomfield, NM 87401

Phone #: 505-632-41166

email or Fax#: Kelly.RobinsonCwnr.com

QA/QC Package:

☐ Standard ☒ Level 4 (Full Validation)

Accreditation

☐ NELAP ☐ Other

☒ EDD (Type) EXCEL

Turn-Around Time:

☒ Standard ☐ Rush

Project Name: RCRA BACKGROUND INVESTIGATION

Project #:

Project Manager: Kelly Robinson

Sampler: Kelly R. & Tracy P.

On Ice: ☐ No

Sample Temperature:

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	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)	Metals (See attached)	TPH 418.1 Samples	TPH 8015		Air Bubbles (Y or N)
1/27/12	1330	Soil	BK-1 (0-0.5')	(2) 4oz Jar	None	-1												X				
	13:34		BK-1 (1.5-2.0')			-2												X				
	14:05		BK-2 (0-0.5')			-3												X				
	14:10		BK-2 (1.5-2.0')			-4												X				
	14:30		BK-3 (0-0.5')			-5												X				
	14:35		BK-3 (1.5-2.0')			-6												X				
	14:40		BK-4 (0-0.5')			-7												X				
	14:45		BK-4 (1.5-2.0')			-8												X				
	15:00		BK-5 (0-0.5')			-9												X				
	15:05		BK-5 (1.5-2.0')			-10												X				
	15:15		BK-6 (0-0.5')			-11												X				
	15:20		BK-6 (1.5-2.0')			-12												X				

Date:	Time:	Relinquished by:	Received by:	Date	Time
1/30/12	1500	Kelly Robinson	TO UPS		
Date:	Time:	Relinquished by:	Received by:	Date	Time
				1/31/12	0930

Remarks: See attached sheet for analyte list

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.

Chain-of-Custody Record

2 of 2

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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

Client: Western Refining Southwest, Inc. Bloomfield Refinery	Turn-Around Time: ☒ Standard ☐ Rush
Mailing Address: 50 Road 4990 Bloomfield, NM 87401	Project Name: RCRA BACKGROUND INVESTIGATION
Phone #: 505-632-4166	Project #:
email or Fax#: Kelly.Robinson@wnr.com	Project Manager: Kelly Robinson
QA/QC Package: ☒ Standard ☒ Level 4 (Full Validation)	Sampler: Kelly R. & Tracy P.
Accreditation: ☐ NELAP ☐ Other	On Ice: ☒ Yes ☐ No
☒ EDD (Type) Excel	Sample Temperature: 2 °C

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.
1/27/12	1530	Soil	BK-7(0-0.5')	(8) 4oz	None	-13
	1535		BK-7 (1.5-2.0')			-14
	1550		BK-8(0-0.5')			-15
	1555		BK-8(1.5-2.0')			-16
	1530		BK-7(0-0.5') DUP			-17
1/27/12	1625	GW	BK-FB-012712	2 Poly	HNO_3	-18

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)~~	
Metals (See attached)	X
TPH-DRO MRO	X
TPH-GRO	X
	X
	X
Air Bubbles (Y or N)	

Date:	Time:	Relinquished by:	Received by:	Date	Time
1/30/12	1500	Kelly Robinson	TO UPS		
Date:	Time:	Relinquished by:	Received by:	Date	Time
				1/31/12	0930

Remarks: See attached for analyte list.

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.

METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Thallium	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Includes ~~Soil~~ Soil Samples & GW Samples (both dissolved & total analytes)

GENERAL CHEMISTRY ANALYSES

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B (dissolved)
Chloride	EPA method 300.0 (dissolved & total)
Sulfate	EPA method 300.0 (dissolved & total)
Calcium	EPA method 6010/6020 (dissolved)
Magnesium	EPA method 6010/6020 (total)
Sodium	EPA method 6010/6020 (dissolved)
Potassium	EPA method 6010/6020 (dissolved)
Manganese	SW-846 method 6010/6020 (dissolved & total)
Nitrate/nitrite	EPA method 300.0 (dissolved)
Iron	SW-846 method 6010/6020 (dissolved & total)

For Groundwater Samples ONLY

Both lists for Lucero Soils and EBs.

KR

SWMU No. 16 Constituent List

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Fluoride	SW-846 method 300

For Soil and Groundwater Samples (Dissolved and Totals)

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

April 13, 2012

Kelly Robinson

Western Refining Southwest, Inc.
#50 CR 4990
Bloomfield, NM 87413
TEL: (505) 632-4135
FAX (505) 632-3911

RE: RCRA Background Investigation OrderNo.: 1202153

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 1 sample(s) on 2/3/2012 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued February 28, 2012.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1202153**
Date Reported: **4/13/2012**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: RCRA Background Investigation
Lab ID: 1202153-001 **Matrix:** SOIL

Client Sample ID: BK-9 (73-73.5)
Collection Date: 2/1/2012 9:00:00 AM
Received Date: 2/3/2012 3:25:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	0.85	1.5	J	mg/Kg	5	2/6/2012 1:37:01 PM
EPA METHOD 7471: MERCURY						Analyst: **JLF**
Mercury	ND	0.033		mg/Kg	1	2/15/2012 4:29:46 PM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	10,000	1,500		mg/Kg	500	2/20/2012 12:25:14 PM
Antimony	2.1	2.5	J	mg/Kg	1	2/19/2012 8:46:30 AM
Arsenic	ND	2.5		mg/Kg	1	2/19/2012 8:46:30 AM
Barium	720	2.0		mg/Kg	20	2/20/2012 12:23:23 PM
Beryllium	0.23	0.15		mg/Kg	1	2/19/2012 8:46:30 AM
Boron	ND	2.0		mg/Kg	1	2/19/2012 8:46:30 AM
Cadmium	0.10	0.10		mg/Kg	1	2/19/2012 8:46:30 AM
Chromium	49	0.30		mg/Kg	1	2/19/2012 8:46:30 AM
Cobalt	6.1	0.30		mg/Kg	1	2/19/2012 8:46:30 AM
Copper	19	0.30		mg/Kg	1	2/19/2012 8:46:30 AM
Lead	1.4	0.50		mg/Kg	2	2/20/2012 12:16:29 PM
Molybdenum	4.0	0.40		mg/Kg	1	2/19/2012 8:46:30 AM
Nickel	12	0.50		mg/Kg	1	2/19/2012 8:46:30 AM
Selenium	ND	2.5		mg/Kg	1	2/19/2012 8:46:30 AM
Silver	ND	0.25		mg/Kg	1	2/19/2012 8:46:30 AM
Thallium	ND	2.5		mg/Kg	1	2/19/2012 8:46:30 AM
Uranium	5.6	5.0		mg/Kg	1	2/19/2012 8:46:30 AM
Vanadium	35	2.5		mg/Kg	1	2/19/2012 8:46:30 AM
Zinc	27	2.5		mg/Kg	1	2/19/2012 8:46:30 AM
CYANIDE-TOTAL						Analyst: **Anat**
Cyanide	ND	0.30		mg/Kg	1	2/14/2012

Qualifiers:

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

CASE NARRATIVE February 27, 2012

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com *FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM*

Project Tracking No.: 1202153
Anatek Batch: 120207014

Project Summary: One (1) soil sample was received on 2/7/2012 for Total Cyanide (EPA 335.4) analysis. All samples were received with the appropriate chain of custody. Sample was received at 4.5 C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1202153 BK-9 (73-73.5)	120207014-001	EPA 335.4

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Y	NA
Tune(s) Valid?	NA	NA
Internal Standard Responses Valid?	NA	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

1. Holding Time Requirements

No problems encountered.

2. GC/MS Tune Requirements

N/A

3. Calibration Requirements

No problems encountered.

4. Surrogate Recovery Requirements

N/A.

5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

6. Method Blank Requirements

No problems encountered.

7. Internal Standard(s) Response Requirements

N/A

8. Comments

None.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by: John W. Coll

Anatek Labs, Inc.

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

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120207014
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1202153
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120207014-001	**Sampling Date**	2/1/2012	**Date/Time Received**	2/7/2012	11:45 AM
Client Sample ID	1202153-001B / BK-9 (73-73.5)	**Sampling Time**	9:00 AM			
Matrix	Soil	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/14/2012	CRW	EPA 335.4	
%moisture	4.6	Percent		2/17/2012	CRW	%moisture	

Surrogate Data

Authorized Signature

John Coddington, Lab Manager

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

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

Anatek Labs, Inc.

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

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120207014
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1202153
Attn:	ANDY FREEMAN		

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Cyanide	0.512	mg/kg	0.5	102.4	80-120	2/14/2012	2/14/2012

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
120207017-001	Cyanide	ND	13.7	mg/kg	14	97.9	60-140	2/14/2012	2/14/2012

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide	14.2	mg/kg	14	101.4	3.6	0-25	2/14/2012	2/14/2012

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide	ND	mg/Kg	0.3	2/14/2012	2/14/2012

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

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0085

Anatek Labs, Inc.

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

Login Report

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

Order ID: 120207014
Order Date: 2/7/2012

Contact Name: ANDY FREEMAN
Project Name: 1202153
Comment:

Sample #: 120207014-001 **Customer Sample #:** 1202153-001B / BK-9 (73-73.5)

Recv'd: ☑ **Collector:** **Date Collected:** 2/1/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/7/2012 11:45:00 A
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/17/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/17/2012	***Normal (6-10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	4.5
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

120207 014 HALL Last Due 2/17/2012
1st SAMP 2/1/2012 1st RCVD 2/7/2012
1202153

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

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1202153-001B	BK-9 (73-73.5)	4OZGU	Soil	2/1/2012 9:00:00 AM	1	TOTAL CYANIDE
2						0	
3						0	MWBS
4						0	
5						0	
6						0	
7						0	
8						0	
9						0	
10						0	

SPECIAL INSTRUCTIONS / COMMENTS:

******LEVEL 4 DATA PACKET, PROVIDE QC******Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By:	Date: 2/6/2013	Time: 2:16 PM	Received By:	Date:
Relinquished By:	Date:	Time:	Received By:	Date:
Relinquished By:	Date:	Time:	Received By:	Date:

TAT: Standard ☐ RUSH Next BD ☐ 2nd BD ☐ 3rd B

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 4.5 °C
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ICE / ICE-PACKS PRESENT: Y
- CUSTODY SEALS PRESENT: Y
- PRESERVATIVES: /
- NUMBER OF CONTAINERS: 1 — SHIPPED VIA: F
- DATE & TIME: 2-7-12 1114 — INSPECTED BY: BT

ONLINE

CYANIDE EXTRACTION BENCHSHEET SW 846

Instrument names & IDs: Denver A-160 balance; Alpchem FIA

Date	SAMPLE #	% Solids	Sample Amt (g)	H2O (mL)	Final Volume	Multiplier	Chemist
2/7/12	120201021-11	89.4	10.03	250	250	27.9	CMW
	-12	95.9	10.00			26.1	
	-13	90.5	10.02			27.6	
	-14	94.8	10.07			26.2	
	-15	92.6	10.03			26.9	
	-16	91.3	10.01			27.4	
	-17	90.4	10.11			27.4	
2/8/12	120201019-1	91.8	10.00	250	250	27.2	CMW
	-2	93.7	10.02			26.6	
	120207027-1	93.0	10.01			26.9	
	-2	89.4	10.18			27.5	
2/8/12	120201019-3	96.7	10.00	250	250	25.9	CMW
	-4	96.6	5.01	125	125	25.8	
	-5	94.6	5.00			26.4	
	-6	94.5	5.05			26.2	
	-7	94.8	5.10			25.9	
	-8	94.9	5.02			26.2	
	-9	97.2	4.99			25.8	
	-10	92.4	5.01			27.0	
	-11	94.3	5.00			26.5	
	120202031-1	15.0	5.00			167	
2/10/12	120207014-1	95.4	10.04	250	250	26.1	CMW
	120207017-1	89.4	10.04			27.9	
	-2	92.2	10.00			27.1	
	-3	96.7	10.03			25.8	
	-4	94.9	10.00			26.3	
	-5	95.3	10.01			26.2	
	-6	95.5	10.09			25.9	
	-7	90.3	9.99			27.7	
	-8	90.2	10.05			27.6	
	120207027-1	88.9	10.03			28.0	
	-2	92.7	10.01			26.9	
	-3	87.0	10.03			28.6	
	-4	90.4	10.01			27.6	
	-5	93.0	10.07			26.7	
	-6	89.0	10.03			27.6	
	-7	88.8	10.00			28.2	
	-8	92.9	10.03			26.8	

Total Cyanide by Semi-Automated Colorimetry
Method: EPA 335.4\SM-4500-CN-E
Distillation Bench Sheet

Weak Acid Dissociable Cyanide by
SM 4500-CN-I (check WAD column)

Total Cyanide MS/MSD/LCS Soln: M838-03 Exp: 2/9/2013
Free Cyanide MS/MSD/LCS Soln: M824-05 Exp: 12/28/2012

Method requirements: All QC +/- 10%
Equipment: Midi-vap
Instrument: ALPCHEM FIA 3000
Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	120207014-1	soil epa	NaOH	50mL	26.1	Same		
2	17-1	"	"	"	27.9	"		
3	-1ms	"	"	"	"	"	1mL	
4	-1msD	"	"	"	"	"	"	
5	-1LCS	"	"	"	1x	"	"	
6	-1BL	"	"	"	"	"		
7	-2	"	"	"	27.1	"		
8	-3	"	"	"	25.8	"		
9	-4	"	"	"	26.3	"		
10	-5	"	"	"	26.2	"		
11	120207017-6	soil epa	NaOH	50mL	25.9	Same		
12	-7	"	"	"	27.7	"		
13	-8	"	"	"	27.6	"		
14	120207027-1	"	"	"	28.0	"		
15	-2	"	"	"	26.9	"		
16	-3	"	"	"	28.6	"		
17	-4	"	"	"	27.6	"		
18	-5	"	"	"	26.7	"		
19	-6	"	"	"	27.6	"		
20	-7	"	"	"	28.2	"		

* If soils this calculation is taken from cyanide extraction bench sheet.
** If soils, mLs of extract used for distillation.

Extraction Reagents:	Reagent #:
methyl red indicator	A041-03
18 N H_2SO_4	A043-10
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% $MgCl_2$	A043-06

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

Distillation Initials/Date Distilled: CMW 2/13/12

Analyst Initials/Date Analyzed: CMW 2/14/12

File name: T:\DATA1\FLOW4\2012\EPA335.4\021412CM.RST
Date: February 14, 2012
Operator: CRW

CRW 2/17/12

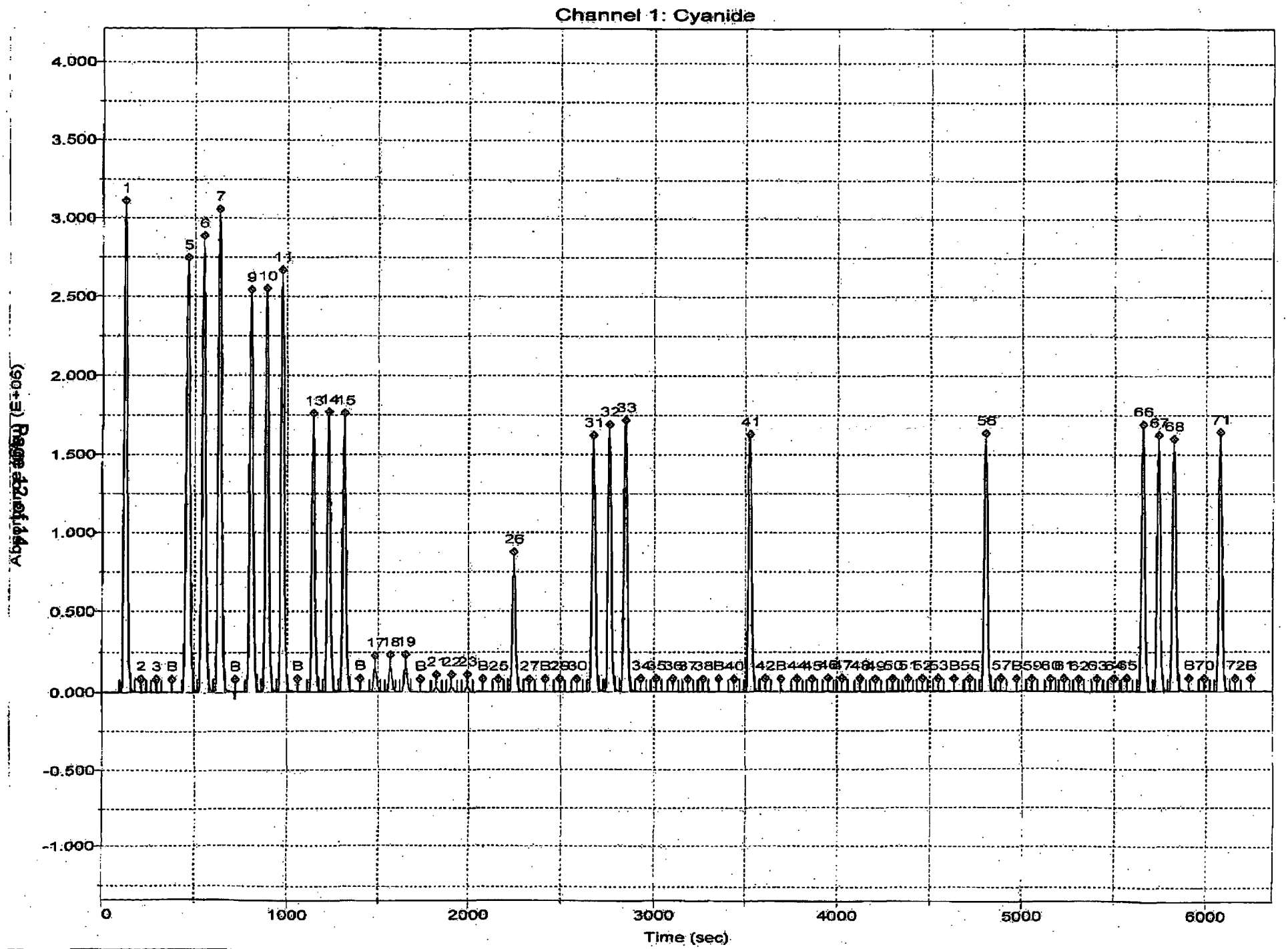
120213FIALNS

ak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
1	2	Sync	SYNC	1	1	6240112	0.950185
2	0	Carryover	CO	1	1	14767	0.003458
3	0	Carryover	CO	1	1	4057	0.001829
B	0	Baseline	RB	1	1	4254	0.001859
5	2	Cal 1.00 ppm	C	1	1	6451998	0.982408
6	2	Cal 1.00 ppm	C	1	1	6376184	0.970878
7	2	Cal 1.00 ppm	C	1	1	6445985	0.981493
B	0	Baseline	RB	1	1	-564	0.001126
9	3	Cal 0.80 ppm	C	1	1	5240594	0.798182
10	3	Cal 0.80 ppm	C	1	1	5270748	0.802768
11	3	Cal 0.80 ppm	C	1	1	5330839	0.811906
B	0	Baseline	RB	1	1	1473	0.001436
13	4	Cal 0.50 ppm	C	1	1	3312679	0.504992
14	4	Cal 0.50 ppm	C	1	1	3343212	0.509635
15	4	Cal 0.50 ppm	C	1	1	3343269	0.509644
B	0	Baseline	RB	1	1	-4543	0.000521
17	5	Cal 0.05 ppm	C	1	1	304698	0.047549
18	5	Cal 0.05 ppm	C	1	1	309485	0.048277
19	5	Cal 0.05 ppm	C	1	1	315598	0.049207
B	0	Baseline	RB	1	1	-368	0.001156
21	6	Cal 0.01 ppm	C	1	1	62752	0.010755
22	6	Cal 0.01 ppm	C	1	1	60671	0.010439
23	6	Cal 0.01 ppm	C	1	1	56879	0.009862
B	0	Baseline	RB	1	1	516	0.001290
25	1	Blank	BLNK	1	1	3584	0.001757
26	7	ICV 0.25 ppm	CCV	1	1	1712997	0.261718
27	1	Blank	BLNK	1	1	-3191	0.000727
B	0	Baseline	RB	1	1	354	0.001266
29	8	120207017-BL S	U	1	1	-3794	0.000635
7	9	120207017-001	U	27.9	1	-2036	0.025178
	10	120207017-001MS	U	27.9	1	3216405	13.680788
	11	120207017-001MSD	U	27.9	1	3336514	14.190402
33	12	120207017-LCS	U	1	1	3357160	0.511756
34	13	120207017-002	U	27.1	1	6448	0.059420
35	14	120207017-003	U	25.8	1	6459	0.056612
36	15	120207017-004	U	26.3	1	2397	0.041466
37	16	120207017-005	U	26.2	1	-2330	0.022472
38	17	120207014-001	U	26.1	1	-3845	0.016375
B	0	Baseline	RB	1	1	-775	0.001094
40	1	Blank	BLNK	1	1	-7331	0.000097
41	4	CCV 0.5 ppm	CCV	1	1	3237268	0.493524
42	1	Blank	BLNK	1	1	-4489	0.000529
B	0	Read Baseline	RB	1	1	-2950	0.000763
44	18	120207017-006	U	25.9	1	-3475	0.017705
45	19	120207017-007	U	27.7	1	-6299	0.007038
46	20	120207017-008	U	27.6	1	5149	0.055064
47	21	120207027-001	U	28	1	-4150	0.016265
48	22	120207027-002	U	26.9	1	1200	0.037512
49	23	120207027-003	U	28.6	1	-8886	-0.003983
50	24	120207027-004	U	27.6	1	-2833	0.021563
51	25	120207027-005	U	26.7	1	1360	0.037884
52	26	120207027-006	U	27.6	1	2106	0.042294
53	27	120207027-007	U	28.2	1	915	0.038105
B	0	Baseline	RB	1	1	-690	0.001107
55	1	Blank	BLNK	1	1	1771	0.001481
56	4	CCV 0.5 ppm	CCV	1	1	3262052	0.497293
57	1	Blank	BLNK	1	1	-1100	0.001045
B	0	Read Baseline	RB	1	1	-4031	0.000599
59	28	RINSE	U	1	1	-5188	0.000423
60	29	RINSE	U	1	1	-10405	-0.000370
61	30	RINSE	U	1	1	-11017	-0.000453
2	31	RINSE	U	1	1	-12689	-0.000718
	32	RINSE	U	1	1	-14595	-0.001007
	33	120131002-BL F	U	1	1	-9775	-0.000274
65	34	120131002-001	U	1	1	-1080	0.001048
66	35	120131002-001MS	U	1	1	3270905	0.498639

Peak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
57	36	120131002-001MSD	U	1	1	3326716	0.507127
58	37	120131002-LCS	U	1	1	3258938	0.496819
3	0	Baseline	RB	1	1	-4128	0.000584
70	1	Blank	BLNK	1	1	-4264	0.000564
71	4	CCV 0.5 ppm	CCV	1	1	3238150	0.493658
72	1	Blank	BLNK	1	1	-3812	0.000632
3	0	Read Baseline	RB	1	1	-2605	0.000816

Peak	Cup	Flags
1	2	
2	0	
3	0	
4	0	BL
5	2	
6	2	
7	2	
8	0	BL
9	3	
10	3	
11	3	
12	0	BL
13	4	
14	4	
15	4	
16	0	BL
17	5	
18	5	
19	5	OL
20	0	BL
21	6	
22	6	
23	6	OL
24	0	BL
25	1	
26	7	
27	1	
28	0	BL
29	8	
30	9	
31	10	
32	11	
33	12	
34	13	
35	14	
36	15	
37	16	
38	17	
39	0	BL
40	1	
41	4	
42	1	
43	0	BL
44	18	
45	19	
46	20	
47	21	
48	22	
49	23	LO
50	24	
51	25	
52	26	
53	27	
54	0	BL
55	1	
56	4	
57	1	
58	0	BL
59	28	

Peak	Cup	Flags
60	29	LO
61	30	LO
	31	LO
	32	LO
	33	LO
55	34	
56	35	
57	36	
58	37	
3	0	BL
70	1	
71	4	
72	1	
3	0	BL


Channel 1: Cyanide
Absorbance (E+05)
Time (sec)
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
-0.500
-1.000
0
1000
2000
3000
4000
5000
6000

File name: T:\DATA1\FLOW4\2012\EPA335.4\021412CM.RST
Date: February 14, 2012
Operator: CRW

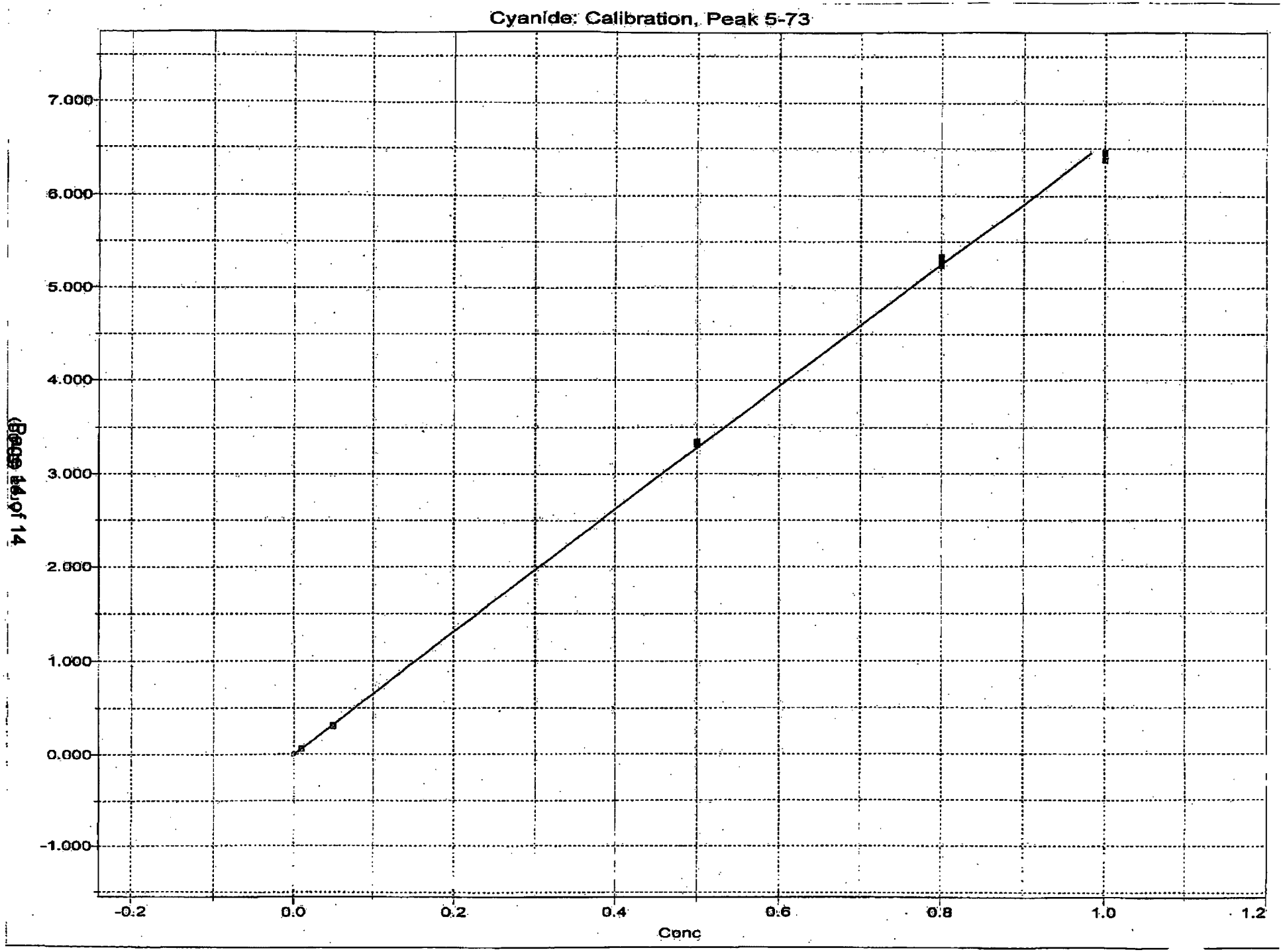
	ame	Conc	Area
*	Cal 1.00 ppm	1.000000	6451997.500000
*	Cal 1.00 ppm	1.000000	6376183.500000
*	Cal 1.00 ppm	1.000000	6445985.000000
*	Cal 0.80 ppm	0.800000	5240594.500000
*	Cal 0.80 ppm	0.800000	5270747.500000
*	Cal 0.80 ppm	0.800000	5330839.000000
*	Cal 0.50 ppm	0.500000	3312679.000000
*	Cal 0.50 ppm	0.500000	3343211.750000
*	Cal 0.50 ppm	0.500000	3343268.750000
*	Cal 0.05 ppm	0.050000	304698.437500
*	Cal 0.05 ppm	0.050000	309484.875000
*	Cal 0.05 ppm	0.050000	315597.906250
*	Cal 0.01 ppm	0.010000	62752.015625
*	Cal 0.01 ppm	0.010000	60670.792969
*	Cal 0.01 ppm	0.010000	56878.894531

Calib Coef:
y=bx+a
a: (intercept) -7.9701e+03
b: 6.5756e+06

Corr Coef: 0.999677

Carryover: 0.237%

No Drift Peaks


Cyanide: Calibration, Peak 5-73
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Conc

QC SUMMARY REPORT

WO#: **1202153**

ıll Environmental Analysis Laboratory, Inc.

13-Apr-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID **MB-571**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS**	Batch ID: **571**	RunNo: **784**
Prep Date: **2/3/2012**	Analysis Date: **2/6/2012**	SeqNo: **22392** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.30								

Sample ID **LCS-571**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS**	Batch ID: **571**	RunNo: **784**
Prep Date: **2/3/2012**	Analysis Date: **2/6/2012**	SeqNo: **22393** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.4	0.30	1.500	0	94.3	90	110			

ıalifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1202153**

13-Apr-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID **MB-723**	SampType: **MBLK**			TestCode: **EPA Method 7471: Mercury**						
Client ID: **PBS**	Batch ID: **723**			RunNo: **963**						
Prep Date: **2/15/2012**	Analysis Date: **2/15/2012**			SeqNo: **27905**		Units: **mg/Kg**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.033								

Sample ID **LCS-723**	SampType: **LCS**			TestCode: **EPA Method 7471: Mercury**						
Client ID: **LCSS**	Batch ID: **723**			RunNo: **963**						
Prep Date: **2/15/2012**	Analysis Date: **2/15/2012**			SeqNo: **27906**		Units: **mg/Kg**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.18	0.033	0.1667	0	105	80	120			

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1202153**

ıll Environmental Analysis Laboratory, Inc.

13-Apr-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID **MB-749**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **PBS**	Batch ID: **749**	RunNo: **1015**
Prep Date: **2/17/2012**	Analysis Date: **2/19/2012**	SeqNo: **29260** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.58	3.0								J
Antimony	ND	2.5								
Arsenic	ND	2.5								
Barium	ND	0.10								
Beryllium	ND	0.15								
Boron	0.16	2.0								J
Cadmium	0.029	0.10								J
Chromium	ND	0.30								
Cobalt	ND	0.30								
Copper	ND	0.30								
Molybdenum	0.074	0.40								J
Nickel	0.12	0.50								J
Selenium	1.0	2.5								J
Silver	0.041	0.25								J
Thallium	ND	2.5								
Uranium	0.93	5.0								J
·adium	0.043	2.5								J
	ND	2.5								

Sample ID **LCS-749**	SampType: **LCS**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **LCSS**	Batch ID: **749**	RunNo: **1015**
Prep Date: **2/17/2012**	Analysis Date: **2/19/2012**	SeqNo: **29261** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	28	3.0	25.00	0.5830	111	80	120			
Antimony	24	2.5	25.00	0	97.6	80	120			
Arsenic	24	2.5	25.00	0	95.2	80	120			
Barium	24	0.10	25.00	0	97.1	80	120			
Beryllium	25	0.15	25.00	0	101	80	120			
Boron	24	2.0	25.00	0.1580	97.2	80	120			
Cadmium	24	0.10	25.00	0.02850	96.9	80	120			
Chromium	25	0.30	25.00	0	99.2	80	120			
Cobalt	24	0.30	25.00	0	94.9	80	120			
Copper	26	0.30	25.00	0	103	80	120			
Molybdenum	26	0.40	25.00	0.07350	103	80	120			
Nickel	24	0.50	25.00	0.1240	95.8	80	120			
Selenium	23	2.5	25.00	1.030	88.3	80	120			
Silver	5.0	0.25	5.000	0.04100	99.1	80	120			
Thallium	25	2.5	25.00	0	100	80	120			
Uranium	26	5.0	25.00	0.9285	100	80	120			
Vanadium	26	2.5	25.00	0.04250	103	80	120			

ıalifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1202153**

13-Apr-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID	LCS-749	SampType:	LCS		TestCode:	EPA Method 6010B: Soil Metals				
Client ID:	LCSS	Batch ID:	749		RunNo:	1015				
Prep Date:	2/17/2012	Analysis Date:	2/19/2012		SeqNo:	29261	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Zinc	24	2.5	25.00	0	94.2	80	120			

Sample ID	1202153-001AMS	SampType:	MS		TestCode:	EPA Method 6010B: Soil Metals				
Client ID:	BK-9 (73-73.5)	Batch ID:	749		RunNo:	1015				
Prep Date:	2/17/2012	Analysis Date:	2/19/2012		SeqNo:	29271	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	12	2.5	24.85	2.108	41.4	75	125			S
Arsenic	22	2.5	24.85	0	86.6	75	125			
Beryllium	23	0.15	24.85	0.2275	91.1	75	125			
Boron	22	2.0	24.85	0	86.8	75	125			
Cadmium	22	0.10	24.85	0.1012	88.3	75	125			
Cobalt	26	0.30	24.85	6.108	81.7	75	125			
Copper	36	0.30	24.85	18.74	71.0	75	125			S
Molybdenum	23	0.40	24.85	4.017	77.0	75	125			
Nickel	26	0.50	24.85	11.55	59.1	75	125			S
Selenium	18	2.5	24.85	0	72.1	75	125			S
Silver	4.5	0.25	4.970	0	90.3	75	125			
Thallium	ND	2.5	24.85	0	0	75	125			S
Uranium	28	5.0	24.85	5.606	89.6	75	125			
Zinc	46	2.5	24.85	26.93	75.1	75	125			

Sample ID	1202153-001AMSD	SampType:	MSD		TestCode:	EPA Method 6010B: Soil Metals				
Client ID:	BK-9 (73-73.5)	Batch ID:	749		RunNo:	1015				
Prep Date:	2/17/2012	Analysis Date:	2/19/2012		SeqNo:	29272	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	11	2.5	24.74	2.108	33.9	75	125	16.5	20	S
Arsenic	20	2.5	24.74	0	82.8	75	125	5.01	20	
Beryllium	23	0.15	24.74	0.2275	91.9	75	125	0.456	20	
Boron	21	2.0	24.74	0	83.7	75	125	4.09	20	
Cadmium	22	0.10	24.74	0.1012	86.6	75	125	2.43	20	
Cobalt	26	0.30	24.74	6.108	79.7	75	125	2.29	20	
Copper	34	0.30	24.74	18.74	60.8	75	125	7.44	20	S
Molybdenum	22	0.40	24.74	4.017	72.8	75	125	4.98	20	S
Selenium	18	2.5	24.74	0	73.6	75	125	1.67	20	S
Silver	4.3	0.25	4.948	0	87.1	75	125	4.01	20	
Thallium	ND	2.5	24.74	0	0	75	125	0	20	S
Uranium	27	5.0	24.74	5.606	87.9	75	125	1.90	20	
Zinc	45	2.5	24.74	26.93	72.9	75	125	1.36	20	S

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1202153**

ıll Environmental Analysis Laboratory, Inc.

13-Apr-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID	MB-749	SampType:	MBLK		TestCode:	EPA Method 6010B: Soil Metals				
Client ID:	PBS	Batch ID:	749		RunNo:	1032				
Prep Date:	2/17/2012	Analysis Date:	2/20/2012		SeqNo:	29831	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	ND	0.25								

Sample ID	LCS-749	SampType:	LCS		TestCode:	EPA Method 6010B: Soil Metals				
Client ID:	LCSS	Batch ID:	749		RunNo:	1032				
Prep Date:	2/17/2012	Analysis Date:	2/20/2012		SeqNo:	29832	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	23	0.25	25.00	0	93.2	80	120			

Sample ID	1202153-001AMS	SampType:	MS		TestCode:	EPA Method 6010B: Soil Metals				
Client ID:	BK-9 (73-73.5)	Batch ID:	749		RunNo:	1032				
Prep Date:	2/17/2012	Analysis Date:	2/20/2012		SeqNo:	29834	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	20	0.50	24.85	1.441	76.6	75	125			

Sample ID	1202153-001AMSD	SampType:	MSD		TestCode:	EPA Method 6010B: Soil Metals				
ent ID:	BK-9 (73-73.5)	Batch ID:	749		RunNo:	1032				
rep Date:	2/17/2012	Analysis Date:	2/20/2012		SeqNo:	29835	Units:	mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lead	22	0.50	24.74	1.441	82.2	75	125	6.13	20	

alifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 8710
TEL: 505-345-3975 FAX: 505-345-410
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: Western Refining Southwest, Inc Bloomfield Work Order Number: 1202153

Received by/date: 2/3/12

Logged By: Ashley Gallegos 2/3/2012 3:25:00 PM

Completed By: Ashley Gallegos 2/3/2012 4:05:30 PM

Reviewed By: MG 2/3/12

Chain of Custody

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

Log In

4. Coolers are present? (see 19. for cooler specific information) Yes ☑ No ☐ NA ☐
5. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
6. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
7. Sample(s) in proper container(s)? Yes ☑ No ☐
8. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
9. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
10. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
11. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
12. Were any sample containers received broken? Yes ☐ No ☑
13. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
14. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
15. Is it clear what analyses were requested? Yes ☑ No ☐
16. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

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

Special Handling (if applicable)

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

Person Notified: _____ Date: _____
By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: _____
Client Instructions: _____

18. Additional remarks:

19. Cooler Information

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

1 of 1

Chain-of-Custody Record

Client: Western Refining Southwest, Inc
Bloomfield Refinery
Mailing Address: 50 Road 4990
Bloomfield, NM 87401
Phone #: 505-632-4166
email or Fax#: KellyRobinson@wnr.com
QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other
☒ EDD (Type) Excel

Turn-Around Time:
☒ Standard ☐ Rush
Project Name: RCRA BACKGROUND INVESTIGATION
Project #:
Project Manager: Kelly Robinson
Sampler: Kelly R. + Tracy P.
On Ice: ☒ Yes ☐ No
Sample Temperature: 4

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

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	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)~~	Metals (See attached)	TPH - MRO DRO	TPH - GRO		Air Bubbles (Y or N)
2/1/12	900	Soil	BK-9 (73-73.5)	1 Jar	None	-1												X				

Date: 2/3/12 Time: 1700 Relinquished by: Kelly Robinson
Received by: Dave Tanner Date: 2/3/12 Time: 11:20
Date: Time: Relinquished by:
Received by: 2/3/12 1525

Remarks: See attached sheet for analyte list.

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.

Background

METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Thallium	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Includes ~~Soil~~ Soil Samples + GW Samples (both dissolved + total analytes)

GENERAL CHEMISTRY ANALYSES

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B (dissolved)
Chloride	EPA method 300.0 (dissolved & total)
Sulfate	EPA method 300.0 (dissolved & total)
Calcium	EPA method 6010/6020 (dissolved)
Magnesium	EPA method 6010/6020 (total)
Sodium	EPA method 6010/6020 (dissolved)
Potassium	EPA method 6010/6020 (dissolved)
Manganese	SW-846 method 6010/6020 (dissolved & total)
Nitrate/nitrite	EPA method 300.0 (dissolved)
Iron	SW-846 method 6010/6020 (dissolved & total)

For Groundwater Samples ONLY

Both lists for Overload Soils and EBs.

KR

SWMU No. 16 Constituent List

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Fluoride	SW-846 method 300

For Soil and Groundwater Samples (Dissolved and Totals)

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

March 22, 2012

Kelly Robinson

Western Refining Southwest, Inc.
#50 CR 4990
Bloomfield, NM 87413
TEL: (505) 632-4166
FAX: (505) 632-3911

RE: RCRA Background Investigation OrderNo.: 1202350

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 4 sample(s) on 2/10/2012 for the analyses presented in the following report.

This report is a revised report and it replaces the original report issued February 29, 2012.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated.

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Case Narrative

WO#: **1202350**
Date: **3/22/2012**

CLIENT: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

The chloride and sulfate reported in fraction -004A was filtered.

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Client Sample ID: BK-10 (5-6')
Project: RCRA Background Investigation
Collection Date: 2/7/2012 7:53:00 AM
Lab ID: 1202350-001 **Matrix:** SOIL **Received Date:** 2/10/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	3.0	0.30		mg/Kg	1	2/10/2012 12:52:44 PM
Chloride	210	30		mg/Kg	20	2/10/2012 1:05:08 PM
Sulfate	2,300	30		mg/Kg	20	2/10/2012 1:05:08 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	ND	0.033		mg/kg	1	2/14/2012 9:59:23 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	7,900	1,500		mg/Kg	500	2/17/2012 8:39:38 AM
Antimony	1.1	5.0	J	mg/Kg	2	2/13/2012 8:23:16 AM
Arsenic	ND	5.0		mg/Kg	2	2/13/2012 8:23:16 AM
Barium	150	0.50		mg/Kg	5	2/17/2012 8:37:43 AM
Beryllium	0.25	0.30	J	mg/Kg	2	2/13/2012 8:23:16 AM
Boron	3.8	4.0	J	mg/Kg	2	2/13/2012 8:23:16 AM
Cadmium	0.065	0.20	J	mg/Kg	2	2/13/2012 8:23:16 AM
Chromium	4.6	0.60		mg/Kg	2	2/13/2012 8:23:16 AM
Cobalt	2.6	0.60		mg/Kg	2	2/13/2012 8:23:16 AM
Copper	3.5	0.60		mg/Kg	2	2/17/2012 8:35:40 AM
Iron	9,100	500		mg/Kg	500	3/18/2012 12:59:27 PM
Lead	2.6	0.50		mg/Kg	2	2/17/2012 8:35:40 AM
Manganese	180	0.48		mg/Kg	5	3/18/2012 12:57:27 PM
Molybdenum	0.33	0.80	J	mg/Kg	2	2/13/2012 8:23:16 AM
Nickel	3.8	1.0		mg/Kg	2	2/13/2012 8:23:16 AM
Selenium	1.1	5.0	J	mg/Kg	2	2/13/2012 8:23:16 AM
Silver	ND	0.50		mg/Kg	2	2/13/2012 8:23:16 AM
Thallium	ND	5.0		mg/Kg	2	2/13/2012 8:23:16 AM
Uranium	ND	10		mg/Kg	2	2/13/2012 8:23:16 AM
Vanadium	15	5.0		mg/Kg	2	2/13/2012 8:23:16 AM
Zinc	16	5.0		mg/Kg	2	2/13/2012 8:23:16 AM
CYANIDE-TOTAL						Analyst: **Anat**
Cyanide	ND	0.30		mg/Kg	1	2/15/2012

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-10 (5-6') DUP
Project: RCRA Background Investigation **Collection Date:** 2/7/2012 7:53:00 AM
Lab ID: 1202350-002 **Matrix:** SOIL **Received Date:** 2/10/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	2.9	0.30		mg/Kg	1	2/10/2012 1:17:33 PM
Chloride	220	30		mg/Kg	20	2/10/2012 1:29:57 PM
Sulfate	2,200	30		mg/Kg	20	2/10/2012 1:29:57 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	ND	0.033		mg/kg	1	2/14/2012 10:04:46 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	8,300	1,500		mg/Kg	500	2/17/2012 8:43:28 AM
Antimony	3.0	12	J	mg/Kg	5	2/17/2012 8:41:35 AM
Arsenic	ND	12		mg/Kg	5	2/17/2012 8:41:35 AM
Barium	110	0.50		mg/Kg	5	2/17/2012 8:41:35 AM
Beryllium	0.33	0.75	J	mg/Kg	5	2/17/2012 8:41:35 AM
Boron	5.0	10	J	mg/Kg	5	2/17/2012 8:41:35 AM
Cadmium	ND	0.50		mg/Kg	5	2/17/2012 8:41:35 AM
Chromium	5.1	1.5		mg/Kg	5	2/17/2012 8:41:35 AM
Cobalt	3.0	1.5		mg/Kg	5	2/17/2012 8:41:35 AM
Copper	3.8	1.5		mg/Kg	5	2/17/2012 8:41:35 AM
Iron	9,900	500		mg/Kg	500	3/18/2012 1:07:39 PM
Lead	3.8	1.2		mg/Kg	5	2/17/2012 8:41:35 AM
Manganese	190	0.50		mg/Kg	5	3/18/2012 1:05:41 PM
Molybdenum	0.40	2.0	J	mg/Kg	5	2/17/2012 8:41:35 AM
Nickel	4.3	2.5		mg/Kg	5	2/17/2012 8:41:35 AM
Selenium	ND	12		mg/Kg	5	2/17/2012 8:41:35 AM
Silver	ND	1.2		mg/Kg	5	2/17/2012 8:41:35 AM
Thallium	ND	12		mg/Kg	5	2/17/2012 8:41:35 AM
Uranium	ND	25		mg/Kg	5	2/17/2012 8:41:35 AM
Vanadium	17	12		mg/Kg	5	2/17/2012 8:41:35 AM
Zinc	19	12		mg/Kg	5	2/17/2012 8:41:35 AM
CYANIDE-TOTAL						Analyst: **Anat**
Cyanide	ND	0.30		mg/Kg	1	2/15/2012

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-10 (40-42')
Project: RCRA Background Investigation **Collection Date:** 2/7/2012 10:43:00 AM
Lab ID: 1202350-003 **Matrix:** SOIL **Received Date:** 2/10/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	2.8	6.0	J	mg/Kg	20	2/10/2012 1:42:21 PM
Chloride	ND	30		mg/Kg	20	2/10/2012 1:42:21 PM
Sulfate	210	30		mg/Kg	20	2/10/2012 1:42:21 PM
EPA METHOD 7471: MERCURY						Analyst: **ELS**
Mercury	ND	0.033		mg/kg	1	2/14/2012 10:06:32 AM
EPA METHOD 6010B: SOIL METALS						Analyst: **ELS**
Aluminum	20,000	1,500		mg/Kg	500	2/17/2012 8:47:28 AM
Antimony	3.1	13	J	mg/Kg	5	2/17/2012 8:45:28 AM
Arsenic	ND	13		mg/Kg	5	2/17/2012 8:45:28 AM
Barium	24	0.50		mg/Kg	5	2/17/2012 8:45:28 AM
Beryllium	0.96	0.75		mg/Kg	5	2/17/2012 8:45:28 AM
Boron	2.5	10	J	mg/Kg	5	2/17/2012 8:45:28 AM
Cadmium	ND	0.50		mg/Kg	5	2/17/2012 8:45:28 AM
Chromium	11	1.5		mg/Kg	5	2/17/2012 8:45:28 AM
Cobalt	4.5	1.5		mg/Kg	5	2/17/2012 8:45:28 AM
Copper	8.8	1.5		mg/Kg	5	2/17/2012 8:45:28 AM
Iron	14,000	500		mg/Kg	500	3/18/2012 1:12:13 PM
Lead	2.4	1.3		mg/Kg	5	2/17/2012 8:45:28 AM
Manganese	90	0.50		mg/Kg	5	3/18/2012 1:10:11 PM
Molybdenum	0.55	2.0	J	mg/Kg	5	2/17/2012 8:45:28 AM
Nickel	6.7	2.5		mg/Kg	5	2/17/2012 8:45:28 AM
Selenium	ND	13		mg/Kg	5	2/17/2012 8:45:28 AM
Silver	ND	1.3		mg/Kg	5	2/17/2012 8:45:28 AM
Thallium	ND	13		mg/Kg	5	2/17/2012 8:45:28 AM
Uranium	4.0	25	J	mg/Kg	5	2/17/2012 8:45:28 AM
Vanadium	28	13		mg/Kg	5	2/17/2012 8:45:28 AM
Zinc	36	13		mg/Kg	5	2/17/2012 8:45:28 AM
CYANIDE-TOTAL						Analyst: **Anat**
Cyanide	ND	0.30		mg/Kg	1	2/15/2012

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-EB-020812
Project: RCRA Background Investigation **Collection Date:** 2/8/2012 1:40:00 PM
Lab ID: 1202350-004 **Matrix:** AQUEOUS **Received Date:** 2/10/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Chloride	ND	0.50		mg/L	1	2/10/2012 1:00:31 PM
Sulfate	ND	0.50		mg/L	1	2/10/2012 1:00:31 PM
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Chloride	1.4	0.50		mg/L	1	2/10/2012 11:53:11 AM
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	2/10/2012 11:53:11 AM
Nitrogen, Nitrate (As N)	0.033	0.10	J	mg/L	1	2/10/2012 11:53:11 AM
Sulfate	0.35	0.50	J	mg/L	1	2/10/2012 11:53:11 AM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **RAG**
Aluminum	ND	0.020		mg/L	1	2/10/2012 4:33:41 PM
Barium	0.00034	0.0020	J	mg/L	1	2/10/2012 4:33:41 PM
Beryllium	ND	0.0020		mg/L	1	2/10/2012 4:33:41 PM
Boron	ND	0.040		mg/L	1	2/10/2012 4:33:41 PM
Cadmium	ND	0.0020		mg/L	1	2/10/2012 4:33:41 PM
Calcium	0.084	1.0	J	mg/L	1	2/10/2012 4:33:41 PM
Chromium	ND	0.0060		mg/L	1	2/10/2012 4:33:41 PM
Cobalt	0.00047	0.0060	J	mg/L	1	2/10/2012 4:33:41 PM
Copper	ND	0.0060		mg/L	1	2/10/2012 4:33:41 PM
Iron	0.0083	0.020	J	mg/L	1	2/13/2012 4:04:53 PM
Lead	ND	0.0050		mg/L	1	2/10/2012 4:33:41 PM
Manganese	ND	0.0020		mg/L	1	2/10/2012 4:33:41 PM
Molybdenum	ND	0.0080		mg/L	1	2/10/2012 4:33:41 PM
Nickel	ND	0.010		mg/L	1	2/10/2012 4:33:41 PM
Potassium	ND	1.0		mg/L	1	2/13/2012 4:04:53 PM
Silver	ND	0.0050		mg/L	1	2/10/2012 4:33:41 PM
Sodium	0.19	1.0	J	mg/L	1	2/13/2012 4:04:53 PM
Vanadium	ND	0.050		mg/L	1	2/10/2012 4:33:41 PM
Zinc	0.063	0.010		mg/L	1	2/13/2012 4:04:53 PM
EPA METHOD 200.7: TOTAL METALS						Analyst: **RAG**
Aluminum	0.031	0.020		mg/L	1	2/14/2012 2:21:40 PM
Barium	ND	0.0020		mg/L	1	2/14/2012 2:21:40 PM
Beryllium	ND	0.0020		mg/L	1	2/14/2012 2:21:40 PM
Boron	ND	0.040		mg/L	1	2/15/2012 4:30:40 PM
Cadmium	0.00044	0.0020	J	mg/L	1	2/14/2012 2:21:40 PM
Chromium	0.0012	0.0060	J	mg/L	1	2/14/2012 2:21:40 PM
Cobalt	ND	0.0060		mg/L	1	2/14/2012 2:21:40 PM
Copper	0.0058	0.0060	J	mg/L	1	2/14/2012 2:21:40 PM
Iron	0.088	0.10	J	mg/L	5	2/14/2012 2:42:04 PM
Lead	ND	0.0050		mg/L	1	2/14/2012 2:21:40 PM
Magnesium	0.057	5.0	J	mg/L	5	2/14/2012 2:42:04 PM
Manganese	0.0019	0.0020	J	mg/L	1	2/14/2012 2:21:40 PM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** BK-EB-020812
Project: RCRA Background Investigation **Collection Date:** 2/8/2012 1:40:00 PM
Lab ID: 1202350-004 **Matrix:** AQUEOUS **Received Date:** 2/10/2012 9:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 200.7: TOTAL METALS						Analyst: **RAG**
Molybdenum	ND	0.0080		mg/L	1	2/14/2012 2:21:40 PM
Nickel	0.00076	0.010	J	mg/L	1	2/14/2012 2:21:40 PM
Silver	ND	0.0050		mg/L	1	2/14/2012 2:21:40 PM
Vanadium	ND	0.050		mg/L	1	2/14/2012 2:21:40 PM
Zinc	0.0019	0.010	J	mg/L	1	2/14/2012 2:21:40 PM
EPA 200.8: DISSOLVED METALS						Analyst: **SNV**
Antimony	ND	0.0010		mg/L	1	2/13/2012 4:41:44 PM
Arsenic	ND	0.0010		mg/L	1	2/13/2012 4:41:44 PM
Selenium	ND	0.0010		mg/L	1	2/13/2012 4:41:44 PM
Thallium	ND	0.0010		mg/L	1	2/13/2012 4:41:44 PM
Uranium	ND	0.0010		mg/L	1	2/13/2012 4:41:44 PM
200.8 ICPMS METALS:TOTAL						Analyst: **SNV**
Antimony	ND	0.0025		mg/L	2.5	2/20/2012 1:22:36 PM
Arsenic	ND	0.0025		mg/L	2.5	2/20/2012 1:22:36 PM
Selenium	ND	0.0025		mg/L	2.5	2/20/2012 1:22:36 PM
Thallium	ND	0.0025		mg/L	2.5	2/20/2012 1:22:36 PM
Uranium	ND	0.0025		mg/L	2.5	2/20/2012 1:22:36 PM
EPA METHOD 7470: MERCURY						Analyst: **JLF**
Mercury	ND	0.00020		mg/L	1	2/14/2012 2:40:39 PM
EPA 335.4: CYANIDE SUBBED						Analyst: **Anat**
Cyanide	ND	0.010		mg/L	1	2/15/2012
SM2320B: ALKALINITY						Analyst: **JLF**
Bicarbonate (As CaCO3)	ND	20		mg/L CaCO3	1	2/14/2012 5:57:50 PM
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	2/14/2012 5:57:50 PM
Total Alkalinity (as CaCO3)	ND	20		mg/L CaCO3	1	2/14/2012 5:57:50 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	ND	20.0		mg/L	1	2/15/2012 4:34:00 PM

Qualifiers:

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

CASE NARRATIVE February 27, 2012

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com *FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM*

Project Tracking No.: 1202350
Anatek Batch: 120214032

Project Summary: Three (3) soil samples were and one water sample were received on 2/14/2012 for Total Cyanide (EPA 335.4) analysis. All samples were received with the appropriate chain of custody. Samples were received at 4.5C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1202350-001B BK-10 (5-6')	120214032-001	EPA 335.4
1202350-002B BK-10 (5-6') DUP	120214032-002	EPA 335.4
1202350-003B BK-10 (40-42')	120214032-003	EPA 335.4
1202350-004E BK-EB-020812 (water)	120214032-004	EPA 335.4

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Y	NA
Tune(s) Valid?	NA	NA
Internal Standard Responses Valid?	NA	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

1. Holding Time Requirements

No problems encountered.

2. GC/MS Tune Requirements

N/A

3. Calibration Requirements

No problems encountered.

4. Surrogate Recovery Requirements

N/A.

5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

6. Method Blank Requirements

No problems encountered.

7. Internal Standard(s) Response Requirements

N/A.

8. Comments

None.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by: John W. Coll

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120214032
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1202350
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120214032-001	**Sampling Date**	2/7/2012	**Date/Time Received**	2/14/2012 12:17 PM
Client Sample ID	1202350-001B / BK-10 (5-6')			**Sampling Time**	7:53 AM
Matrix	Soil				
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/15/2012	CRW	EPA 335.4	
%moisture	4.4	Percent		2/17/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120214032
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1202350
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120214032-002	**Sampling Date**	2/7/2012	**Date/Time Received**	2/14/2012 12:17 PM
Client Sample ID	1202350-002B / BK-10 (5-6') DUP			**Sampling Time**	7:53 AM
Matrix	Soil				
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/15/2012	CRW	EPA 335.4	
%moisture	4.1	Percent		2/17/2012	CRW	%moisture	

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120214032
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1202350
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120214032-003	**Sampling Date**	2/7/2012	**Date/Time Received**	2/14/2012 12:17 PM
Client Sample ID	1202350-003B / BK-10 (40-42')			**Sampling Time**	10:43 AM
Matrix	Soil				
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/Kg	0.3	2/15/2012	CRW	EPA 335.4	
%moisture	8.4	Percent		2/17/2012	CRW	%moisture	

Authorized Signature

John Coddington, Lab Manager

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

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The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120214032
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1202350
Attn:	ANDY FREEMAN		

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Cyanide	0.518	mg/kg	0.5	103.6	80-120	2/15/2012	2/15/2012

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
120207027-008	Cyanide	ND	13.1	mg/kg	13.4	97.8	60-140	2/15/2012	2/15/2012

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide	13.2	mg/kg	13.4	98.5	0.8	0-25	2/15/2012	2/15/2012

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide	ND	mg/Kg	0.3	2/15/2012	2/15/2012

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

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120214032
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1202350
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120214032-004	**Sampling Date**	2/8/2012	**Date/Time Received**	2/14/2012 12:17 PM
Client Sample ID	1202350-004E / BK-EB-020812			**Sampling Time**	1:40 PM
Matrix	Water				
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/L	0.01	2/21/2012	CRW	EPA 335.4	

Authorized Signature

John Coddington, Lab Manager

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

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

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Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

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Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 120214032
Project Name: 1202350

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Cyanide	0.489	mg/L	0.5	97.8	90-110	2/21/2012	2/21/2012

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
120217018-006	Cyanide	ND	0.476	mg/L	0.5	95.2	80-120	2/21/2012	2/21/2012

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide	0.498	mg/L	0.5	99.6	4.5	0-25	2/21/2012	2/21/2012

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide	ND	mg/L	0.01	2/21/2012	2/21/2012

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

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; CA:Cert2632; ID:WA00169; WA:C585; MT:Cert0095

Monday, February 27, 2012 Page 1 of 1

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Login Report

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

Order ID: 120214032
Order Date: 2/14/2012

Contact Name: ANDY FREEMAN
Project Name: 1202350
Comment:

Sample #: 120214032-001 **Customer Sample #:** 1202350-001B / BK-10 (5-6')

Recv'd: ☑ **Collector:** **Date Collected:** 2/7/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/14/2012 12:17:00 P
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/24/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/24/2012	***Normal (6-10 Days)***

Sample #: 120214032-002 **Customer Sample #:** 1202350-002B / BK-10 (5-6') DUP

Recv'd: ☑ **Collector:** **Date Collected:** 2/7/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/14/2012 12:17:00 P
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/24/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/24/2012	***Normal (6-10 Days)***

Sample #: 120214032-003 **Customer Sample #:** 1202350-003B / BK-10 (40-42')

Recv'd: ☑ **Collector:** **Date Collected:** 2/7/2012
Quantity: 1 **Matrix:** Soil **Date Received:** 2/14/2012 12:17:00 P
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	M	%moisture	2/24/2012	***Normal (6-10 Days)***
CYANIDE TOTAL EPA	M	EPA 335.4	2/24/2012	***Normal (6-10 Days)***

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

Order ID: 120214032
Order Date: 2/14/2012

Contact Name: ANDY FREEMAN

Project Name: 1202350

Comment:

Sample #: 120214032-004 **Customer Sample #:** 1202350-004E / BK-EB-020812

Recv'd: ☑ **Collector:** **Date Collected:** 2/8/2012
Quantity: 1 **Matrix:** Water **Date Received:** 2/14/2012 12:17:00 P
Comment:

Test	Lab	Method	Due Date	Priority
CYANIDE TOTAL EPA	M	EPA 335.4	2/24/2012	***Normal (6-10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	4.5
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

Hall Environmental Analysis Laboratory

120214 032 HALL Last Due 2/24/2012

1st SAMP 2/7/2012 1st RCVD 2/14/2012

1202350

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

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1202350-001B	BK-10 (5-6')	4OZGU	Soil	2/7/2012 7:53:00 AM	1	TOTAL CYANIDE
2	1202350-002B	BK-10 (5-6') DUP	4OZGU	Soil	2/7/2012 7:53:00 AM	1	TOTAL CYANIDE
3	1202350-003B	BK-10 (40-42')	4OZGU	Soil	2/7/2012 10:43:00 AM	1	TOTAL CYANIDE
4	1202350-004E	BK-EB-020812	500AMBHDP F-NAOH	Aqueous	2/8/2012 1:40:00 PM	1	TOTAL CYANIDE
5						0	
6						0	
7		MW3S				0	
8						0	
9						0	
10						0	

Page 11 of 25

SPECIAL INSTRUCTIONS / COMMENTS:

****LEVEL 4 PLEASE PROVIDE QC******* Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By:	Date: 2/10/2012	Time: 10:24 AM	Received By:	Date:
Relinquished By:	Date:	Time:	Received By:	Date:
Relinquished By:	Date:	Time:	Received By:	Date:

TAT: Standard ☐ RUSH Next BD ☐ 2nd BD ☐ 3rd

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 4.5 °C
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE — ICE / ICE-PACKS PRESENT: Y
- CUSTODY SEALS PRESENT: Y
- PRESERVATIVES: NaOH
- NUMBER OF CONTAINERS: 4 SHIPPED VIA: F
- DATE & TIME: 2/14/12 12:17 INSPECTED BY: BT

] ONLINE

File name: T:\DATA1\FLOW4\2012\EPA335.4\022112CN.RST
Date: February 21, 2012
Operator: JTT/CRW

120221FIACNW

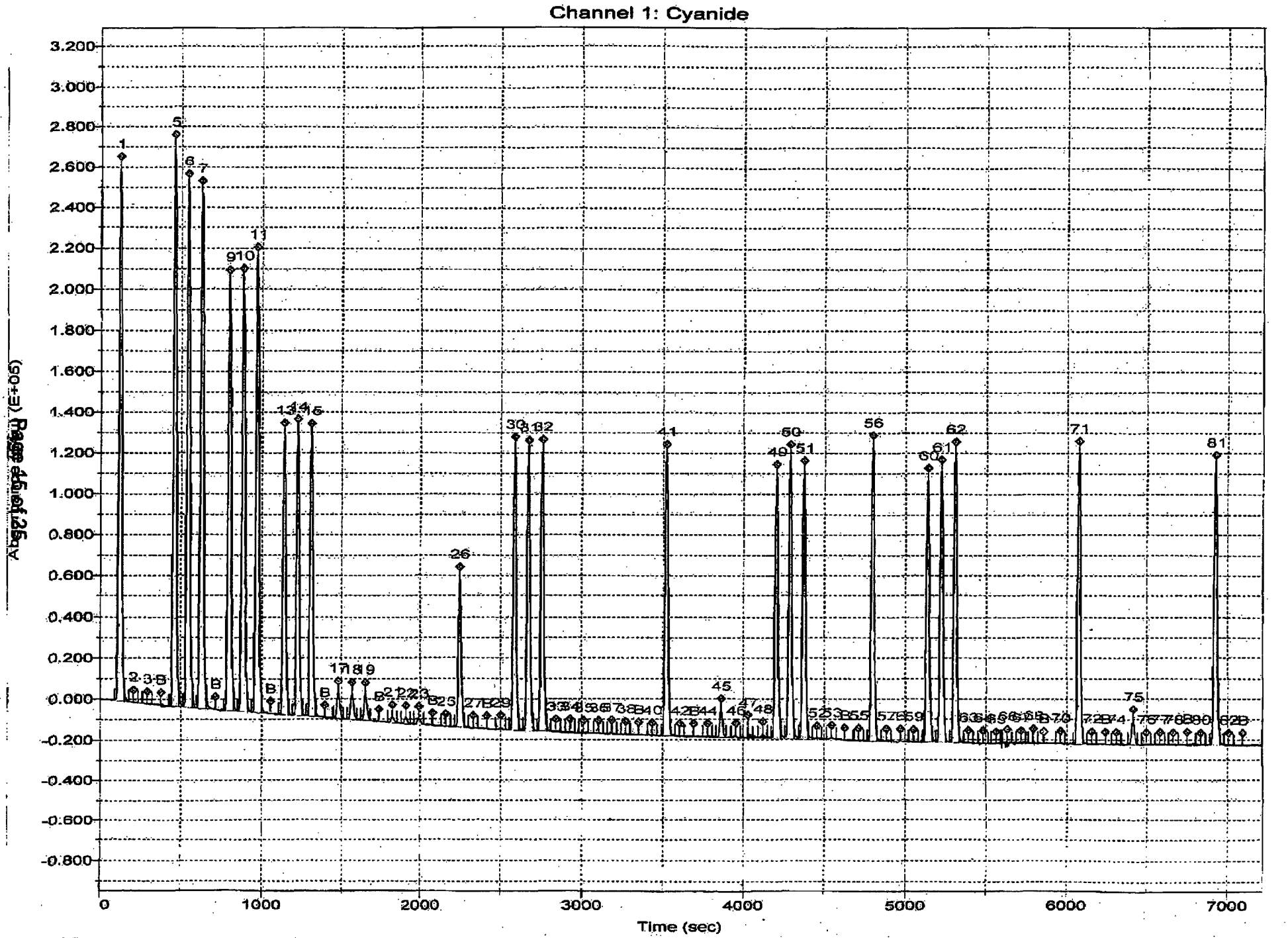
CNW 2/22/12

ık	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
1	2	Sync	SYNC	1	1	5699854	0.980929
2	0	Carryover	CO	1	1	2080	0.000752
3	0	Carryover	CO	1	1	-2666	-0.000064
3	0	Baseline	RB	1	1	-5180	-0.000497
5	2	Cal 1.00 ppm	C	1	1	5895348	1.014559
6	2	Cal 1.00 ppm	C	1	1	5857978	1.008130
7	2	Cal 1.00 ppm	C	1	1	5814036	1.000571
8	0	Baseline	RB	1	1	7594	0.001701
9	3	Cal 0.80 ppm	C	1	1	4724392	0.813122
10	3	Cal 0.80 ppm	C	1	1	4687798	0.806827
11	3	Cal 0.80 ppm	C	1	1	4793075	0.824937
3	0	Baseline	RB	1	1	1712	0.000689
13	4	Cal 0.50 ppm	C	1	1	2898468	0.499012
14	4	Cal 0.50 ppm	C	1	1	2908341	0.500710
15	4	Cal 0.50 ppm	C	1	1	2897045	0.498767
3	0	Baseline	RB	1	1	-4819	-0.000435
17	5	Cal 0.05 ppm	C	1	1	261123	0.045315
18	5	Cal 0.05 ppm	C	1	1	267215	0.046363
19	5	Cal 0.05 ppm	C	1	1	276648	0.047986
3	0	Baseline	RB	1	1	-817	0.000254
21	6	Cal 0.01 ppm	C	1	1	57502	0.010286
22	6	Cal 0.01 ppm	C	1	1	64834	0.011548
23	6	Cal 0.01 ppm	C	1	1	65410	0.011647
3	0	Baseline	RB	1	1	3642	0.001021
25	1	Blank	BLNK	1	1	-2898	-0.000104
26	7	ICV 0.25 ppm	CCV	1	1	1521704	0.262170
27	1	Blank	BLNK	1	1	-4159	-0.000321
3	0	Baseline	RB	1	1	-1798	0.000085
29	8	120207028-001 R	U	30.2	1	11376	0.071013
30	9	120207028-001MS	U	30.2	1	2954055	15.358950
	10	120207028-001MSD	U	30.2	1	2969649	15.439961
	11	120207028-LCS	U	1	1	3063630	0.527424
33	12	120207028-BL	U	1	1	-6385	-0.000704
34	13	120207028-002	U	28.1	1	-13282	-0.053119
35	14	120214032-004	U	1	1	-10990	-0.001496
36	15	120214037-001	U	1	1	-4989	-0.000464
37	16	120217018-001	U	1	1	7655	0.001711
38	17	120217032-001	U	1	1	22	0.000398
3	0	Baseline	RB	1	1	-527	0.000304
40	1	Blank	BLNK	1	1	3277	0.000958
41	4	CCV 0.5 ppm	CCV	1	1	2934942	0.505287
42	1	Blank	BLNK	1	1	-269	0.000348
3	0	Read Baseline	RB	1	1	-2143	0.000026
44	18	120217018-003	U	1	1	2212	0.000775
45	19	120217018-004	U	1	1	251989	0.043744
46	20	120217018-005	U	1	1	13768	0.002763
47	21	120217018-006	U	1	1	18204	0.003526
48	22	120217032-006 WW	U	1	1	36686	0.006706
49	23	120217032-006MS	U	1	1	2766943	0.476386
50	24	120217032-006MSD	U	1	1	2892484	0.497982
51	25	120217032-LCS	U	1	1	2839514	0.488870
52	26	120217032-BL	U	1	1	31941	0.005889
53	27	120217033-001	U	1	1	38679	0.007048
3	0	Baseline	RB	1	1	5361	0.001317
55	1	Blank	BLNK	1	1	-3802	-0.000260
56	4	CCV 0.5 ppm	CCV	1	1	2950465	0.507957
57	1	Blank	BLNK	1	1	2733	0.000865
3	0	Read Baseline	RB	1	1	-872	0.000244
59	28	120215006-006 DW	U	1	1	-6498	-0.000723
60	29	120215006-006MS	U	1	1	2864499	0.493168
61	30	120215006-006MSD	U	1	1	2834083	0.487936
62	31	120215006-LCS	U	1	1	2942564	0.506598
	32	120215006-BL	U	1	1	-12568	-0.001768
	33	120215008-006	U	1	1	-22587	-0.003491
65	34	120215009-006	U	1	1	-18203	-0.002737
66	35	120215010-006	U	1	1	-375	0.000330

Peak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)	
57	36	120215011-006	U	1	1	14948	0.002966	
58	37	120215012-006	U	1	1	12010	0.002460	
3	0	Baseline	RB	1	1	17024	0.003323	
70	1	Blank	BLNK	1	1	10958	0.002280	
71	4	CCV 0.5 ppm	CCV	1	1	2955563	0.508834	
72	1	Blank	BLNK	1	1	3165	0.000939	
3	0	Read Baseline	RB	1	1	-3585	-0.000222	
74	38	RINSE	U	1	1	-5636	-0.000575	
75	39	120217018-004	U	1	1	238291	0.041387	verify
76	40	RINSE	U	1	1	-13913	-0.001999	
77	41	RINSE	U	1	1	-13806	-0.001981	
78	42	RINSE	U	1	1	-16870	-0.002508	
3	0	Baseline	RB	1	1	-15369	-0.002249	
10	1	Blank	BLNK	1	1	-8322	-0.001037	
11	4	CCV 0.5 ppm	CCV	1	1	3062064	0.527155	
12	1	Blank	BLNK	1	1	1190	0.000599	
3	0	Read Baseline	RB	1	1	-924	0.000236	

Peak	Cup	Flags
	2	
3	0	
4	0	LO
5	0	BL
6	2	
7	2	
8	2	
9	0	BL
0	3	
0	3	
1	3	
2	0	BL
3	4	
4	4	
5	4	
6	0	BL
7	5	
8	5	
9	5	OL
	0	BL
1	6	OL
2	6	
3	6	
4	0	BL
5	1	LO
6	7	
7	1	LO
8	0	BL
9	8	
0	9	
1	10	
2	11	
3	12	LO
4	13	LO
5	14	LO
6	15	LO
7	16	
8	17	
9	0	BL
0	1	
1	4	
2	1	
3	0	BL
4	18	
5	19	
6	20	
7	21	
8	22	
9	23	

Peak	Cup	Flags
50	24	
51	25	
	26	
	27	
	0	BL
55	1	LO
56	4	
57	1	
8	0	BL UM
59	28	LO
60	29	
61	30	
62	31	
63	32	LO
64	33	LO
65	34	LO
66	35	
67	36	
68	37	
3	0	BL UM
70	1	
71	4	
72	1	
3	0	BL
74	38	LO
75	39	
76	40	LO
77	41	LO
78	42	LO
3	0	BL
80	1	LO
81	4	
82	1	
3	0	BL


Channel 1: Cyanide
Abs (E+05)
Time (sec)
3.200
3.000
2.800
2.600
2.400
2.200
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
-0.200
-0.400
-0.600
-0.800
0
1000
2000
3000
4000
5000
6000
7000

File name: T:\DATA1\FLOW4\2012\EPA335.4\022112CN.RST
Date: February 21, 2012
Operator: JTT

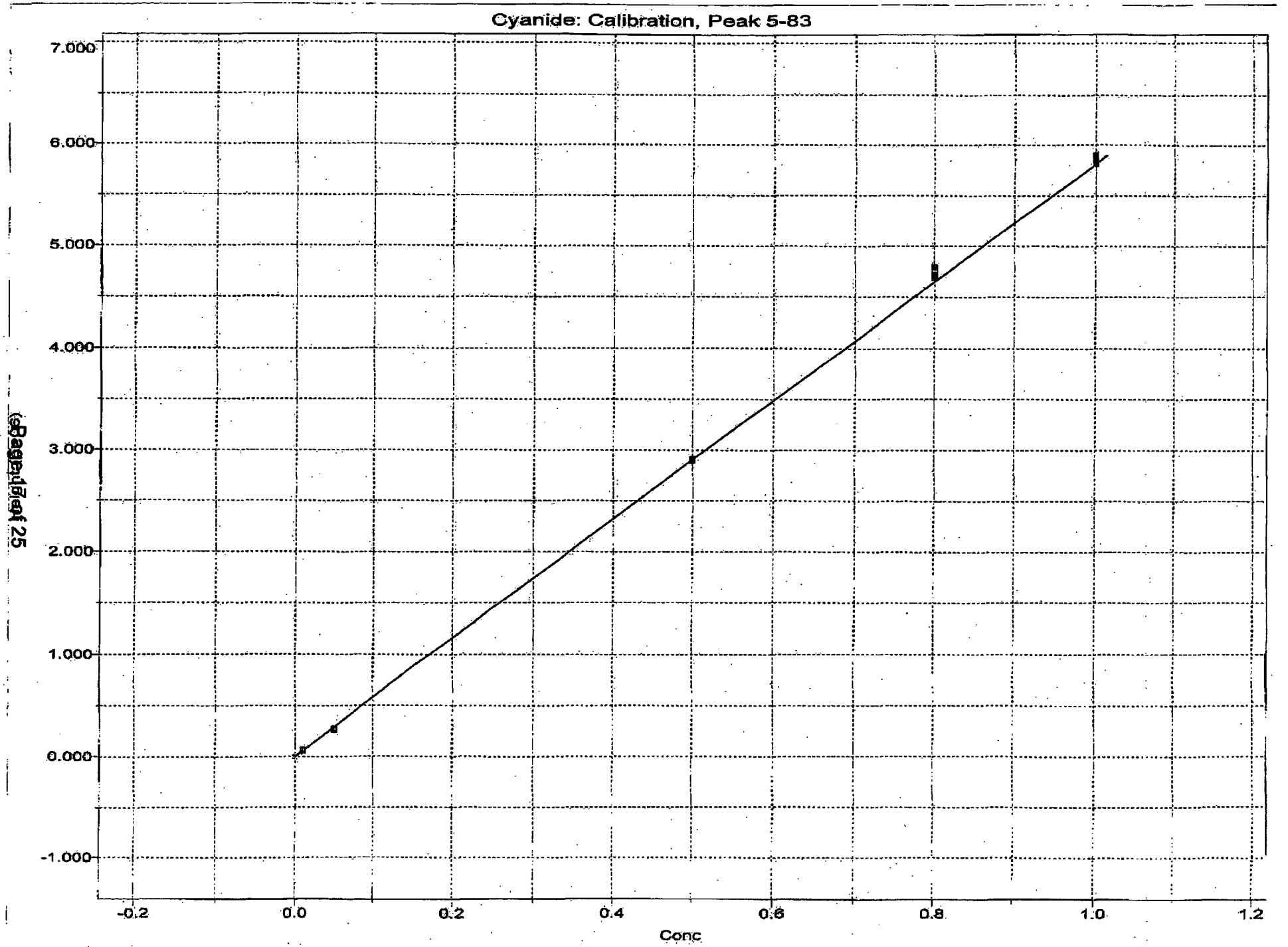
	Name	Conc	Area
*	Cal 1.00 ppm	1.000000	5895348.000000
*	Cal 1.00 ppm	1.000000	5857977.500000
*	Cal 1.00 ppm	1.000000	5814036.000000
*	Cal 0.80 ppm	0.800000	4724392.500000
*	Cal 0.80 ppm	0.800000	4687798.500000
*	Cal 0.80 ppm	0.800000	4793075.000000
*	Cal 0.50 ppm	0.500000	2898468.500000
*	Cal 0.50 ppm	0.500000	2908340.750000
*	Cal 0.50 ppm	0.500000	2897045.000000
*	Cal 0.05 ppm	0.050000	261122.890625
*	Cal 0.05 ppm	0.050000	267214.531250
*	Cal 0.05 ppm	0.050000	276648.062500
*	Cal 0.01 ppm	0.010000	57502.253906
*	Cal 0.01 ppm	0.010000	64833.636719
*	Cal 0.01 ppm	0.010000	65410.171875

Calib Coef:
y=bx+a
a: (intercept) -2.2928e+03
b: 5.8130e+06

Corr Coef: 0.999885

Carryover: 0.0365%

No Drift Peaks


Cyanide: Calibration, Peak 5-83
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Conc

CYANIDE EXTRACTION BENCHSHEET SW 846

Instrument names & IDs: Denver A-160 balance; Alpchem FIA

Date	SAMPLE #	% Solids	Sample Amt (g)	H2O (mL)	Final Volume	Multiplier	Chemist
2/14/12	1202070 12 - 1	91.8	10.04	250	250	27.1	CMW
	-2	96.9	10.07			25.6	
	-3	95.0	10.04			26.2	
	-4	90.0	10.07			27.6	
	-5	90.2	10.01			27.7	
	120208030 - 1	91.1	10.01			27.4	
	-2	89.5	10.06			27.8	
	-3	90.7	10.11			27.3	
	-4	86.1	10.14			30.8	
	-5	96.8	10.07			25.6	
	-6	97.4	10.09			25.4	
	120214032 - 1	95.6	10.04			26.0	
	-2	95.9	10.01			26.0	
	-3	91.6	10.03			27.7	
2/16/12	120207028 - 1	83.1	9.96	250	250	30.2	CMW
	-2	88.4	10.05			28.1	

Total Cyanide by Semi-Automated Colorimetry
Method: EPA 335.4\SM-4500-CN-E
Distillation Bench Sheet

Weak Acid Dissociable Cyanide by
SM 4500-CN-I (check WAD column)

Total Cyanide MS/MSD/LCS Soln: M838-03 Exp: 2/9/2013
Free Cyanide MS/MSD/LCS Soln: M824-05 Exp: 12/28/2012

Method requirements: All QC +/- 10%
Equipment: Midi-vap
Instrument: ALPCHEM FIA 3000
Absorbance: 570nm

	Sample ID	Matrix	Preserved	Sample Amount (mL)**	Initial Multiplier*	Final Multiplier	Spike Amount (mL)	WAD? (check if yes)
1	120207027-8	epa soil	NaOH	50mL	26.8	same		
2	-8ms	↓	↓	↓	↓	↓	1mL	
3	-8msd				↓		↓	
4	-LCS				1x			
5	-BL				↓			
6	120207012-1				27.1			
7	-2				25.6			
8	-3				26.2			
9	-4				27.6			
10	-5	↓	↓	↓	27.7	↓		
11	120208030-1	epa soil	NaOH	50mL	27.4	same		
12	-2				27.8			
13	-3				27.3			
14	-4				30.8			
15	-5				25.6			
16	-6				25.4			
17	120214032-1				26.0			
18	-2				26.0			
19	-3	↓	↓	↓	27.2	↓		
20								

* If soils this calculation is taken from cyanide extraction bench sheet.

** If soils, mLs of extract used for distillation.

Extraction Reagents:	Reagent #:
methyl red indicator	A041-03
18 N H_2SO_4	A043-10
sulfamic acid	R009-12
0.025N NaOH	R014-16
51% $MgCl_2$	A043-06

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

Distillation Initials/Date Distilled: CMW 2/15/12

Analyst Initials/Date Analyzed: CMW 2/15/12

File name: T:\DATA1\FLOW4\2012\EPA335.4\021512CM.RST
Date: February 15, 2012
Operator: JTT

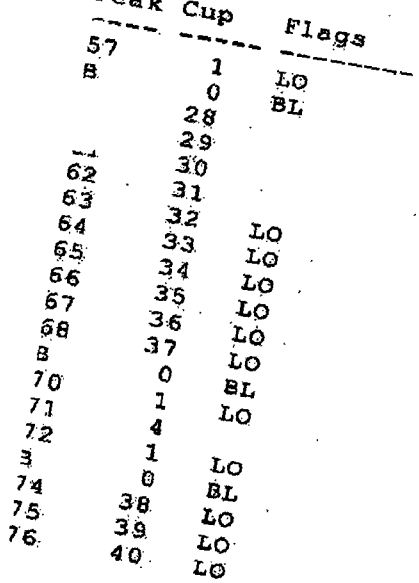
CMW 2/17/12

120215 FIA CNS

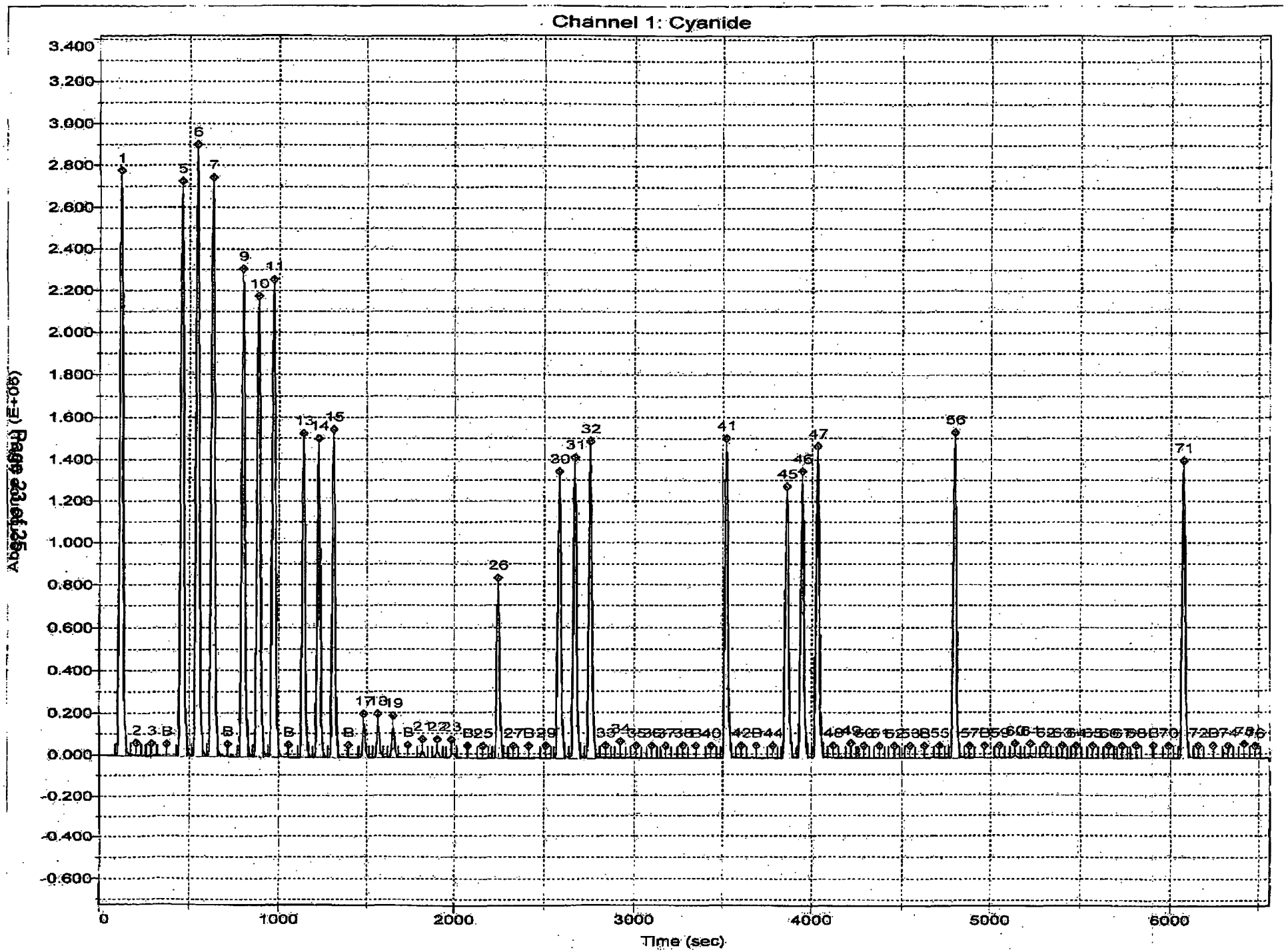
k	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
1	2	Sync	SYNC	1	1	5825412	1.023780
2	0	Carryover	CO	1	1	22125	0.004010
3	0	Carryover	CO	1	1	6865	0.001329
8	0	Baseline	RB	1	1	-159	0.000095
5	2	Cal 1.00 ppm	C	1	1	5800565	1.019414
6	2	Cal 1.00 ppm	C	1	1	5938287	1.043615
7	2	Cal 1.00 ppm	C	1	1	5805906	1.020352
8	0	Baseline	RB	1	1	1019	0.000302
9	3	Cal 0.80 ppm	C	1	1	4707213	0.827287
10	3	Cal 0.80 ppm	C	1	1	4758870	0.836364
11	3	Cal 0.80 ppm	C	1	1	4788800	0.841624
8	0	Baseline	RB	1	1	-1310	-0.000108
13	4	Cal 0.50 ppm	C	1	1	2926831	0.514433
14	4	Cal 0.50 ppm	C	1	1	2944859	0.517601
15	4	Cal 0.50 ppm	C	1	1	2923532	0.513854
8	0	Baseline	RB	1	1	-96	0.000105
17	5	Cal 0.05 ppm	C	1	1	279029	0.049154
18	5	Cal 0.05 ppm	C	1	1	278124	0.048995
19	5	Cal 0.05 ppm	C	1	1	279436	0.049226
8	0	Baseline	RB	1	1	-825	-0.000023
21	6	Cal 0.01 ppm	C	1	1	57916	0.010299
22	6	Cal 0.01 ppm	C	1	1	58423	0.010389
23	6	Cal 0.01 ppm	C	1	1	58837	0.010461
8	0	Baseline	RB	1	1	-409	0.000051
25	1	Blank	BLNK	1	1	-3308	-0.000459
26	7	ICV 0.25 ppm	CCV	1	1	1537964	0.270378
27	1	Blank	BLNK	1	1	508	0.000212
8	0	Baseline	RB	1	1	1092	0.000314
29	8	120203013-001 DW	U	1	1	7941	0.001518
[illegible]	9	120203013-001MS	U	1	1	2796078	0.491457
	10	120203013-001MSD	U	1	1	2855622	0.501920
	11	120203013-LCS	U	1	1	2959570	0.520186
33	12	120203013-BL	U	1	1	6321	0.001233
34	13	120208026-006	U	1	1	18965	0.003455
35	14	120208027-006	U	1	1	7761	0.001486
36	15	120208028-006	U	1	1	4100	0.000843
37	16	120208029-006	U	1	1	3261	0.000695
38	17	120210022-006	U	1	1	4007	0.000827
8	0	Baseline	RB	1	1	-187	0.000090
10	1	Blank	BLNK	1	1	-1906	-0.000212
11	4	CCV 0.5 ppm	CCV	1	1	2965604	0.521247
12	1	Blank	BLNK	1	1	-10723	-0.001762
8	0	Read Baseline	RB	1	1	-699	0.000000
14	18	120207027-008 S	U	26.8	1	-827	-0.000615
15	19	120207027-008MS	U	26.8	1	2779246	13.091780
16	20	120207027-008MSD	U	26.8	1	2810774	13.240262
17	21	120207027-LCS	U	1	1	2949645	0.518442
18	22	120207027-BL	U	1	1	-7029	-0.001113
19	23	120207012-001	U	27.1	1	5832	0.031092
50	24	120207012-002	U	25.6	1	99	0.003579
51	25	120207012-003	U	26.2	1	107	0.003698
52	26	120207012-004	U	27.6	1	-4643	-0.019140
53	27	120207012-005	U	27.7	1	-2045	-0.006563
8	0	Baseline	RB	1	1	-1413	-0.000126
55	1	Blank	BLNK	1	1	786	0.000260
56	4	CCV 0.5 ppm	CCV	1	1	2965979	0.521313
57	1	Blank	BLNK	1	1	-5832	-0.000902
8	0	Read Baseline	RB	1	1	1650	0.000412
59	28	120208030-001	U	27.4	1	7278	0.038397
60	29	120208030-002	U	27.8	1	23450	0.117961
61	30	120208030-003	U	27.3	1	18157	0.090448
[illegible]	31	120208030-004	U	30.8	1	-659	0.000204
	32	120208030-005	U	25.6	1	-885	-0.000849
	33	120208030-006	U	25.4	1	-3446	-0.012271
65	34	120214032-001	U	26	1	-1682	-0.004502
66	35	120214032-002	U	26	1	-867	-0.000780

Peak	Cup	Name	Type	Dil	Wt	Area	Calc. (ppm)
67	36	120214032-003	U	27.2	1	-2669	-0.009427
68	37	RINSE	U	1	1	-1605	-0.000160
B	0	Baseline	RB	1	1	-507	0.000033
70	1	Blank	BLNK	1	1	-5655	-0.000871
71	4	CCV 0.5 ppm	CCV	1	1	2910344	0.511536
72	1	Blank	BLNK	1	1	-7377	-0.001174
B	0	Read Baseline	RB	1	1	-513	0.000032
74	38		U	1	1	-1829	-0.000199
75	39		U	1	1	-1762	-0.000187
76	40		U	1	1	-5162	-0.000785

Peak	Cup	Flags
1	2	
2	0	
3	0	
B	0	BL
5	2	
6	2	
7	2	
B	0	BL
9	3	
10	3	
11	3	
B	0	BL
13	4	
14	4	
15	4	
B	0	BL
17	5	
18	5	
19	5	
B	0	BL
21	6	
22	6	
23	6	
B	0	BL
25	1	LO
26	7	
27	1	
B	0	BL
29	8	
30	9	
31	10	
32	11	
33	12	
34	13	
35	14	
36	15	
37	16	
38	17	
B	0	BL
40	1	LO
41	4	
42	1	LO
B	0	BL
44	18	LO
45	19	
46	20	
47	21	
48	22	LO
49	23	
50	24	
51	25	
52	26	LO
53	27	LO
B	0	BL
55	1	
56	4	



Cak	Cup	Flags
57	1	LO
B	0	BL
	28	
	29	
	30	
62	31	
63	32	
64	33	LO
65	34	LO
66	35	LO
67	36	LO
68	37	LO
B	0	LO
70	1	BL
71	4	LO
72	1	
3	0	LO
74	38	BL
75	39	LO
76	40	LO
		LO


Channel 1: Cyanide
Absorbance (E+05)
Time (sec)
3.400
3.200
3.000
2.800
2.600
2.400
2.200
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
-0.200
-0.400
-0.600
0
1000
2000
3000
4000
5000
6000

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Date: February 15, 2012
Operator: JTT

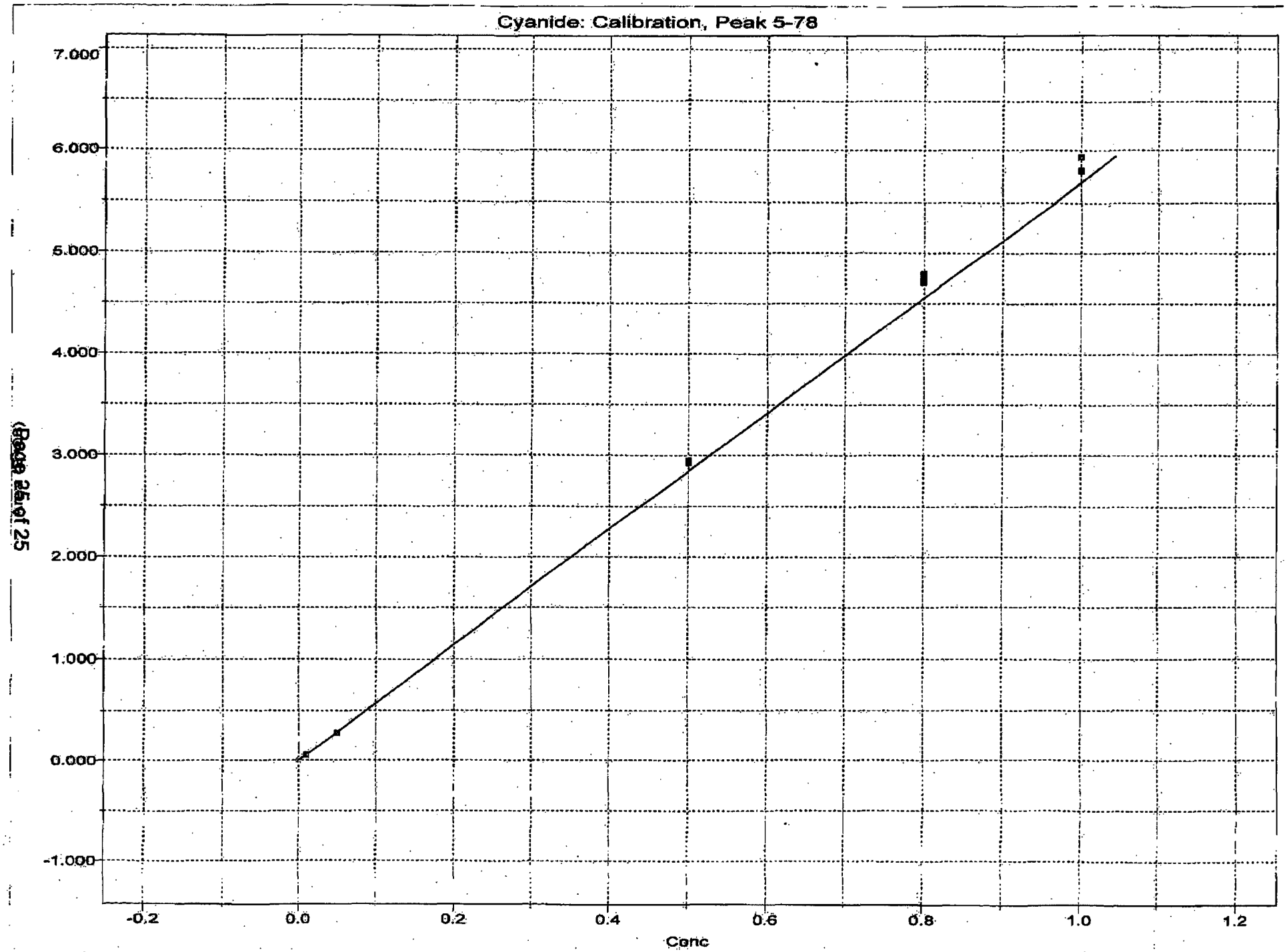
	Name	Conc	Area
*	Cal 1.00 ppm	1.000000	5800565.000000
*	Cal 1.00 ppm	1.000000	5938287.000000
*	Cal 1.00 ppm	1.000000	5805906.000000
*	Cal 0.80 ppm	0.800000	4707213.000000
*	Cal 0.80 ppm	0.800000	4758870.000000
*	Cal 0.80 ppm	0.800000	4788800.500000
*	Cal 0.50 ppm	0.500000	2926830.750000
*	Cal 0.50 ppm	0.500000	2944859.000000
*	Cal 0.50 ppm	0.500000	2923532.000000
*	Cal 0.05 ppm	0.050000	279028.687500
*	Cal 0.05 ppm	0.050000	278124.031250
*	Cal 0.05 ppm	0.050000	279435.531250
*	Cal 0.01 ppm	0.010000	57915.500000
*	Cal 0.01 ppm	0.010000	58423.179688
*	Cal 0.01 ppm	0.010000	58836.558594

Calib Coef:
y=bx+a
a: (intercept) -6.9667e+02
b: 5.6908e+06

Corr Coef: 0.999837

Carryover: 0.38%

No Drift Peaks


Cyanide: Calibration, Peak 5-78
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
-1.000
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Conc

QC SUMMARY REPORT

WO#: **1202350**

ıll Environmental Analysis Laboratory, Inc.

22-Mar-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R901**	RunNo: **901**
Prep Date:	Analysis Date: **2/10/2012**	SeqNo: **25640** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Barium	ND	0.0020								
Beryllium	ND	0.0020								
Boron	ND	0.040								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Cobalt	ND	0.0060								
Copper	ND	0.0060								
Lead	ND	0.0050								
Manganese	ND	0.0020								
Molybdenum	ND	0.0080								
Nickel	ND	0.010								
Silver	ND	0.0050								
Vanadium	ND	0.050								

›mple ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
ənt ID: **LCSW**	Batch ID: **R901**	RunNo: **901**
Prep Date:	Analysis Date: **2/10/2012**	SeqNo: **25641** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.56	0.020	0.5000	0	112	85	115			
Barium	0.49	0.0020	0.5000	0	97.5	85	115			
Beryllium	0.50	0.0020	0.5000	0	101	85	115			
Boron	0.51	0.040	0.5000	0	103	85	115			
Cadmium	0.49	0.0020	0.5000	0	98.9	85	115			
Calcium	51	1.0	50.00	0	102	85	115			
Chromium	0.49	0.0060	0.5000	0	98.3	85	115			
Cobalt	0.47	0.0060	0.5000	0	94.1	85	115			
Copper	0.48	0.0060	0.5000	0	96.7	85	115			
Lead	0.48	0.0050	0.5000	0	96.2	85	115			
Manganese	0.48	0.0020	0.5000	0	95.5	85	115			
Molybdenum	0.51	0.0080	0.5000	0	101	85	115			
Nickel	0.47	0.010	0.5000	0	93.2	85	115			
Silver	0.10	0.0050	0.1000	0	100	85	115			
Vanadium	0.51	0.050	0.5000	0	102	85	115			

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R921**	RunNo: **921**
Prep Date:	Analysis Date: **2/13/2012**	SeqNo: **26476** Units: **mg/L**

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

ɛlifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1202350**

22-Mar-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R921**	RunNo: **921**
Prep Date:	Analysis Date: **2/13/2012**	SeqNo: **26476** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.0032	0.020								J
Potassium	ND	1.0								
Sodium	ND	1.0								
Zinc	ND	0.010								

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R921**	RunNo: **921**
Prep Date:	Analysis Date: **2/13/2012**	SeqNo: **26477** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.49	0.020	0.5000	0.003150	98.2	85	115			
Potassium	48	1.0	50.00	0	96.9	85	115			
Sodium	49	1.0	50.00	0	98.4	85	115			
Zinc	0.50	0.010	0.5000	0	99.7	85	115			

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1202350**

ıll Environmental Analysis Laboratory, Inc.

22-Mar-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID: **MB-685** SampType: **MBLK** TestCode: **EPA Method 200.7: Total Metals**
Client ID: **PBW** Batch ID: **685** RunNo: **934**
Prep Date: **2/13/2012** Analysis Date: **2/14/2012** SeqNo: **27010** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Barium	ND	0.0020								
Beryllium	ND	0.0020								
Cadmium	0.00039	0.0020								J
Chromium	0.00064	0.0060								J
Cobalt	ND	0.0060								
Copper	0.0028	0.0060								J
Iron	ND	0.020								
Lead	ND	0.0050								
Magnesium	0.0072	1.0								J
Manganese	ND	0.0020								
Molybdenum	0.0034	0.0080								J
Nickel	ND	0.010								
Silver	ND	0.0050								
Vanadium	ND	0.050								
Zinc	0.0011	0.010								J

ɲple ID: **LCS-685** SampType: **LCS** TestCode: **EPA Method 200.7: Total Metals**
Client ID: **LCSW** Batch ID: **685** RunNo: **934**
Prep Date: **2/13/2012** Analysis Date: **2/14/2012** SeqNo: **27011** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.54	0.020	0.5000	0	108	85	115			
Barium	0.47	0.0020	0.5000	0	94.0	85	115			
Beryllium	0.51	0.0020	0.5000	0	101	85	115			
Cadmium	0.48	0.0020	0.5000	0.0003900	96.5	85	115			
Chromium	0.48	0.0060	0.5000	0.0006400	95.4	85	115			
Cobalt	0.46	0.0060	0.5000	0	92.3	85	115			
Copper	0.47	0.0060	0.5000	0.002820	94.3	85	115			
Iron	0.47	0.020	0.5000	0	94.4	85	115			
Lead	0.47	0.0050	0.5000	0	93.7	85	115			
Magnesium	51	1.0	50.00	0.007190	103	85	115			
Manganese	0.46	0.0020	0.5000	0	92.2	85	115			
Molybdenum	0.50	0.0080	0.5000	0.003360	98.9	85	115			
Nickel	0.46	0.010	0.5000	0	91.1	85	115			
Silver	0.097	0.0050	0.1000	0	97.0	85	115			
Vanadium	0.49	0.050	0.5000	0	98.6	85	115			
Zinc	0.47	0.010	0.5000	0.001100	92.8	85	115			

ʻalifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1202350**

22-Mar-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID: **1202350-004CMS** SampType: **MS** TestCode: **EPA Method 200.7: Total Metals**

Client ID: **BK-EB-020812** Batch ID: **685** RunNo: **934**

Prep Date: **2/13/2012** Analysis Date: **2/14/2012** SeqNo: **27015** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.58	0.020	0.5000	0.03108	110	70	130			
Barium	0.46	0.0020	0.5000	0	91.6	70	130			
Beryllium	0.49	0.0020	0.5000	0	97.7	70	130			
Cadmium	0.48	0.0020	0.5000	0.0004400	95.2	70	130			
Chromium	0.47	0.0060	0.5000	0.001160	94.2	70	130			
Cobalt	0.46	0.0060	0.5000	0	91.2	70	130			
Copper	0.46	0.0060	0.5000	0.005760	91.2	70	130			
Lead	0.46	0.0050	0.5000	0	92.8	70	130			
Manganese	0.45	0.0020	0.5000	0.001940	89.5	70	130			
Molybdenum	0.49	0.0080	0.5000	0	98.0	70	130			
Nickel	0.45	0.010	0.5000	0.0007600	89.8	70	130			
Silver	0.094	0.0050	0.1000	0	94.5	70	130			
Vanadium	0.48	0.050	0.5000	0	96.1	70	130			
Zinc	0.45	0.010	0.5000	0.001860	89.1	70	130			

Sample ID: **1202350-004CMSD** SampType: **MSD** TestCode: **EPA Method 200.7: Total Metals**

Client ID: **BK-EB-020812** Batch ID: **685** RunNo: **934**

Prep Date: **2/13/2012** Analysis Date: **2/14/2012** SeqNo: **27085** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.58	0.020	0.5000	0.03108	111	70	130	0.701	20	
Barium	0.46	0.0020	0.5000	0	92.1	70	130	0.562	20	
Beryllium	0.49	0.0020	0.5000	0	98.7	70	130	0.957	20	
Cadmium	0.46	0.0020	0.5000	0.0004400	92.8	70	130	2.51	20	
Chromium	0.46	0.0060	0.5000	0.001160	91.7	70	130	2.63	20	
Cobalt	0.44	0.0060	0.5000	0	88.7	70	130	2.76	20	
Copper	0.46	0.0060	0.5000	0.005760	91.2	70	130	0.00217	20	
Lead	0.45	0.0050	0.5000	0	90.5	70	130	2.45	20	
Manganese	0.45	0.0020	0.5000	0.001940	90.3	70	130	0.817	20	
Molybdenum	0.48	0.0080	0.5000	0	95.4	70	130	2.70	20	
Nickel	0.44	0.010	0.5000	0.0007600	88.3	70	130	1.66	20	
Silver	0.095	0.0050	0.1000	0	94.6	70	130	0.148	20	
Vanadium	0.48	0.050	0.5000	0	96.8	70	130	0.728	20	
Zinc	0.45	0.010	0.5000	0.001860	89.9	70	130	0.852	20	

Sample ID: **1202350-004CMS** SampType: **MS** TestCode: **EPA Method 200.7: Total Metals**

Client ID: **BK-EB-020812** Batch ID: **685** RunNo: **934**

Prep Date: **2/13/2012** Analysis Date: **2/14/2012** SeqNo: **27087** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.56	0.10	0.5000	0.08790	94.1	70	130			
Magnesium	51	5.0	50.00	0.05675	102	70	130			

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1202350**

ll Environmental Analysis Laboratory, Inc.

22-Mar-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID: **1202350-004CMSD** SampType: **MSD** TestCode: **EPA Method 200.7: Total Metals**
Client ID: **BK-EB-020812** Batch ID: **685** RunNo: **934**
Prep Date: **2/13/2012** Analysis Date: **2/14/2012** SeqNo: **27088** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.58	0.10	0.5000	0.08790	98.2	70	130	3.61	20	
Magnesium	51	5.0	50.00	0.05675	103	70	130	0.614	20	

Sample ID: **MB-685** SampType: **MBLK** TestCode: **EPA Method 200.7: Total Metals**
Client ID: **PBW** Batch ID: **685** RunNo: **959**
Prep Date: **2/13/2012** Analysis Date: **2/15/2012** SeqNo: **27822** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	ND	0.040								

Sample ID: **LCS-685** SampType: **LCS** TestCode: **EPA Method 200.7: Total Metals**
Client ID: **LCSW** Batch ID: **685** RunNo: **959**
Prep Date: **2/13/2012** Analysis Date: **2/15/2012** SeqNo: **27823** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.49	0.040	0.5000	0	98.9	85	115			

nple ID: **1202350-004CMS** SampType: **MS** TestCode: **EPA Method 200.7: Total Metals**
ient ID: **BK-EB-020812** Batch ID: **685** RunNo: **959**
Prep Date: **2/13/2012** Analysis Date: **2/15/2012** SeqNo: **28184** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.47	0.040	0.5000	0	93.5	70	130			

Sample ID: **1202350-004CMSD** SampType: **MSD** TestCode: **EPA Method 200.7: Total Metals**
Client ID: **BK-EB-020812** Batch ID: **685** RunNo: **959**
Prep Date: **2/13/2012** Analysis Date: **2/15/2012** SeqNo: **28188** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.47	0.040	0.5000	0	94.4	70	130	0.949	20	

ıalifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1202350**

22-Mar-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R922**	RunNo: **922**
Prep Date:	Analysis Date: **2/13/2012**	SeqNo: **26622** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	0.0010								
Arsenic	ND	0.0010								
Selenium	ND	0.0010								
Thallium	ND	0.0010								
Uranium	ND	0.0010								

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R922**	RunNo: **922**
Prep Date:	Analysis Date: **2/13/2012**	SeqNo: **26623** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.024	0.0010	0.02500	0	97.8	85	115			
Arsenic	0.026	0.0010	0.02500	0	104	85	115			
Selenium	0.027	0.0010	0.02500	0	109	85	115			
Thallium	0.025	0.0010	0.02500	0	100	85	115			
Uranium	0.024	0.0010	0.02500	0	95.2	85	115			

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1202350**

ıll Environmental Analysis Laboratory, Inc.

22-Mar-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID: **MB-685**	SampType: **MBLK**	TestCode: **200.8 ICPMS Metals:Total**
Client ID: **PBW**	Batch ID: **685**	RunNo: **948**
Prep Date: **2/13/2012**	Analysis Date: **2/14/2012**	SeqNo: **27416** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	ND	0.0025								
Selenium	ND	0.0025								
Uranium	0.000031	0.0025								J

Sample ID: **MB-685**	SampType: **MBLK**	TestCode: **200.8 ICPMS Metals:Total**
Client ID: **PBW**	Batch ID: **685**	RunNo: **1028**
Prep Date: **2/13/2012**	Analysis Date: **2/20/2012**	SeqNo: **29709** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	0.0025								
Arsenic	ND	0.0025								
Selenium	ND	0.0025								
Thallium	ND	0.0025								
Uranium	ND	0.0025								

ɜalifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1202350**

22-Mar-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID: **MB-674**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS**	Batch ID: **674**	RunNo: **898**
Prep Date: **2/10/2012**	Analysis Date: **2/10/2012**	SeqNo: **25516** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	ND	0.30								
Chloride	ND	1.5								
Sulfate	ND	1.5								

Sample ID: **LCS-674**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS**	Batch ID: **674**	RunNo: **898**
Prep Date: **2/10/2012**	Analysis Date: **2/10/2012**	SeqNo: **25517** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1.5	0.30	1.500	0	100	90	110			
Chloride	14	1.5	15.00	0	92.3	90	110			
Sulfate	28	1.5	30.00	0	93.9	90	110			

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1202350**

ıll Environmental Analysis Laboratory, Inc.

22-Mar-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID: **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R904**	RunNo: **904**
Prep Date:	Analysis Date: **2/10/2012**	SeqNo: **25863** Units: **mg/L**

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

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R904**	RunNo: **904**
Prep Date:	Analysis Date: **2/10/2012**	SeqNo: **25864** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.6	0.50	5.000	0	92.6	90	110			
Nitrogen, Nitrite (As N)	0.97	0.10	1.000	0	97.0	90	110			
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	94.2	90	110			
Sulfate	9.6	0.50	10.00	0	95.7	90	110			

ıalifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1202350**

22-Mar-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID: **MB-689**	SampType: **MBLK**	TestCode: **EPA Method 7471: Mercury**
Client ID: **PBS**	Batch ID: **689**	RunNo: **926**
Prep Date: **2/13/2012**	Analysis Date: **2/14/2012**	SeqNo: **26731** Units: **mg/kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.033								

Sample ID: **LCS-689**	SampType: **LCS**	TestCode: **EPA Method 7471: Mercury**
Client ID: **LCSS**	Batch ID: **689**	RunNo: **926**
Prep Date: **2/13/2012**	Analysis Date: **2/14/2012**	SeqNo: **26732** Units: **mg/kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.17	0.033	0.1667	0	99.7	80	120			

Sample ID: **1202350-001AMS**	SampType: **MS**	TestCode: **EPA Method 7471: Mercury**
Client ID: **BK-10 (5-6')**	Batch ID: **689**	RunNo: **926**
Prep Date: **2/13/2012**	Analysis Date: **2/14/2012**	SeqNo: **26749** Units: **mg/kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.16	0.033	0.1647	0	98.8	75	125			

Sample ID: **1202350-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 7471: Mercury**
Client ID: **BK-10 (5-6')**	Batch ID: **689**	RunNo: **926**
Prep Date: **2/13/2012**	Analysis Date: **2/14/2012**	SeqNo: **26750** Units: **mg/kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.17	0.033	0.1657	0	103	75	125	4.39	20	

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1202350**

ıll Environmental Analysis Laboratory, Inc.

22-Mar-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID: **MB-707**	SampType: **MBLK**	TestCode: **EPA Method 7470: Mercury**
Client ID: **PBW**	Batch ID: **707**	RunNo: **935**
Prep Date: **2/14/2012**	Analysis Date: **2/14/2012**	SeqNo: **27024** Units: **mg/L**

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

Sample ID: **LCS-707**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **707**	RunNo: **935**
Prep Date: **2/14/2012**	Analysis Date: **2/14/2012**	SeqNo: **27025** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0055	0.00020	0.005000	0	109	80	120			

Sample ID: **1202350-004CMS**	SampType: **MS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **BK-EB-020812**	Batch ID: **707**	RunNo: **935**
Prep Date: **2/14/2012**	Analysis Date: **2/14/2012**	SeqNo: **27027** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0055	0.00020	0.005000	0	109	75	125			

Sample ID: **1202350-004CMSD**	SampType: **MSD**	TestCode: **EPA Method 7470: Mercury**
ent ID: **BK-EB-020812**	Batch ID: **707**	RunNo: **935**
Prep Date: **2/14/2012**	Analysis Date: **2/14/2012**	SeqNo: **27028** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0055	0.00020	0.005000	0	111	75	125	1.40	20	

alifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1202350**

22-Mar-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID: **MB-677**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **PBS**	Batch ID: **677**	RunNo: **900**
Prep Date: **2/10/2012**	Analysis Date: **2/13/2012**	SeqNo: **25543** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	0.67	3.0								J
Antimony	0.53	2.5								J
Arsenic	ND	2.5								
Barium	ND	0.10								
Beryllium	ND	0.15								
Boron	0.16	2.0								J
Cadmium	0.026	0.10								J
Chromium	0.094	0.30								J
Cobalt	ND	0.30								
Molybdenum	ND	0.40								
Nickel	0.20	0.50								J
Selenium	1.4	2.5								J
Silver	ND	0.25								
Thallium	ND	2.5								
Uranium	0.54	5.0								J
Vanadium	ND	2.5								
Zinc	0.94	2.5								J

Sample ID: **LCS-677**	SampType: **LCS**	TestCode: **EPA Method 6010B: Soil Metals**
Client ID: **LCSS**	Batch ID: **677**	RunNo: **900**
Prep Date: **2/10/2012**	Analysis Date: **2/13/2012**	SeqNo: **25544** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	28	3.0	25.00	0.6685	110	80	120			
Antimony	26	2.5	25.00	0.5325	102	80	120			
Arsenic	23	2.5	25.00	0	90.6	80	120			
Barium	24	0.10	25.00	0	95.9	80	120			
Beryllium	25	0.15	25.00	0	98.7	80	120			
Boron	24	2.0	25.00	0.1635	95.3	80	120			
Cadmium	24	0.10	25.00	0.02550	94.8	80	120			
Chromium	24	0.30	25.00	0.09450	95.7	80	120			
Cobalt	23	0.30	25.00	0	93.4	80	120			
Molybdenum	25	0.40	25.00	0	102	80	120			
Nickel	23	0.50	25.00	0.2015	90.1	80	120			
Selenium	24	2.5	25.00	1.418	89.9	80	120			
Silver	4.8	0.25	5.000	0	96.3	80	120			
Thallium	24	2.5	25.00	0	95.9	80	120			
Uranium	25	5.0	25.00	0.5410	99.4	80	120			
Vanadium	25	2.5	25.00	0	100	80	120			
Zinc	23	2.5	25.00	0.9425	90.0	80	120			

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1202350**

ıll Environmental Analysis Laboratory, Inc.

22-Mar-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID: **MB-677**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Soil Metals**							
Client ID: **PBS**	Batch ID: **677**	RunNo: **909**							
Prep Date: **2/10/2012**	Analysis Date: **2/13/2012**	SeqNo: **26102**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Copper	ND	0.30								
Lead	ND	0.25								

Sample ID: **LCS-677**	SampType: **LCS**	TestCode: **EPA Method 6010B: Soil Metals**							
Client ID: **LCSS**	Batch ID: **677**	RunNo: **909**							
Prep Date: **2/10/2012**	Analysis Date: **2/13/2012**	SeqNo: **26103**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Copper	25	0.30	25.00	0	101	80	120			
Lead	24	0.25	25.00	0	94.9	80	120			

Sample ID: **MB-677**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Soil Metals**							
Client ID: **PBS**	Batch ID: **677**	RunNo: **994**							
Prep Date: **2/10/2012**	Analysis Date: **2/17/2012**	SeqNo: **28799**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
·nper	0.17	0.30								J
	ND	0.25								

Sample ID: **LCS-677**	SampType: **LCS**	TestCode: **EPA Method 6010B: Soil Metals**							
Client ID: **LCSS**	Batch ID: **677**	RunNo: **994**							
Prep Date: **2/10/2012**	Analysis Date: **2/17/2012**	SeqNo: **28800**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Copper	25	0.30	25.00	0.1690	97.9	80	120			
Lead	23	0.25	25.00	0	92.8	80	120			

Sample ID: **MB-1127**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Soil Metals**							
Client ID: **PBS**	Batch ID: **1127**	RunNo: **1527**							
Prep Date: **3/17/2012**	Analysis Date: **3/18/2012**	SeqNo: **42804**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	ND	1.0								
Manganese	ND	0.10								

Sample ID: **LCS-1127**	SampType: **LCS**	TestCode: **EPA Method 6010B: Soil Metals**							
Client ID: **LCSS**	Batch ID: **1127**	RunNo: **1527**							
Prep Date: **3/17/2012**	Analysis Date: **3/18/2012**	SeqNo: **42805**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	26	1.0	25.00	0	105	80	120			
Manganese	24	0.10	25.00	0	97.4	80	120			

·alifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1202350**

22-Mar-12

Client: Western Refining Southwest, Inc.

Project: RCRA Background Investigation

Sample ID: **mb-1**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R947**	RunNo: **947**							
Prep Date:	Analysis Date: **2/14/2012**	SeqNo: **27332**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID: **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R947**	RunNo: **947**							
Prep Date:	Analysis Date: **2/14/2012**	SeqNo: **27333**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	79	20	80.00	0	98.8	88.1	104			

Sample ID: **mb-2**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R947**	RunNo: **947**							
Prep Date:	Analysis Date: **2/14/2012**	SeqNo: **27357**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID: **lcs-2**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R947**	RunNo: **947**							
Prep Date:	Analysis Date: **2/14/2012**	SeqNo: **27358**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	99.5	88.1	104			

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1202350**

ıll Environmental Analysis Laboratory, Inc.

22-Mar-12

Client: Western Refining Southwest, Inc.
Project: RCRA Background Investigation

Sample ID: **MB-709**	SampType: **MBLK**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **709**	RunNo: **962**
Prep Date: **2/14/2012**	Analysis Date: **2/15/2012**	SeqNo: **27879** Units: **mg/L**

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

Sample ID: **LCS-709**	SampType: **LCS**	TestCode: **SM2540C MOD: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **709**	RunNo: **962**
Prep Date: **2/14/2012**	Analysis Date: **2/15/2012**	SeqNo: **27880** Units: **mg/L**

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

ılifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 8710
TEL: 505-345-3975 FAX: 505-345-410
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: Western Refining Southwest, Inc Bloomfield Work Order Number: 1202350

Received by/date: AG 2/10/12

Logged By: Lindsay Mangin 2/10/2012 9:30:00 AM

Completed By: Lindsay Mangin 2/10/2012 9:54:01 AM

Reviewed By: 2/10/12

Chain of Custody

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

Log In

4. Coolers are present? (see 19. for cooler specific information)	Yes ☑	No ☐	NA ☐
5. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
6. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
7. Sample(s) in proper container(s)?	Yes ☑	No ☐	
8. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
9. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
10. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
11. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
12. Were any sample containers received broken?	Yes ☐	No ☑	
13. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
14. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
15. Is it clear what analyses were requested?	Yes ☑	No ☐	
16. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 3 1 (<2 or >12 unless noted)

Adjusted? —

Checked by:

Special Handling (if applicable)

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

Person Notified: Date:

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

Regarding:

Client Instructions:

18. Additional remarks:

19. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	2.4	Good	Yes			

Chain-of-Custody Record

Client: Western Refining Southwest, Inc
Bloomfield, Refinery
Mailing Address: 50 Road 4990
Bloomfield, NM 87401
Phone #: 505-632-4166
email or Fax#: Kelly.Robinson@wnr.com
QA/QC Package:
☐ Standard ☒ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other _____
☒ EDD (Type) _____

Turn-Around Time:
☒ Standard ☐ Rush _____
Project Name:
Project #:
Background RCRA Investigation
Project Manager:
Kelly Robinson
Sampler: Kelly. R & Tracy A
On Ice: ☒ Yes ☐ No
Sample Temperature: 2.2

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		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)	Metals (See attachment)				Air Bubbles (Y or N)
2/7/12	753	Soil	BK-10 (5-6')	3 Jars	None	-1												X				
2/7/12	753	Soil	BK-10 (5-6') DUP	3 Jars	↓	-2												X				
2/7/12	1043	Soil	BK-10 (40-42')	3 Jars	None	-3												X				
2/8/12	1340	Water	BK-EB-020812	1 Poly	None	-4												X				
				2 Poly	HNO_3													X				
				1 Poly	H_2SO_4													X				
				1 poly	NaOH													X				

Date	Time	Relinquished by:	Received by:	Date	Time
2/9/12	1500	Kelly Robinson	To UPS		
				2/10/12	930

Remarks:
See attachment for analyte list

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.

METALS ANALYSES

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.3/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Thallium	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Includes ~~Soil~~ Soil Samples + GW Samples (both dissolved + total analysis)

GENERAL CHEMISTRY ANALYSES

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B (dissolved)
Chloride	EPA method 300.0 (dissolved & total)
Sulfate	EPA method 300.0 (dissolved & total)
Calcium	EPA method 6010/6020 (dissolved)
Magnesium	EPA method 6010/6020 (total)
Sodium	EPA method 6010/6020 (dissolved)
Potassium	EPA method 6010/6020 (dissolved)
Manganese	SW-846 method 6010/6020 (dissolved & total)
Nitrate/nitrite	EPA method 300.0 (dissolved)
Iron	SW-846 method 6010/6020 (dissolved & total)

For Groundwater Samples ONLY

SWMU No. 16 Constituent List

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Fluoride	SW-846 method 300

For Soil and Groundwater Samples (Dissolved and Totals)

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

June 26, 2012

Kelly Robinson
Western Refining Southwest, Inc.
#50 CR 4990
Bloomfield, NM 87413
TEL: (505) 632-4135
FAX (505) 632-3911

RE: Background Investigation OrderNo.: 1206661

Dear Kelly Robinson:

Hall Environmental Analysis Laboratory received 8 sample(s) on 6/15/2012 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

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

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** EB-061412
Project: Background Investigation **Collection Date:** 6/14/2012 9:30:00 AM
Lab ID: 1206661-001 **Matrix:** AQUEOUS **Received Date:** 6/15/2012 9:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	ND	0.10		mg/L	1	6/16/2012 12:09:54 AM
Chloride	ND	0.50		mg/L	1	6/16/2012 12:09:54 AM
Sulfate	ND	0.50		mg/L	1	6/16/2012 12:09:54 AM
Nitrate+Nitrite as N	ND	1.0		mg/L	5	6/19/2012 5:57:10 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**
Aluminum	ND	0.020		mg/L	1	6/20/2012 9:45:23 AM
Barium	ND	0.0020		mg/L	1	6/20/2012 9:45:23 AM
Beryllium	ND	0.0020		mg/L	1	6/20/2012 9:45:23 AM
Boron	ND	0.040		mg/L	1	6/20/2012 9:45:23 AM
Cadmium	ND	0.0020		mg/L	1	6/20/2012 9:45:23 AM
Calcium	ND	1.0		mg/L	1	6/21/2012 9:00:53 AM
Chromium	ND	0.0060		mg/L	1	6/20/2012 9:45:23 AM
Cobalt	ND	0.0060		mg/L	1	6/20/2012 9:45:23 AM
Copper	ND	0.0060		mg/L	1	6/20/2012 9:45:23 AM
Iron	ND	0.020		mg/L	1	6/21/2012 12:49:57 PM
Magnesium	ND	1.0		mg/L	1	6/21/2012 9:00:53 AM
Manganese	ND	0.0020		mg/L	1	6/20/2012 9:45:23 AM
Molybdenum	ND	0.0080		mg/L	1	6/21/2012 9:00:53 AM
Nickel	ND	0.010		mg/L	1	6/21/2012 9:00:53 AM
Potassium	ND	1.0		mg/L	1	6/21/2012 9:00:53 AM
Silver	ND	0.0050		mg/L	1	6/20/2012 9:45:23 AM
Sodium	ND	1.0		mg/L	1	6/21/2012 9:00:53 AM
Vanadium	ND	0.050		mg/L	1	6/20/2012 9:45:23 AM
Zinc	0.025	0.010		mg/L	1	6/20/2012 9:45:23 AM
EPA METHOD 200.7: TOTAL METALS						Analyst: **ELS**
Aluminum	ND	0.020		mg/L	1	6/20/2012 9:14:54 AM
Barium	ND	0.0020		mg/L	1	6/20/2012 9:14:54 AM
Beryllium	ND	0.0020		mg/L	1	6/20/2012 9:14:54 AM
Boron	ND	0.040		mg/L	1	6/20/2012 9:14:54 AM
Cadmium	ND	0.0020		mg/L	1	6/20/2012 9:14:54 AM
Chromium	ND	0.0060		mg/L	1	6/20/2012 9:14:54 AM
Cobalt	ND	0.0060		mg/L	1	6/20/2012 9:14:54 AM
Copper	ND	0.0060		mg/L	1	6/20/2012 9:14:54 AM
Iron	ND	0.020		mg/L	1	6/21/2012 12:11:03 PM
Magnesium	ND	1.0		mg/L	1	6/21/2012 12:11:03 PM
Manganese	ND	0.0020		mg/L	1	6/20/2012 9:14:54 AM
Molybdenum	ND	0.0080		mg/L	1	6/21/2012 2:07:06 PM
Nickel	ND	0.010		mg/L	1	6/21/2012 12:11:03 PM
Silver	ND	0.0050		mg/L	1	6/20/2012 9:14:54 AM
Vanadium	ND	0.050		mg/L	1	6/20/2012 9:14:54 AM
Zinc	0.010	0.010		mg/L	1	6/20/2012 9:14:54 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** EB-061412
Project: Background Investigation **Collection Date:** 6/14/2012 9:30:00 AM
Lab ID: 1206661-001 **Matrix:** AQUEOUS **Received Date:** 6/15/2012 9:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA 200.8: DISSOLVED METALS						Analyst: **SNV**
Antimony	ND	0.0010		mg/L	1	6/19/2012 4:49:26 PM
Arsenic	ND	0.0010		mg/L	1	6/19/2012 4:49:26 PM
Lead	ND	0.0010		mg/L	1	6/19/2012 4:49:26 PM
Selenium	ND	0.0010		mg/L	1	6/19/2012 4:49:26 PM
Thallium	ND	0.0010		mg/L	1	6/19/2012 4:49:26 PM
Uranium	ND	0.0010		mg/L	1	6/19/2012 4:49:26 PM
200.8 ICPMS METALS:TOTAL						Analyst: **SNV**
Antimony	ND	0.0025		mg/L	2.5	6/20/2012 4:59:16 PM
Arsenic	ND	0.0025		mg/L	2.5	6/20/2012 4:59:16 PM
Lead	ND	0.0025		mg/L	2.5	6/20/2012 4:59:16 PM
Selenium	ND	0.0025		mg/L	2.5	6/20/2012 4:59:16 PM
Thallium	ND	0.0025		mg/L	2.5	6/20/2012 4:59:16 PM
Uranium	ND	0.0025		mg/L	2.5	6/20/2012 4:59:16 PM
EPA METHOD 245.1: MERCURY						Analyst: **RAG**
Mercury	ND	0.00020		mg/L	1	6/19/2012 4:53:35 PM
SM2320B: ALKALINITY						Analyst: **DBD**
Bicarbonate (As CaCO3)	ND	20		mg/L CaCO3	1	6/18/2012 9:47:24 AM
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	6/18/2012 9:47:24 AM
Total Alkalinity (as CaCO3)	ND	20		mg/L CaCO3	1	6/18/2012 9:47:24 AM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	ND	20.0		mg/L	1	6/20/2012

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Client Sample ID: MW-BCK2
Project: Background Investigation
Collection Date: 6/14/2012 12:00:00 PM
Lab ID: 1206661-002 **Matrix:** AQUEOUS **Received Date:** 6/15/2012 9:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	ND	2.0		mg/L	20	6/16/2012 12:47:09 AM
Chloride	21	10		mg/L	20	6/16/2012 12:47:09 AM
Sulfate	7900	500		mg/L	1000	6/22/2012 5:37:20 AM
Nitrate+Nitrite as N	ND	2.0		mg/L	10	6/19/2012 6:09:34 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**
Aluminum	3.8	0.10	*	mg/L	5	6/21/2012 11:18:21 AM
Barium	0.035	0.0020		mg/L	1	6/21/2012 11:25:27 AM
Beryllium	ND	0.0020		mg/L	1	6/21/2012 11:25:27 AM
Boron	0.67	0.040		mg/L	1	6/21/2012 11:25:27 AM
Cadmium	ND	0.0020		mg/L	1	6/21/2012 11:25:27 AM
Calcium	390	5.0		mg/L	5	6/21/2012 11:18:21 AM
Chromium	ND	0.0060		mg/L	1	6/21/2012 11:25:27 AM
Cobalt	0.0068	0.0060		mg/L	1	6/21/2012 11:25:27 AM
Copper	ND	0.0060		mg/L	1	6/21/2012 11:25:27 AM
Iron	0.94	0.020	*	mg/L	1	6/21/2012 11:25:27 AM
Magnesium	47	1.0		mg/L	1	6/21/2012 11:25:27 AM
Manganese	1.1	0.010	*	mg/L	5	6/21/2012 11:18:21 AM
Molybdenum	0.024	0.0080		mg/L	1	6/21/2012 2:22:16 PM
Nickel	ND	0.010		mg/L	1	6/21/2012 11:25:27 AM
Potassium	18	1.0		mg/L	1	6/21/2012 11:25:27 AM
Silver	ND	0.0050		mg/L	1	6/21/2012 11:25:27 AM
Sodium	3700	50		mg/L	50	6/21/2012 10:55:20 AM
Vanadium	ND	0.050		mg/L	1	6/21/2012 11:25:27 AM
Zinc	0.030	0.010		mg/L	1	6/21/2012 11:25:27 AM
EPA METHOD 200.7: TOTAL METALS						Analyst: **ELS**
Aluminum	33	1.0	*	mg/L	50	6/21/2012 10:44:20 AM
Barium	0.12	0.0020		mg/L	1	6/20/2012 9:21:24 AM
Beryllium	0.0023	0.0020		mg/L	1	6/20/2012 9:21:24 AM
Boron	0.60	0.040		mg/L	1	6/20/2012 9:21:24 AM
Cadmium	ND	0.0020		mg/L	1	6/20/2012 9:21:24 AM
Chromium	0.025	0.0060		mg/L	1	6/20/2012 9:21:24 AM
Cobalt	0.019	0.0060		mg/L	1	6/20/2012 9:21:24 AM
Copper	0.010	0.0060		mg/L	1	6/20/2012 9:21:24 AM
Iron	29	1.0	*	mg/L	50	6/21/2012 10:44:20 AM
Magnesium	52	1.0		mg/L	1	6/21/2012 11:36:54 AM
Manganese	1.9	0.010	*	mg/L	5	6/20/2012 9:24:07 AM
Molybdenum	0.017	0.0080		mg/L	1	6/21/2012 2:09:03 PM
Nickel	0.015	0.010		mg/L	1	6/21/2012 11:36:54 AM
Silver	ND	0.0050		mg/L	1	6/20/2012 9:21:24 AM
Vanadium	ND	0.050		mg/L	1	6/20/2012 9:21:24 AM
Zinc	0.089	0.010		mg/L	1	6/20/2012 9:21:24 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Client Sample ID: MW-BCK2
Project: Background Investigation
Collection Date: 6/14/2012 12:00:00 PM
Lab ID: 1206661-002
Matrix: AQUEOUS
Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA 200.8: DISSOLVED METALS						Analyst: **SNV**
Antimony	ND	0.0050		mg/L	5	6/20/2012 2:18:17 PM
Arsenic	0.0027	0.0010		mg/L	1	6/19/2012 4:57:17 PM
Lead	ND	0.0050		mg/L	5	6/20/2012 2:18:17 PM
Selenium	0.0079	0.0010		mg/L	1	6/19/2012 4:57:17 PM
Thallium	ND	0.0050		mg/L	5	6/20/2012 2:18:17 PM
Uranium	ND	0.0050		mg/L	5	6/21/2012 11:39:03 AM
200.8 ICPMS METALS:TOTAL						Analyst: **SNV**
Antimony	ND	0.0025		mg/L	2.5	6/20/2012 5:03:12 PM
Arsenic	0.0047	0.0025		mg/L	2.5	6/20/2012 5:03:12 PM
Lead	0.025	0.0025	*	mg/L	2.5	6/20/2012 5:03:12 PM
Selenium	0.0041	0.0025		mg/L	2.5	6/20/2012 5:03:12 PM
Thallium	ND	0.0025		mg/L	2.5	6/20/2012 5:03:12 PM
Uranium	0.0040	0.0025		mg/L	2.5	6/20/2012 5:03:12 PM
EPA METHOD 245.1: MERCURY						Analyst: **RAG**
Mercury	ND	0.0010		mg/L	5	6/19/2012 5:02:36 PM
SM2320B: ALKALINITY						Analyst: **DBD**
Bicarbonate (As CaCO3)	110	20		mg/L CaCO3	1	6/18/2012 9:52:31 AM
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	6/18/2012 9:52:31 AM
Total Alkalinity (as CaCO3)	110	20		mg/L CaCO3	1	6/18/2012 9:52:31 AM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	12700	200		mg/L	1	6/20/2012

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Background Investigation
Lab ID: 1206661-003 **Matrix:** AQUEOUS

Client Sample ID: MW-BCK2 (DUP)
Collection Date: 6/14/2012 12:00:00 PM
Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	ND	2.0		mg/L	20	6/16/2012 1:11:58 AM
Chloride	20	10		mg/L	20	6/16/2012 1:11:58 AM
Sulfate	7800	500		mg/L	1000	6/22/2012 6:02:10 AM
Nitrate+Nitrite as N	ND	2.0		mg/L	10	6/19/2012 5:19:55 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**
Aluminum	ND	0.020		mg/L	1	6/21/2012 11:30:13 AM
Barium	0.020	0.0020		mg/L	1	6/21/2012 11:30:13 AM
Beryllium	ND	0.0020		mg/L	1	6/21/2012 11:30:13 AM
Boron	0.71	0.040		mg/L	1	6/21/2012 11:30:13 AM
Cadmium	ND	0.0020		mg/L	1	6/21/2012 11:30:13 AM
Calcium	380	5.0		mg/L	5	6/21/2012 11:21:51 AM
Chromium	ND	0.0060		mg/L	1	6/21/2012 11:30:13 AM
Cobalt	ND	0.0060		mg/L	1	6/21/2012 11:30:13 AM
Copper	ND	0.0060		mg/L	1	6/21/2012 11:30:13 AM
Iron	0.099	0.020		mg/L	1	6/21/2012 11:30:13 AM
Magnesium	46	1.0		mg/L	1	6/21/2012 11:30:13 AM
Manganese	1.1	0.010	*	mg/L	5	6/21/2012 11:21:51 AM
Molybdenum	0.015	0.0080		mg/L	1	6/21/2012 2:24:12 PM
Nickel	ND	0.010		mg/L	1	6/21/2012 11:30:13 AM
Potassium	16	1.0		mg/L	1	6/21/2012 11:30:13 AM
Silver	ND	0.0050		mg/L	1	6/21/2012 11:30:13 AM
Sodium	3700	50		mg/L	50	6/21/2012 10:58:36 AM
Vanadium	ND	0.050		mg/L	1	6/21/2012 11:30:13 AM
Zinc	0.023	0.010		mg/L	1	6/21/2012 11:30:13 AM
EPA METHOD 200.7: TOTAL METALS						Analyst: **ELS**
Aluminum	25	1.0	*	mg/L	50	6/21/2012 10:47:27 AM
Barium	0.13	0.0020		mg/L	1	6/20/2012 9:33:36 AM
Beryllium	ND	0.0020		mg/L	1	6/20/2012 9:33:36 AM
Boron	0.63	0.040		mg/L	1	6/20/2012 9:33:36 AM
Cadmium	ND	0.0020		mg/L	1	6/20/2012 9:33:36 AM
Chromium	0.017	0.0060		mg/L	1	6/20/2012 9:33:36 AM
Cobalt	0.013	0.0060		mg/L	1	6/20/2012 9:33:36 AM
Copper	0.011	0.0060		mg/L	1	6/20/2012 9:33:36 AM
Iron	21	1.0	*	mg/L	50	6/21/2012 10:47:27 AM
Magnesium	50	1.0		mg/L	1	6/21/2012 11:39:36 AM
Manganese	1.7	0.010	*	mg/L	5	6/20/2012 9:36:20 AM
Molybdenum	0.016	0.0080		mg/L	1	6/21/2012 2:10:57 PM
Nickel	ND	0.010		mg/L	1	6/21/2012 11:39:36 AM
Silver	ND	0.0050		mg/L	1	6/20/2012 9:33:36 AM
Vanadium	ND	0.050		mg/L	1	6/20/2012 9:33:36 AM
Zinc	0.066	0.010		mg/L	1	6/20/2012 9:33:36 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Background Investigation
Lab ID: 1206661-003 **Matrix:** AQUEOUS

Client Sample ID: MW-BCK2 (DUP)
Collection Date: 6/14/2012 12:00:00 PM
Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA 200.8: DISSOLVED METALS						Analyst: **SNV**
Antimony	ND	0.0050		mg/L	5	6/20/2012 2:30:09 PM
Arsenic	0.0032	0.0010		mg/L	1	6/19/2012 5:01:13 PM
Lead	ND	0.0050		mg/L	5	6/20/2012 2:30:09 PM
Selenium	0.011	0.0010		mg/L	1	6/19/2012 5:01:13 PM
Thallium	ND	0.0050		mg/L	5	6/20/2012 2:30:09 PM
Uranium	ND	0.0050		mg/L	5	6/21/2012 11:40:55 AM
200.8 ICPMS METALS:TOTAL						Analyst: **SNV**
Antimony	ND	0.0025		mg/L	2.5	6/20/2012 5:07:08 PM
Arsenic	0.0042	0.0025		mg/L	2.5	6/20/2012 5:07:08 PM
Lead	0.016	0.0025	*	mg/L	2.5	6/20/2012 5:07:08 PM
Selenium	0.0054	0.0025		mg/L	2.5	6/20/2012 5:07:08 PM
Thallium	ND	0.0025		mg/L	2.5	6/20/2012 5:07:08 PM
Uranium	0.0026	0.0025		mg/L	2.5	6/20/2012 5:07:08 PM
EPA METHOD 245.1: MERCURY						Analyst: **RAG**
Mercury	ND	0.0010		mg/L	5	6/19/2012 5:39:57 PM
SM2320B: ALKALINITY						Analyst: **DBD**
Bicarbonate (As CaCO3)	100	20		mg/L CaCO3	1	6/18/2012 10:02:45 AM
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	6/18/2012 10:02:45 AM
Total Alkalinity (as CaCO3)	100	20		mg/L CaCO3	1	6/18/2012 10:02:45 AM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	12500	200		mg/L	1	6/20/2012

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** MW-BCK1
Project: Background Investigation **Collection Date:** 6/14/2012 1:00:00 PM
Lab ID: 1206661-004 **Matrix:** AQUEOUS **Received Date:** 6/15/2012 9:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	0.25	0.10		mg/L	1	6/15/2012 2:32:41 PM
Chloride	35	10		mg/L	20	6/15/2012 2:43:54 PM
Sulfate	4100	50		mg/L	100	6/19/2012 3:28:13 PM
Nitrate+Nitrite as N	ND	1.0		mg/L	5	6/19/2012 5:32:20 PM
EPA METHOD 200.7: DISSOLVED METALS						Analyst: **ELS**
Aluminum	0.11	0.020		mg/L	1	6/21/2012 11:33:28 AM
Barium	0.022	0.0020		mg/L	1	6/21/2012 11:33:28 AM
Beryllium	ND	0.0020		mg/L	1	6/21/2012 11:33:28 AM
Boron	0.23	0.040		mg/L	1	6/21/2012 11:33:28 AM
Cadmium	ND	0.0020		mg/L	1	6/21/2012 11:33:28 AM
Calcium	420	10		mg/L	10	6/21/2012 11:01:50 AM
Chromium	ND	0.0060		mg/L	1	6/21/2012 11:33:28 AM
Cobalt	ND	0.0060		mg/L	1	6/21/2012 11:33:28 AM
Copper	ND	0.0060		mg/L	1	6/21/2012 11:33:28 AM
Iron	0.10	0.020		mg/L	1	6/21/2012 11:33:28 AM
Magnesium	64	1.0		mg/L	1	6/21/2012 11:33:28 AM
Manganese	0.39	0.0020	*	mg/L	1	6/21/2012 11:33:28 AM
Molybdenum	0.026	0.0080		mg/L	1	6/21/2012 2:26:06 PM
Nickel	ND	0.010		mg/L	1	6/21/2012 11:33:28 AM
Potassium	4.4	1.0		mg/L	1	6/21/2012 11:33:28 AM
Silver	ND	0.0050		mg/L	1	6/21/2012 11:33:28 AM
Sodium	950	10		mg/L	10	6/21/2012 11:01:50 AM
Vanadium	ND	0.050		mg/L	1	6/21/2012 11:33:28 AM
Zinc	0.012	0.010		mg/L	1	6/21/2012 11:33:28 AM
EPA METHOD 200.7: TOTAL METALS						Analyst: **ELS**
Aluminum	31	1.0	*	mg/L	50	6/21/2012 10:50:35 AM
Barium	0.28	0.0020		mg/L	1	6/20/2012 9:39:43 AM
Beryllium	0.0020	0.0020		mg/L	1	6/20/2012 9:39:43 AM
Boron	0.19	0.040		mg/L	1	6/20/2012 9:39:43 AM
Cadmium	ND	0.0020		mg/L	1	6/20/2012 9:39:43 AM
Chromium	0.032	0.0060		mg/L	1	6/20/2012 9:39:43 AM
Cobalt	0.029	0.0060		mg/L	1	6/20/2012 9:39:43 AM
Copper	0.050	0.0060		mg/L	1	6/20/2012 9:39:43 AM
Iron	41	1.0	*	mg/L	50	6/21/2012 10:50:35 AM
Magnesium	67	1.0		mg/L	1	6/21/2012 11:42:19 AM
Manganese	1.4	0.010	*	mg/L	5	6/20/2012 9:42:45 AM
Molybdenum	0.019	0.0080		mg/L	1	6/21/2012 2:12:51 PM
Nickel	0.032	0.010		mg/L	1	6/21/2012 11:42:19 AM
Silver	ND	0.0050		mg/L	1	6/20/2012 9:39:43 AM
Vanadium	ND	0.050		mg/L	1	6/20/2012 9:39:43 AM
Zinc	0.12	0.010		mg/L	1	6/20/2012 9:39:43 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc. **Client Sample ID:** MW-BCK1
Project: Background Investigation **Collection Date:** 6/14/2012 1:00:00 PM
Lab ID: 1206661-004 **Matrix:** AQUEOUS **Received Date:** 6/15/2012 9:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA 200.8: DISSOLVED METALS						Analyst: **SNV**
Antimony	ND	0.0010		mg/L	1	6/19/2012 5:05:09 PM
Arsenic	0.0014	0.0010		mg/L	1	6/19/2012 5:05:09 PM
Lead	ND	0.0010		mg/L	1	6/19/2012 5:05:09 PM
Selenium	0.0069	0.0010		mg/L	1	6/19/2012 5:05:09 PM
Thallium	ND	0.0010		mg/L	1	6/19/2012 5:05:09 PM
Uranium	0.012	0.0010		mg/L	1	6/19/2012 5:05:09 PM
200.8 ICPMS METALS:TOTAL						Analyst: **SNV**
Antimony	ND	0.0025		mg/L	2.5	6/20/2012 5:18:59 PM
Arsenic	0.0084	0.0025		mg/L	2.5	6/20/2012 5:18:59 PM
Lead	0.033	0.0025	*	mg/L	2.5	6/20/2012 5:18:59 PM
Selenium	0.0060	0.0025		mg/L	2.5	6/21/2012 3:03:07 PM
Thallium	ND	0.0025		mg/L	2.5	6/20/2012 5:18:59 PM
Uranium	0.014	0.0025		mg/L	2.5	6/20/2012 5:18:59 PM
EPA METHOD 245.1: MERCURY						Analyst: **RAG**
Mercury	ND	0.0010		mg/L	5	6/19/2012 5:06:08 PM
SM2320B: ALKALINITY						Analyst: **DBD**
Bicarbonate (As CaCO3)	150	20		mg/L CaCO3	1	6/18/2012 10:12:38 AM
Carbonate (As CaCO3)	ND	2.0		mg/L CaCO3	1	6/18/2012 10:12:38 AM
Total Alkalinity (as CaCO3)	150	20		mg/L CaCO3	1	6/18/2012 10:12:38 AM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	4470	100		mg/L	1	6/20/2012

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Background Investigation
Lab ID: 1206661-005 **Matrix:** AQUEOUS

Client Sample ID: EB-061412-Filtered
Collection Date: 6/14/2012 9:30:00 AM
Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	ND	0.10		mg/L	1	6/15/2012 2:55:08 PM
Chloride	ND	0.50		mg/L	1	6/15/2012 2:55:08 PM
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	6/15/2012 2:55:08 PM
Nitrogen, Nitrate (As N)	ND	0.10		mg/L	1	6/15/2012 2:55:08 PM
Sulfate	ND	0.50		mg/L	1	6/15/2012 2:55:08 PM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Background Investigation
Lab ID: 1206661-006 **Matrix:** AQUEOUS

Client Sample ID: MW-BCK2 Filtered
Collection Date: 6/14/2012 12:00:00 PM
Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	ND	2.0		mg/L	20	6/15/2012 3:51:18 PM
Chloride	23	10		mg/L	20	6/15/2012 3:51:18 PM
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	6/15/2012 3:40:04 PM
Nitrogen, Nitrate (As N)	ND	2.0		mg/L	20	6/15/2012 3:51:18 PM
Sulfate	8100	500		mg/L	1000	6/26/2012 1:39:53 PM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Project: Background Investigation
Lab ID: 1206661-007 **Matrix:** AQUEOUS

Client Sample ID: MW-BCK 2 (Dup) Filtered
Collection Date: 6/14/2012 12:00:00 PM
Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	ND	2.0		mg/L	20	6/15/2012 4:36:13 PM
Chloride	21	5.0		mg/L	10	6/20/2012 12:21:49 AM
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	6/15/2012 4:24:59 PM
Nitrogen, Nitrate (As N)	ND	2.0		mg/L	20	6/15/2012 4:36:13 PM
Sulfate	8600	500		mg/L	1000	6/26/2012 5:33:28 AM

Qualifiers:

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Western Refining Southwest, Inc.
Client Sample ID: MW-BCK1 Filtered
Project: Background Investigation
Collection Date: 6/14/2012 1:00:00 PM
Lab ID: 1206661-008
Matrix: AQUEOUS
Received Date: 6/15/2012 9:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **BRM**
Fluoride	0.24	0.10		mg/L	1	6/15/2012 4:47:27 PM
Chloride	34	5.0		mg/L	10	6/20/2012 12:46:40 AM
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	6/15/2012 4:47:27 PM
Nitrogen, Nitrate (As N)	0.15	0.10		mg/L	1	6/15/2012 4:47:27 PM
Sulfate	3200	50		mg/L	100	6/20/2012 12:59:04 AM

Qualifiers:

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

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120619027
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1206661
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120619027-001	**Sampling Date**	6/14/2012	**Date/Time Received**	6/19/2012 11:30 AM
Client Sample ID	1206661-001D / EB-061412	**Sampling Time**	9:30 AM		
Matrix	Water	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/L	0.01	6/20/2012	CRW	EPA 335.4	

Sample Number	120619027-002	**Sampling Date**	6/14/2012	**Date/Time Received**	6/19/2012 11:30 AM
Client Sample ID	1206661-002D / MW-BK2	**Sampling Time**	12:00 PM		
Matrix	Water	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/L	0.01	6/20/2012	CRW	EPA 335.4	

Sample Number	120619027-003	**Sampling Date**	6/14/2012	**Date/Time Received**	6/19/2012 11:30 AM
Client Sample ID	1206661-003D / MW-BK2 (DUP)	**Sampling Time**	12:00 PM		
Matrix	Water	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/L	0.01	6/20/2012	CRW	EPA 335.4	

Anatek Labs, Inc.

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

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120619027
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1206661
Attn:	ANDY FREEMAN		

Analytical Results Report

Sample Number	120619027-004	**Sampling Date**	6/14/2012	**Date/Time Received**	6/19/2012	11:30 AM	
Client Sample ID	1206661-004D / MW-BCK1	**Sampling Time**	1:00 PM				
Matrix	Water	**Sample Location**					
Comments							

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Cyanide	ND	mg/L	0.01	6/20/2012	CRW	EPA 335.4	

Authorized Signature

John Coddington, Lab Manager

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

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

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0096

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	120619027
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1206661
Attn:	ANDY FREEMAN		

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Cyanide	0.496	mg/L	0.5	99.2	90-110	6/20/2012	6/20/2012

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
120619027-001	Cyanide	ND	0.472	mg/L	0.5	94.4	80-120	6/20/2012	6/20/2012

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Cyanide	0.491	mg/L	0.5	98.2	3.9	0-25	6/20/2012	6/20/2012

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Cyanide	ND	mg/L	0.01	6/20/2012	6/20/2012

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

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0026; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

QC SUMMARY REPORT

WO#: **1206661**

ll Environmental Analysis Laboratory, Inc.

26-Jun-12

Client: Western Refining Southwest, Inc.
Project: Background Investigation

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R3580**	RunNo: **3580**
Prep Date:	Analysis Date: **6/21/2012**	SeqNo: **100997** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.0020								
Beryllium	ND	0.0020								
Cadmium	ND	0.0020								
Calcium	ND	1.0								
Chromium	ND	0.0060								
Magnesium	ND	1.0								
Manganese	ND	0.0020								
Molybdenum	ND	0.0080								
Nickel	ND	0.010								
Potassium	ND	1.0								
Silver	ND	0.0050								
Sodium	ND	1.0								
Vanadium	ND	0.050								
Zinc	ND	0.010								

alifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1206661**

26-Jun-12

Client: Western Refining Southwest, Inc.

Project: Background Investigation

Sample ID **MB-2437**	SampType: **MBLK**	TestCode: **EPA Method 200.7: Total Metals**
Client ID: **PBW**	Batch ID: **2437**	RunNo: **3558**
Prep Date: **6/18/2012**	Analysis Date: **6/20/2012**	SeqNo: **100447** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Aluminum	ND	0.020								
Barium	ND	0.0020								
Beryllium	ND	0.0020								
Boron	ND	0.040								
Cadmium	ND	0.0020								
Chromium	ND	0.0060								
Cobalt	ND	0.0060								
Copper	ND	0.0060								
Iron	ND	0.020								
Magnesium	ND	1.0								
Manganese	ND	0.0020								
Silver	ND	0.0050								
Vanadium	ND	0.050								
Zinc	ND	0.010								

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1206661**

ıll Environmental Analysis Laboratory, Inc.

26-Jun-12

Client: Western Refining Southwest, Inc.
Project: Background Investigation

Sample ID **1206661-001CMS**	SampType: **MS**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **EB-061412**	Batch ID: **R3538**	RunNo: **3538**
Prep Date:	Analysis Date: **6/19/2012**	SeqNo: **99655** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.026	0.0010	0.02500	0	103	70	130			
Arsenic	0.025	0.0010	0.02500	0	99.7	70	130			
Lead	0.025	0.0010	0.02500	0	102	70	130			
Selenium	0.024	0.0010	0.02500	0	97.8	70	130			
Thallium	0.026	0.0010	0.02500	0	102	70	130			
Uranium	0.023	0.0010	0.02500	0	93.3	70	130			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R3538**	RunNo: **3538**
Prep Date:	Analysis Date: **6/19/2012**	SeqNo: **99660** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	0.0010								
Arsenic	ND	0.0010								
Lead	ND	0.0010								
Selenium	ND	0.0010								
ʻlium	ND	0.0010								
ıum	ND	0.0010								

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R3579**	RunNo: **3579**
Prep Date:	Analysis Date: **6/20/2012**	SeqNo: **100985** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	0.0010								
Lead	ND	0.0010								
Thallium	ND	0.0010								

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA 200.8: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R3592**	RunNo: **3592**
Prep Date:	Analysis Date: **6/21/2012**	SeqNo: **101453** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Uranium	ND	0.0010								

ɑlifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1206661**

26-Jun-12

Client: Western Refining Southwest, Inc.

Project: Background Investigation

Sample ID **MB-2437**	SampType: **MBLK**	TestCode: **200.8 ICPMS Metals:Total**
Client ID: **PBW**	Batch ID: **2437**	RunNo: **3586**
Prep Date: **6/18/2012**	Analysis Date: **6/20/2012**	SeqNo: **101232** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	ND	0.0025								
Arsenic	ND	0.0025								
Lead	ND	0.0025								
Selenium	ND	0.0025								
Thallium	ND	0.0025								
Uranium	ND	0.0025								

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1206661**

ıll Environmental Analysis Laboratory, Inc.

26-Jun-12

Client: Western Refining Southwest, Inc.
Project: Background Investigation

Sample ID	MB-2463	SampType:	MBLK	TestCode:	EPA Method 245.1: Mercury					
Client ID:	PBW	Batch ID:	2463	RunNo:	3543					
Prep Date:	6/19/2012	Analysis Date:	6/19/2012	SeqNo:	99864	Units:	mg/L			

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

Sample ID	1206661-001BMS	SampType:	MS	TestCode:	EPA Method 245.1: Mercury					
Client ID:	EB-061412	Batch ID:	2463	RunNo:	3543					
Prep Date:	6/19/2012	Analysis Date:	6/19/2012	SeqNo:	99867	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0058	0.00020	0.005000	0	116	75	125			

Sample ID	1206661-001BMSD	SampType:	MSD	TestCode:	EPA Method 245.1: Mercury					
Client ID:	EB-061412	Batch ID:	2463	RunNo:	3543					
Prep Date:	6/19/2012	Analysis Date:	6/19/2012	SeqNo:	99868	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0055	0.00020	0.005000	0	109	75	125	5.73	20	

alifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1206661**

26-Jun-12

Client: Western Refining Southwest, Inc.

Project: Background Investigation

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R3480**	RunNo: **3480**
Prep Date:	Analysis Date: **6/15/2012**	SeqNo: **97695** 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								
Sulfate	ND	0.50								

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R3489**	RunNo: **3489**
Prep Date:	Analysis Date: **6/15/2012**	SeqNo: **98017** 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								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **1206661-005AMS**	SampType: **MS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **EB-061412-Filtered**	Batch ID: **R3489**	RunNo: **3489**
Prep Date:	Analysis Date: **6/15/2012**	SeqNo: **98022** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.62	0.10	0.5000	0	125	76.6	110			S
Chloride	6.0	0.50	5.000	0.1042	118	87.8	111			S
Nitrogen, Nitrite (As N)	1.2	0.10	1.000	0	118	72.5	111			S
Nitrogen, Nitrate (As N)	3.1	0.10	2.500	0	124	90.4	113			S
Sulfate	12	0.50	10.00	0.1853	119	84.6	122			

Sample ID **1206661-005AMSD**	SampType: **MSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **EB-061412-Filtered**	Batch ID: **R3489**	RunNo: **3489**
Prep Date:	Analysis Date: **6/15/2012**	SeqNo: **98023** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	0.54	0.10	0.5000	0	107	76.6	110	15.1	20	
Chloride	5.0	0.50	5.000	0.1042	97.2	87.8	111	18.7	20	
Nitrogen, Nitrite (As N)	1.0	0.10	1.000	0	99.6	72.5	111	17.0	20	
Nitrogen, Nitrate (As N)	2.6	0.10	2.500	0	103	90.4	113	18.7	20	
Sulfate	10	0.50	10.00	0.1853	99.4	84.6	122	18.0	20	

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R3489**	RunNo: **3489**
Prep Date:	Analysis Date: **6/16/2012**	SeqNo: **98080** Units: **mg/L**

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

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1206661**

ll Environmental Analysis Laboratory, Inc.

26-Jun-12

Client: Western Refining Southwest, Inc.
Project: Background Investigation

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBW**	Batch ID: **R3489**	RunNo: **3489**							
Prep Date:	Analysis Date: **6/16/2012**	SeqNo: **98080**	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								
Nitrogen, Nitrate (As N)	ND	0.10								

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBW**	Batch ID: **R3540**	RunNo: **3540**							
Prep Date:	Analysis Date: **6/19/2012**	SeqNo: **99670**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sulfate	ND	0.50								
Nitrate+Nitrite as N	ND	0.20								

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBW**	Batch ID: **R3540**	RunNo: **3540**							
ep Date:	Analysis Date: **6/20/2012**	SeqNo: **99759**	Units: **mg/L**						
nalyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Sulfate	ND	0.50								
Nitrate+Nitrite as N	ND	0.20								

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBW**	Batch ID: **R3610**	RunNo: **3610**							
Prep Date:	Analysis Date: **6/21/2012**	SeqNo: **101849**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBW**	Batch ID: **R3610**	RunNo: **3610**							
Prep Date:	Analysis Date: **6/22/2012**	SeqNo: **101925**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	ND	0.50								

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBW**	Batch ID: **R3674**	RunNo: **3674**							
Prep Date:	Analysis Date: **6/25/2012**	SeqNo: **103580**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

alifiers:

`	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
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1206661**

26-Jun-12

Client: Western Refining Southwest, Inc.

Project: Background Investigation

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R3674**	RunNo: **3674**
Prep Date:	Analysis Date: **6/25/2012**	SeqNo: **103580** Units: **mg/L**

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

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R3687**	RunNo: **3687**
Prep Date:	Analysis Date: **6/26/2012**	SeqNo: **104078** Units: **mg/L**

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

Qualifiers:

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

QC SUMMARY REPORT

WO#: **1206661**

ıll Environmental Analysis Laboratory, Inc.

26-Jun-12

Client: Western Refining Southwest, Inc.
Project: Background Investigation

Sample ID **mb-1**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R3500**	RunNo: **3500**							
Prep Date:	Analysis Date: **6/18/2012**	SeqNo: **98353**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **1206661-004A ms**	SampType: **MS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **MW-BCK1**	Batch ID: **R3500**	RunNo: **3500**							
Prep Date:	Analysis Date: **6/18/2012**	SeqNo: **98363**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	210	20	80.00	149.8	79.7	62.6	110			

Sample ID **1206661-004A msd**	SampType: **MSD**	TestCode: **SM2320B: Alkalinity**							
Client ID: **MW-BCK1**	Batch ID: **R3500**	RunNo: **3500**							
Prep Date:	Analysis Date: **6/18/2012**	SeqNo: **98364**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	210	20	80.00	149.8	70.2	59.9	111	3.64	10	

·alifiers:

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1206661**

26-Jun-12

Client: Western Refining Southwest, Inc.

Project: Background Investigation

Sample ID **MB-2466**	SampType: **MBLK**			TestCode: **SM2540C MOD: Total Dissolved Solids**						
Client ID: **PBW**	Batch ID: **2466**			RunNo: **3568**						
Prep Date: **6/19/2012**	Analysis Date: **6/20/2012**			SeqNo: **100603**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: Western Refining Southwest, Inc Bloomfield Work Order Number: 1206661

Received by/date: LM 06/15/12

Logged By: Michelle Garcia 6/15/2012 9:50:00 AM Michelle Garcia

Completed By: Michelle Garcia 6/15/2012 10:17:28 AM Michelle Garcia

Reviewed By: 06/15/12

Chain of Custody

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

Log In

4. Coolers are present? (see 19. for cooler specific information) Yes ☑ No ☐ NA ☐
5. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
6. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
7. Sample(s) in proper container(s)? Yes ☑ No ☐
8. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
9. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
10. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
11. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
12. Were any sample containers received broken? Yes ☐ No ☑
13. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
14. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
15. Is it clear what analyses were requested? Yes ☑ No ☐
16. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

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

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

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

Person Notified: _____ Date: _____

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

Regarding: _____

Client Instructions: _____

18. Additional remarks:

19. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	4.9	Good	Yes			

Chain-of-Custody Record

Client: Western Refining Bloomfield Refinery
Mailing Address: 50 Road 4990 Bloomfield NM 87413
Phone #: 505-801-5616
email or Fax#: Kelly.Robinson@wnr.com
QA/QC Package: ☐ Standard ☒ Level 4 (Full Validation)
Accreditation: ☐ NELAP ☐ Other
☒ EDD (Type) EXCEL

Turn-Around Time: ☐ Standard ☒ Rush ASAP
Project Name: Background Investigation
Project #:
Project Manager: Kelly Robinson
Sampler: Kelly Robinson
On Ice: ☒ Yes ☐ No
Sample Temperature: 4°

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	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)	Total Metals (See Note)	Dissolved Metals (See Note)	General Chemistry		Air Bubbles (Y or N)
6/14/12	930	GW	EB-061412	2 poly	None	-001														X		
				1 poly	HNO_3													X				
				1 Poly	NaOH													X				
				1 Poly Filtered	HNO_3														X			
				1 Poly	H_2SO_4													X				
↓	↓	↓	" Filtered	1 poly filtered	None	-005													X			
	1200		MW-BCK2	2 Poly	None	-002														X		
				1 Poly	HNO_3													X				
				1 Poly	NaOH													X				
				1 Poly Filtered	HNO_3														X			
				1 Poly	H_2SO_4													X				
↓	↓	↓	" Filtered	1 Poly filtered	None	-006													X			

Date:	Time:	Relinquished by:	Received by:	Date	Time
6/14/12	1500	Kelly Robinson			
Date:	Time:	Relinquished by:	Received by:	Date	Time
				6/15/12	0930

Remarks: See Attached for analyte list.

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.

Chain-of-Custody Record

Client: Western Refining Bloomfield Refinery
Mailing Address: 50 Road 4990 Bloomfield, NM 87413
Phone #: 505-801-5616
email or Fax#: Kelly.Robinson@wnr.com
QA/QC Package: ☐ Standard ☒ Level 4 (Full Validation)
Accreditation: ☐ NELAP ☐ Other
☒ EDD (Type) EXCEL

Turn-Around Time: ☐ Standard ☒ Rush
Project Name: Background Investigation
Project #:
Project Manager: Kelly Robinson
Sampler: Kelly Robinson
On Ice: ☒ Yes ☐ No
Sample Temperature: N/A

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

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F,Cl,NO3,NO2,PO4,SO4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Total Metals *	Dissolved Metals *	General Chemistry *		Air Bubbles (Y or N)
6/14/12	1200	GW	MW-BCK2 (DUP)	2 Poly	None	-003												X		X		
				1 poly	HNO_3													X				
				1 poly	NaOH													X				
				1 poly filtered	HNO_3														X			
				1 Poly	H_2SO_4													X				
	↓		" filtered	1 poly filtered	None	-007													X			
	1300		MW-BCK1	2 Poly	None	-004												X		X		
				1 poly	HNO_3													X				
				1 poly	NaOH													X				
				1 poly filtered	HNO_3														X			
				1 poly	H_2SO_4													X				
↓	↓	↓	" filtered	1 poly filtered	None	-008													X			

Date:	Time:	Relinquished by:	Received by:	Date	Time
6/14/12	1300	Kelly Robinson			
Date:	Time:	Relinquished by:	Received by:	Date	Time
				6/15/12	0730

Remarks:
* See attachment for full analyte list.

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.

4.7 Documentation of Field Activities

Daily field activities, including observations and field procedures, will be recorded in a field log book. The original field forms will be maintained at the Facility. Copies of the completed forms will be maintained in a bound and sequentially numbered field file for reference during field activities. Indelible ink will be used to record all field activities. Photographic documentation of field activities will be performed, as appropriate. The daily record of field activities will include the following:

1. Site or unit designation;
2. Date;
3. Time of arrival and departure;
4. Field investigation team members including subcontractors and visitors;
5. Weather conditions;
6. Daily activities and times conducted;
7. Observations;
8. Record of samples collected with sample designations and locations specified;
9. Photographic log, as appropriate;
10. Field monitoring data, including health and safety monitoring;
11. Equipment used and calibration records, if appropriate;
12. List of additional data sheets and maps completed;
13. An inventory of the waste generated and the method of storage or disposal; and
14. Signature of personnel completing the field record.

4.8 Chemical Analyses

All samples collected for laboratory analysis will be submitted to an accredited laboratory. The laboratory will use the most recent standard EPA and industry-accepted analytical methods for target analytes as the testing methods for each medium sampled. Chemical analyses will be performed in accordance with the most recent EPA standard analytical methodologies and extraction methods.

Ground water and soil samples will also be analyzed for the following metals using the indicated analytical methods. The ground water analyses will be reported for dissolved and total metals.

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020

dissolved + total

Analyte	Analytical Method
Cyanide	SW-846 method 335.4/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Thallium	SW846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

Soil & GW ~~Soil~~ Dissolved & totals

Ground water samples will also be analyzed for the following additional general chemistry parameters.

Analyte	Analytical Method
Total Dissolved Solids	SM-2540C
Bicarbonate	SM-2320B (dissolved)
Chloride	EPA method 300.0 (dissolved & total)
Sulfate	EPA method 300.0 (dissolved & total)
Calcium	EPA method 6010/6020 (dissolved)
Magnesium	EPA method 6010/6020 (dissolved & total)
Sodium	EPA method 6010/6020 (dissolved)
Potassium	EPA method 6010/6020 (dissolved)
Manganese	SW-846 method 6010/6020 (dissolved & total)
Nitrate/nitrite	EPA method 300.0 (dissolved)
Iron	SW-846 method 6010/6020 (dissolved & total)

GW only

Soil samples and ground water samples will be analyzed for the following constituents in addition to those listed above to support possible development of background for SWMU No. 16 (Active Landfill). The ground water analyses will be reported as both total and dissolved phase.

Analyte	Analytical Method
Aluminum	SW-846 method 6010/6020
Boron	SW-846 method 6010/6020
Copper	SW-846 method 6010/6020
Molybdenum	SW-846 method 6010/6020
Uranium	SW-846 method 6020
Fluoride	SW-846 method 300

Soil & gw

Appendix F

Quality Assurance/Quality Control Review

1.0 DATA VALIDATION INTRODUCTION

This summary presents data verification results for soil and groundwater samples collected from soil borings and monitoring wells installed at the Bloomfield Refinery in accordance with the approved Background Investigation Work Plan. The data review was performed in accordance with the procedures specified in the Order issued by NMED (NMED, 2007), USEPA Functional Guidelines for Organic and Inorganic Data Review, and quality assurance and control parameters set by the project laboratory Hall Environmental Analysis Laboratory, Inc.

A total of 21 soil samples and 2 groundwater samples were collected between January 2012 and June 2012 in accordance with the Background Investigation Work Plan. Soil and groundwater samples were submitted to Hall Environmental Analysis Laboratory for the following parameters in accordance with the approved Work Plan:

- Gasoline, diesel, and motor oil range organics by SW-846 Method 8015B (selected samples);
- Total recoverable metals (aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, thallium, uranium, vanadium, and zinc) by SW846 Method 6010B;
- Cyanide by EPA Method 335.4;
- Mercury by EPA Method 7471; and
- Anions (chloride, fluoride, and sulfate) by USEPA Method 300.0

In addition as stated in the approved Work Plan, ground water samples submitted to Hall Environmental Analysis Laboratory were analyzed for the following additional analytes:

- Anions (nitrate and nitrite) by USEPA Method 300.0;
- Alkalinity (total alkalinity, carbonate, and bicarbonate) by SM-2320B;
- Total metals (calcium, magnesium) by USEPA Method 6010B;
- Dissolved metals (aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, manganese, magnesium, molybdenum, nickel, potassium, selenium, silver, sodium, thallium, uranium, vanadium, and zinc) by USEPA Method 200.7B; and
- Total dissolved solids by SM-2540C.

Additionally, 6 quality assurance samples consisting of trip blanks, equipment rinsate blanks, and field duplicates were collected and analyzed as part of the investigation activities. Table A-1 presents a summary of the sample identifications, laboratory sample identifications, and requested analytical parameters.

2.0 QUALITY CONTROL PARAMETERS REVIEWED

Sample results were subject to a Level II data review that includes an evaluation of the following quality control (QC) parameters:

- Chain-of-Custody;
- Sample Preservation and Temperature Upon Laboratory Receipt
- Holding Times;
- Blank Contamination (method blanks, trip blanks, field blanks, and equipment rinsate blanks);
- Surrogate Recovery (for organic parameters);
- Laboratory Control Sample (LCS) Recovery and Relative Percent Difference (RPD);
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recovery and RPD;
- Duplicates (field duplicate, laboratory duplicate); and
- Other Applicable QC Parameters.

The data qualifiers used to qualify the analytical results associated with QC parameters outside of the established data quality objectives are defined below:

J+	The analyte was positively identified; however, the result should be considered an estimated value with a potential high bias.
J-	The analyte was positively identified; however, the result should be considered an estimated value with a potential low bias.
UJ	The reporting limit is considered an estimated value.
R	Quality control indicates that the data is not usable.

Results qualified as "J+", "J-", or "UJ" are of acceptable data quality and may be used quantitatively to fulfill the objectives of the analytical program, per EPA guidelines. In order to perform a statistical evaluation of the data collected as part of the background investigation activities, analytical results for analytes that were detected at concentrations above the respective laboratory detection limit but below the practical quanitation limit were qualified with a "J," as shown on Table 3 of this Investigation Report.

In addition, field sample BK-3 (1.5-2.0') analytical result for sulfate was qualified "J" since the reported concentration was above the analytical quanitation range.

Results for the performance monitoring events that required qualification based on the data verification are summarized in Table A-2.

2.1 CHAIN-OF-CUSTODY

The chain-of-custody documentation associated with project samples was found to be complete. Chain-of-custodies included sample identifications, date and time of collection, requested parameters, and relinquished/received signatures.

2.2 SAMPLE PRESERVATION AND TEMPERATURE UPON LABORATORY RECEIPT

Samples collected were received preserved and intact by Hall Environmental Laboratories, Inc. Samples were received by the laboratory at a temperature of 6.0 degrees Celsius or lower. Data qualification on lower temperature samples was not required.

2.3 HOLDING TIMES

All samples were extracted and analyzed within method-specified holding time limits.

2.4 BLANK CONTAMINATION

2.4.1 Method Blank

Method blanks were analyzed at the appropriate frequency. Target compounds were not detected above the practical quanitation limit in the method blanks, with the exception of the following:

- Sulfate was detected in the method blank for analytical batch 502. Associated field sample results did not include sufate as a reported analyte, therefore data qualification was not needed.
- Aluminum, copper, nickel, and selenium were detected in the method blank for analytical batch 514 and 529. Associated field samples have detected concentrations greater than 10 times the respective concentrations detected in the method blank; therefore data qualification was not needed.
- Dissolved iron was detected in the method blank for analytical batch R921. Associated field sample results were non-detect; therefore data qualification was not needed.
- Beryllium, cobalt, iron, molybdenum, vanadium, and zinc were detected in method blank for analytical batch 551. Associated field sample detected

concentrations were greater than 100 times the respective concentrations detected in the method blank; therefore data qualification was not needed.

- Mercury was detected in the method blank for analytical batch 602. Associated field sample results were non-detect; therefore data qualification was not needed.
- Boron was detected in the method blank for analytical batch 529. Associated field samples have detected concentrations greater than 10 times the respective concentration detected in the method blank; therefore data qualification was not needed.
- Aluminum, boron, cadmium, molybdenum, nickel, selenium, silver, and vanadium were detected in the method blank for analytical batch 749. Associated detected field sample results have concentrations greater than 10 times the respective concentration detected in the method blank; therefore data qualification was not needed.
- Cadmium, chromium, copper, magnesium, molybdenum, uranium, and zinc were detected in the method blank for analytical batch 685. Associated field sample results have detected concentrations greater than 10 times the respective concentration detected in the method blank; therefore data qualification was not needed.
- Aluminum, antimony, boron, cadmium, chromium, copper, nickel, selenium, uranium, and zinc were detected in the method blank for analytical batch 677. Associated field sample results have detected concentrations greater than 10 times the respective concentration detected in the method blank; therefore data qualification was not needed.

2.4.2 Trip Blank

Trip blanks were analyzed at the appropriate frequency as specified in the Order. Target compounds were not detected in the trip blanks.

2.4.3 Field Blanks/Equipment Rinsate Blank

Field and equipment rinsate blanks were collected at the appropriate frequency as specified in the Background Investigation Work Plan. Target compounds were not detected in the field blanks and equipment rinsate blank, with the exception of the following:

- Zinc was detected in equipment blank EB-061412 at 0.025 mg/L and 0.010 mg/L. Associated field samples were qualified "J+" due to a potential high bias.

2.4.4 Common Laboratory Contaminants

Per USEPA guidelines, common laboratory contaminants for VOC analysis are acetone,

2-butanone (MEK), cyclohexane, chloromethane, and methylene chloride. Common laboratory contaminants for SVOC analysis include phthalates. Concentrations were not detected in method blanks, and therefore no field data was qualified due to common laboratory impacts.

2.5 SURROGATE RECOVERY

Surrogate recoveries for the organic and inorganic analyses were performed at the required frequency and were within laboratory acceptance limits.

2.6 LCS RECOVERY AND RELATIVE PERCENT DIFFERENCE

LCS/LCS duplicates were performed at the required frequency and were evaluated based on the following criteria:

- If the analyte recovery was above acceptance limits for the LCS or LCS duplicate, but the analyte was not detected in the associated batch, then data qualification was not required.
- If the analyte recovery was above acceptance limits for the LCS or LCS duplicate and the analyte was detected in the associated batch, then the analyte results were qualified "J+" to account for a potential high bias.
- If the analyte recovery was below acceptance limits for LCS or LCS duplicate then the analyte results in the associated analytical batch were qualified ("UJ" for non-detects and "J-" for detected results) to acount for a potential low bias.

LCS/LCSD percent recoveries and relative percent differences (RPDs) were within acceptance limits; therefore no data qualification due to LCS/LCSD was required.

2.7 MS/MSD RECOVERY AND RELATIVE PERCENT DIFFERENCE

MS/MSD samples were performed at the required frequency and were evaluated by the following criteria:

- If the MS or MSD recovery for an analyte was above acceptance limits but the analyte was not detected in the associated analytical batch, then data qualification was not required.
- If the MS or MSD recovery for an analyte was above acceptance limits and the analyte was detected in the associated analytical batch, then analyte results were qualified "J+" to account for a potential high bias.

- Low MS/MSD recoveries for inorganic parameters result in sample qualification of the associated analytical batch.
- Results were not qualified based on non-project specific MS/MSD (i.e., batch QC) recoveries.

MS/MSD percent recoveries and RPDs were within acceptance limits except for the following:

- The MS/MSD percent recoveries for Antimony (43.8% / 41.0%) were below the lower acceptance limit of 75% for analytical batch 514. Associated field sample results for Antimony were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS/MSD percent recoveries for Thallium (40.7% / 42.5%) were below the lower acceptance limit of 75% for analytical batch 514. Associated field sample results for Thallium were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS duplicate percent recoveries for Lead (73.8%), Nickel (74.3%), Selenium (74.1%), and Zinc (73.7%) were below the lower acceptance limit of 75% for analytical batch 514. The MS recoveries for these analytes were within acceptance limits, therefore data qualification was not necessary.
- The MS/MSD percent recoveries for Antimony (32.1% / 29.6%) were below the lower acceptance limit of 75% for analytical batch 529. Associated field sample results for Antimony were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS/MSD percent recoveries for Selenium (67.7% / 67.3%) were below the lower acceptance limit of 75% for analytical batch 514. Associated field sample results for Selenium were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS/MSD percent recoveries for Thallium (0% / 0%) were below the lower acceptance limit of 75% for analytical batch 514. Associated field sample results for Thallium were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS duplicate percent recoveries for Lead (74.6%), Molybdenum (72.4%), and Nickel (71.7%) were below the lower acceptance limit of 75% for analytical batch 529. The MS recoveries for these analytes were within acceptance limits, therefore data qualification was not required.
- The MS/MSD percent recoveries for Antimony (41.4% / 33.9%) were below the lower acceptance limit of 75% for analytical batch 749. Associated field sample results for Antimony were non-detect. Data qualification "J-" was required to indicate a potential bias for the associated samples.
- The MS/MSD percent recoveries for Copper (71.0% / 60.8%) were below the lower acceptance limit of 75% for analytical batch 749. Associated field sample

results for Selenium were non-detect. Data qualification "J-" was required to indicate a potential bias for the associated samples.

- The MS/MSD percent recoveries for Selenium (72.1% / 73.6%) were below the lower acceptance limit of 75% for analytical batch 749. Associated field sample results for Selenium were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS/MSD percent recoveries for Thallium (0% / 0%) were below the lower acceptance limit of 75% for analytical batch 749. Associated field sample results for Thallium were non-detect. Data qualification "UJ" was required to indicate a potential bias for the associated samples.
- The MS duplicate percent recovery for Zinc (72.9%) was below the lower acceptance limit of 75% for analytical batch 749. The MS recovery for this analyte was within acceptance limit, therefore data qualification was not required.
- The MS percent recoveries for Fluoride (125%), Chloride 118%), Nitrite (118%) and Nitrate (124%) were above the upper acceptance limit of 110%, 111%, 111%, and 113%, respectively, for analytical batch R3489. The MS duplicate recoveries for these analytes were within acceptance limits; therefore data qualification was not required.

2.8 DUPLICATES

2.8.1 Field Duplicates

Field duplicates were collected at a rate required per the approved Background Investigation Work Plan. The RPDs between the field duplicate and its associated sample were calculated and are presented in Table A-3. The field duplicates were evaluated by the following criteria:

- If an analyte was detected at a concentration greater than five times the method reporting limit, the RPD should be less than 35 percent for soil and 25 percent for ground water samples.
- If an analyte was detected at a concentration that is less than five times the method reporting limit, then the difference between the sample and the field duplicate should not exceed the method reporting limit.
- Duplicate RPDs are calculated by dividing the difference of the concentrations by the average of the concentrations.

Field duplicate RPDs were within acceptance limits except for the following:

- Lead for field sample BK-10 (5-6')
- Aluminum, chromium, iron, lead, zinc, barium, iron, molybdenum, selenium, and zinc for MW-BCK2

3.0 COMPLETENESS SUMMARY

Two types of completeness were calculated for this project: contract and technical. The following equations were used to calculate the two types of completeness:

$$\%\ \text{Contract Completeness} = \left(\frac{\text{Number of contract compliant results}}{\text{Number of reported results}}\right) \times 100$$

$$\%\ \text{Technical Completeness} = \left(\frac{\text{Number of usable results}}{\text{Number of reported results}}\right) \times 100$$

The overall contract completeness, which includes the evaluation of protocol and contract deviations, which includes the evaluation of the QC parameters listed in Section 2.0, was approximately 97.5 percent for soil analysis and 97 percent for groundwater analysis. The technical completeness attained for Background Investigation activities was 100 percent. The completeness results are provided in Table A-4. The analytical results for the required analytes per the approved Background Investigation Work Plan were considered usable for the intended purposes and the project DQOs have been met.

TABLE A-1
Sampling and Analysis Schedule

Table A-1
Sampling and Analysis Schedule
Background Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

Sample ID	Lab ID	Date Collected	Sample Type
BK-9 (5-5.5')	1201809-001	1/24/2012	N
BK-9 (54-56')	1201809-002	1/24/2012	N
MeOH Blank	1201809-003		TB
BK-1 (0-0.5')	1201885-001	1/27/2012	N
BK-1 (1.5-2.0')	1201885-002	1/27/2012	N
BK-2 (0-0.5')	1201885-003	1/27/2012	N
BK-2 (1.5-2.0')	1201885-004	1/27/2012	N
BK-3 (0-0.5')	1201885-005	1/27/2012	N
BK-3 (1.5-2.0')	1201885-006	1/27/2012	N
BK-4 (0-0.5')	1201885-007	1/27/2012	N
BK-4 (1.5-2.0')	1201885-008	1/27/2012	N
BK-5 (0-0.5')	1201885-009	1/27/2012	N
BK-5 (1.5-2.0')	1201885-010	1/27/2012	N
BK-6 (0-0.5')	1201885-011	1/27/2012	N
BK-6 (1.5-2.0')	1201885-012	1/27/2012	N
BK-7 (0-0.5')	1201885-013	1/27/2012	N
BK-7 (1.5-2.0')	1201885-014	1/27/2012	N
BK-8 (0-0.5')	1201885-015	1/27/2012	N
BK-8 (1.5-2.0')	1201885-016	1/27/2012	N
BK-7 (0-0.5') DUP	1201885-017	1/27/2012	FD
BK-EB-012712	1201885-018	1/27/2012	N
BK-9 (73-73.5)	1202153-001	2/1/2012	N
BK-10 (5-6')	1202350-001	2/7/2012	N
BK-10 (5-6') DUP	1202350-002	2/7/2012	FD
BK-10 (40-42')	1202350-003	2/7/2012	N
BK-EB-020812	1202350-004	2/8/2012	N
EB-061412	1206661-001	6/14/2012	N
MW-BCK2	1206661-002	6/14/2012	N
MW-BCK2 (DUP)	1206661-003	6/14/2012	FD
MW-BCK1	1206661-004	6/14/2012	N

Notes:

VOCs = Volatile Organic Compounds
N = Normal field sample
FD = Field duplicate
TB = Trip Blank
EB = Equipment Blank
MB = Methanol Blank

TABLE A-2
Qualified Data

Table A-2
Qualified Data
Background Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

Sample ID	Date Collected	Analyte	Result	Units	Matrix	Qualifier	Comments
BK-9 (5-5.5')	1/24/2012	Antimony	< 2.5	mg/Kg	Soil	UJ	Qaulified due to low MS/ MSD recovery.
BK-1 (1.5-2.0')	1/27/2012	Antimony	< 5.0	mg/Kg	Soil	UJ	Qaulified due to low MS/ MSD recovery.
BK-9 (73-73.5)	2/1/2012	Antimony	2.1	mg/Kg	Soil	J-	Qaulified due to low MS/ MSD recovery.
BK-9 (73-73.5)	2/1/2012	Copper	19	mg/Kg	Soil	J-	Qaulified due to low MS/ MSD recovery.
BK-1 (1.5-2.0')	1/27/2012	Selenium	< 5.0	mg/Kg	Soil	UJ	Qaulified due to low MS/ MSD recovery.
BK-9 (73-73.5)	2/1/2012	Selenium	< 2.5	mg/Kg	Soil	UJ	Qaulified due to low MS/ MSD recovery.
BK-3 (1.5-2.0')	1/27/2012	Sulfate	7,600	mg/kg	Soil	J	Qualified due to concentration above the quanitation limit.
BK-8 (1.5-2.0')	1/27/2012	Sulfate	10,000	mg/kg	Soil	J	Qualified due to concentration above the quanitation limit.
BK-9 (5-5.5')	1/24/2012	Thallium	< 2.5	mg/Kg	Soil	UJ	Qaulified due to low MS/ MSD recovery.
BK-1 (1.5-2.0')	1/27/2012	Thallium	< 5.0	mg/Kg	Soil	UJ	Qaulified due to low MS/ MSD recovery.
BK-9 (73-73.5)	2/1/2012	Thallium	< 2.5	mg/Kg	Soil	UJ	Qaulified due to low MS/ MSD recovery.
MW-BCK2	6/14/2012	Zinc	0.089	mg/L	Water	J+	Qualified due to associated equipment blank detections.
MW-BCK2	6/14/2012	Zinc	0.030	mg/L	Water	J+	Qualified due to associated equipment blank detections.
MW-BCK1	6/14/2012	Zinc	0.12	mg/L	Water	J+	Qualified due to associated equipment blank detections.
MW-BCK1	6/14/2012	Zinc	0.012	mg/L	Water	J+	Qualified due to associated equipment blank detections.

ug/kg - microgram per kilogram
mg/kg - milligrams per kilogram
UJ - Estimated reporting limit
J+ = high bias

MS/MSD - Matrix spike/matrix spike duplicate

TABLE A-3
Field Duplicate Summary

Table A-3
Field Duplicate Summary
Background Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	BK-7 (0-0.5') Sample Result	BK-7 (0-0.5') DUP Field Duplicate	RPD (%)
Inorganics (mg/kg)	Aluminum	12,000	11,000	8.7
	Antimony	< 2.5	< 2.5	NC
	Arsenic	3.2	< 2.5	NC
	Barium	140	160	13.3
	Beryllium	0.40	0.36	10.5
	Boron	4.3	4.0	7.2
	Cadmium	< 0.10	< 0.10	NC
	Chloride	< 7.5	< 7.5	4.7
	Chromium	5.8	5.3	9.0
	Cobalt	3.2	3.0	6.5
	Copper	5.5	5.1	7.5
	Cyanide	< 0.50	< 0.50	NC
	Fluoride	< 1.5	< 1.5	3.4
	Iron	11,000	12,000	8.7
	Lead	2.4	2.7	11.8
	Manganese	200	200	0.0
	Mercury	< 0.033	< 0.033	NC
	Molybdenum	< 0.40	< 0.40	NC
	Nickel	4.6	4.3	6.7
	Selenium	< 2.5	< 2.5	NC
	Silver	< 0.25	< 0.25	NC
	Sulfate	< 7.5	< 7.5	4.4
	Thallium	< 2.5	< 2.5	NC
	Uranium	< 5.0	< 5.0	NC
	Vanadium	19	17	11.1
	Zinc	19	18	5.4

Notes:
RPD = Relative percent difference; [(difference)/(average)]* 100
NC = Not calculated; RPD values were not calculated for non-detects
mg/kg = milligrams per kilogram
* = Field Duplicate RPD Outlier

Table A-3
Field Duplicate Summary
Background Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	MW-BCK2 Sample Result	MW-BCK2 (DUP) Field Duplicate	RPD (%)
General Chemistry (mg/l);	Chloride	21	20	4.9
	Fluoride	< 2.0	< 2.0	NC
	Nitrate+Nitrite as N	< 2.0	< 2.0	NC
	Sulfate	7900	7800	1.3
	Total Dissolved Solids	12700	12500	1.6
	Bicarbonate (As CaCO3)	110	100	9.5
	Carbonate (As CaCO3)	< 2.0	< 2.0	NC
	Total Alkalinity (as CaCO3)	110	100	9.5
Total Metals (mg/l):	Aluminum	33	25	**27.6 ***
	Antimony	< 0.0025	< 0.0025	NC
	Arsenic	0.0047	0.0042	11.2
	Barium	0.12	0.13	8.0
	Beryllium	0.0023	< 0.0020	NC
	Boron	0.60	0.63	4.9
	Cadmium	< 0.0020	< 0.0020	NC
	Chromium	0.025	0.017	**38.1 ***
	Cobalt	0.019	0.013	37.5
	Copper	0.010	0.011	9.5
	Cyanide	<0.01	<0.01	NC
	Iron	29	21	**32 ***
	Lead	0.025	0.016	**43.9 ***
	Magnesium	52	50	3.9
	Manganese	1.9	1.7	11.1
	Mercury	< 0.0010	< 0.0010	NC
	Molybdenum	0.017	0.016	6.1
	Nickel	0.015	< 0.010	NC
	Selenium	0.0041	0.0054	27.4
	Silver	< 0.0050	< 0.0050	NC
	Thallium	< 0.0025	< 0.0025	NC
	Uranium	0.0040	0.0026	42.4
	Vanadium	< 0.050	< 0.050	NC
	Zinc	0.089	0.066	**29.7 ***
Dissolved Metals (mg/l):	Aluminum	3.8	< 0.020	NC
	Antimony	< 0.0050	< 0.0050	NC
	Arsenic	0.0027	0.0032	16.9
	Barium	0.035	0.020	**54.5 ***
	Beryllium	< 0.0020	< 0.0020	NC
	Boron	0.67	0.71	5.8
	Cadmium	< 0.0020	< 0.0020	NC
	Calcium	390	380	2.6
	Chromium	< 0.0060	< 0.0060	NC
	Cobalt	0.0068	< 0.0060	NC
	Copper	< 0.0060	< 0.0060	NC
	Iron	0.94	0.099	**161.9 ***
	Lead	< 0.0050	< 0.0050	NC
	Magnesium	47	46	2.2
	Manganese	1.1	1.1	0.0
	Molybdenum	0.024	0.015	**46.2 ***
	Nickel	< 0.010	< 0.010	NC
	Potassium	18	16	11.8
	Selenium	0.0079	0.011	**32.8 ***
	Silver	< 0.0050	< 0.0050	NC
	Sodium	3700	3700	0.0
	Thallium	< 0.0050	< 0.0050	NC
	Uranium	< 0.0050	< 0.0050	NC
	Vanadium	< 0.050	< 0.050	NC
	Zinc	0.089	0.023	**117.9 ***

Notes:
RPD = Relative percent difference; [(difference)/(average)]* 100
NC = Not calculated; RPD values were not calculated for non-detects
ug/kg-dry = micrograms per kilogram dry
mg/kg-dry = milligrams per kilogram
* = Field Duplicate RPD Outlier

Table A-3
Field Duplicate Summary
Background Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	BK-10 (5-6') Sample Result	BK-10 (5-6') DUP Field Duplicate	RPD (%)
Inorganics (mg/kg)	Aluminum	7,900	8,300	4.9
	Antimony	< 5.0	< 12	NC
	Arsenic	< 5.0	< 12	NC
	Barium	150	110	30.8
	Beryllium	< 0.30	< 0.75	NC
	Boron	< 4.0	< 10	NC
	Cadmium	< 0.20	< 0.50	NC
	Chloride	210	220	4.7
	Chromium	4.6	5.1	10.3
	Cobalt	2.6	3.0	14.3
	Copper	3.5	3.8	8.2
	Cyanide	< 0.30	< 0.30	NC
	Fluoride	3.0	2.9	3.4
	Iron	9,100	9,900	8.4
	Lead	2.6	3.8	**37.5***
	Manganese	180	190	5.4
	Mercury	< 0.033	< 0.033	NC
	Molybdenum	< 0.80	< 2.0	NC
	Nickel	3.8	4.3	12.3
	Selenium	< 5.0	< 12	NC
	Silver	< 0.50	< 1.2	NC
	Sulfate	2,300	2,200	4.4
	Thallium	< 5.0	< 12	NC
	Uranium	< 10	< 25	NC
	Vanadium	15	17	12.5
	Zinc	16	19	17.1

Notes:
RPD = Relative percent difference; [(difference)/(average)]* 100
NC = Not calculated; RPD values were not calculated for non-detects
mg/kg = milligrams per kilogram
* = Field Duplicate RPD Outlier

TABLE A-4
Completeness Summaries

Table A-4
Completeness Summary - Soil
Background Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	Total Number of Results	Number of Contractual Compliance	Percent Contractual Compliance	Number of Usable Results	Percent Technical Compliance
TPH (mg/kg-dry):	Diesel Range Organics (DRO)	1	1	100.0	1	100
	Motor Oil Range Organics (MRO)	1	1	100.0	1	100
	Gasoline Range Organics (GRO)	1	1	100.0	1	100
Metals (mg/kg-dry):	Antimony	21	18 [c]	85.7	21	100
	Copper	21	20 [c]	95.2	21	100
	Selenium	21	19 [c]	90.5	21	100
	Sulfate	20	18 [b]	90.0	20	100
	Thallium	21	18 [c]	85.7	21	100
	Zinc	21	18 [a]	85.7	21	100
	All remaining metals	21	21	100.0	21	100

Notes:
Number of samples used in completeness calculations includes field duplicates but does not include equipment rinsate, field, or trip blanks.
Percent Contractual Compliance = (number of contract compliant results / Number of reported results)*100
Percent Technical Compliance = (Number of usable results / Number of reported results) * 100
a = Qualified due to equipment blank detection.
b = Qualified due to detected concentration exceeding the laboratory quanitation limit.
c = Qualified due to low MS/MSD recovery

Table

Completeness Summary - Groundwater
Background Investigation Report
Western Refining Southwest, Inc. - Bloomfield Refinery

	Parameter	Total Number of Results	Number of Contractual Compliance	Percent Contractual Compliance	Number of Usable Results	Percent Technical Compliance
Total Metals:	Zinc	2	0 [a]	0.0	2	100
	All remaining metals	2	2	100.0	2	100
Metals (mg/kg-dry):	Zinc	2	0 [a]	0.0	2	100
	All remaining metals	2	2	100.0	2	100
General Chemistry	All analytes	2	2	100.0	2	100

Notes:
Number of samples used in completeness calculations includes field duplicates but does not include equipment rinsate, field, or trip blanks.
Percent Contractual Compliance = (number of contract compliant results / Number of reported results)*100
Percent Technical Compliance = (Number of usable results / Number of reported results) * 100
a = Qualified due to equipment blank detection.
b = Qualified due to detected concentration exceeding the laboratory quanitation limit.
c = Qualified due to low MS/MSD recovery

Appendix G

Dixon Outliers Test

Dixon's Test

Dixon's Extreme Value test (1953) can be used to test for statistical outliers when the sample size is less than or equal to 25[1]. It is noted that Dixon's test considers both extreme values that are much smaller than the rest of the data (Case 1) and extreme values that are much larger than the rest of the data (Case 2). This test assumes that the data without the suspected outlier are normally distributed; therefore, it is necessary to perform a test for normality on the data without the suspected outlier before applying this test. This means that the user has to identify (guess) potential outliers that may be present in the data set. One simple way to identify and look at outliers is the use of graphical displays such as a Q-Q plot and box plot. The Dixon test often suffers from masking effects when more than one outlier may be present in the data set. If more than one outlier is suspected, the Dixon test may lead to masking where two or more outliers close in value "hide" one another. As mentioned before, the use of robust and resistant outlier procedures (Singh and Nocerino, 1995, Rousseeuw and Leroy, 1987, and Scout, 1999) is desirable. However, robust and resistant methods are beyond the scope of ProUCL 4.0. Several robust methods are available in Scout (1999) software package, which is currently under revision and upgrade.

Even though Dixon's test finds outliers in both tails (low and high outliers) of the data distribution, it is the identification of high outlying observations (perhaps representing contamination), which is important in environmental applications. The inclusion of high outliers in a data set results in distorted statistics of interest, including estimates and test statistics. The low identified outliers (if any) may be retained in a data set to compute various statistics of interest.

Directions for the Dixon's Test

STEP 1: Let $X_{(1)}, X_{(2)}, \ldots, X_{(n)}$ represent the data ordered from smallest to largest. Check that the data without the suspect outlier are normally distributed. If normality fails, then apply a different outlier identification method such as a robust outlier identification procedure. *It is suggested to avoid the use of a transformation such as a log-transformation to achieve normality to be able to use the Dixon test.* All cleanup and remediation decisions are made based upon the data set in raw scale. Therefore, outliers perhaps representing isolated contaminated locations should be identified in the original scale. As mentioned before, the use of a log-transformation tends to hide and accommodate outliers (instead of identifying them).

STEP 2: $X_{(1)}$ is a potential outlier (Case 1): Compute the test statistic, C, where

$$C = \frac{X_{(2)} - X_{(1)}}{X_{(n)} - X_{(1)}} \text{ for } 3 \le n \le 7, \quad C = \frac{X_{(3)} - X_{(1)}}{X_{(n-1)} - X_{(1)}} \text{ for } 11 \le n \le 13,$$

$$C = \frac{X_{(2)} - X_{(1)}}{X_{(n-1)} - X_{(1)}} \text{ for } 8 \le n \le 10, \quad C = \frac{X_{(3)} - X_{(1)}}{X_{(n-2)} - X_{(1)}} \text{ for } 14 \le n \le 25,$$

[1] Explanation of Dixon's Test is excerpt from ProUCL Version 4.00.05 Technical Guide (EPA/600/R-07/041), pp. 182-183.

STEP 3: If *C* exceeds the critical value for the specified significance level α, then $X_{(1)}$ is an outlier and should be further investigated.

STEP 4: $X_{(n)}$ is a potential outlier (Case 2): Compute the test statistic, *C*, where

$$C = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(1)}} \text{ for } 3 \le n \le 7, \; C = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(2)}} \text{ for } 11 \le n \le 13,$$

$$C = \frac{X_{(n)} - X_{(n-1)}}{X_{(n)} - X_{(2)}} \text{ for } 8 \le n \le 10, \; C = \frac{X_{(n)} - X_{(n-2)}}{X_{(n)} - X_{(3)}} \text{ for } 14 \le n \le 25,$$

STEP 5: If *C* exceeds the critical value for the specified significance level α, then $X_{(n)}$ is an outlier and should be further investigated.

Appendix H

Statistical Evaluation

	Normal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1

Aluminum

Raw Statistics	
Number of Valid Observations	18
Number of Distinct Observations	12
Minimum	6600
Maximum	26000
Second Largest	23000
Mean	15456
First Quartile	12000
Median	16000
Third Quartile	17750
SD	5089
Coefficient of Variation	0.329
Skewness	0.166

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.981
5% Shapiro Wilk Critical Value	0.897
Data appear Normal at 5% Significance Level	

Background Statistics Assuming Normal Distribution	
90% Percentile (z)	21978
95% Percentile (z)	23827
99% Percentile (z)	27295
Tolerance Factor K	2.453
95% UTL with 95% Coverage	27940
95% UPL (t)	24552

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Aluminum

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 26000 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.368

For 10% significance level, 26000 is not an outlier.

For 5% significance level, 26000 is not an outlier.

For 1% significance level, 26000 is not an outlier.

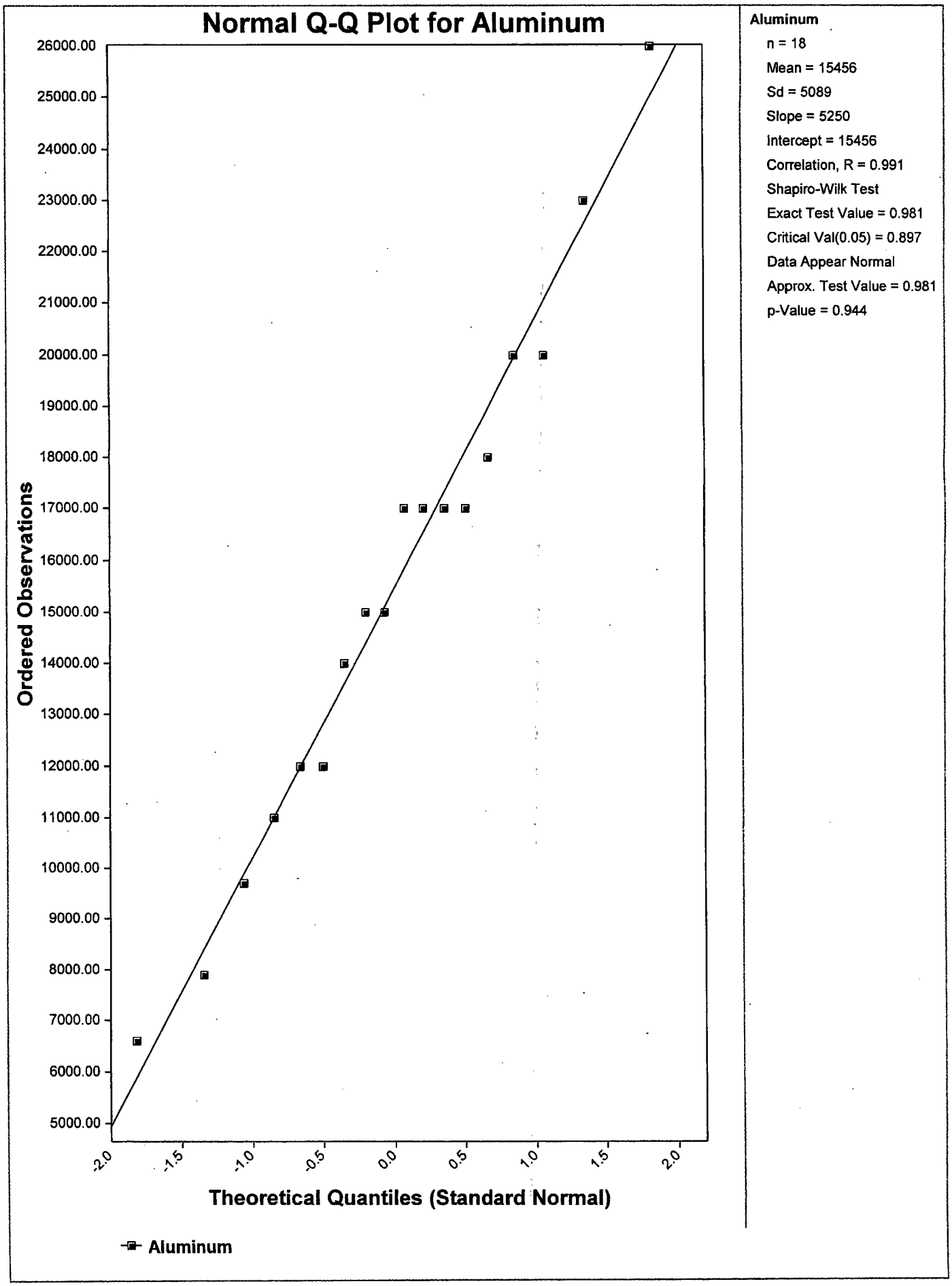
2. Data Value 6600 is a Potential Outlier (Lower Tail)?

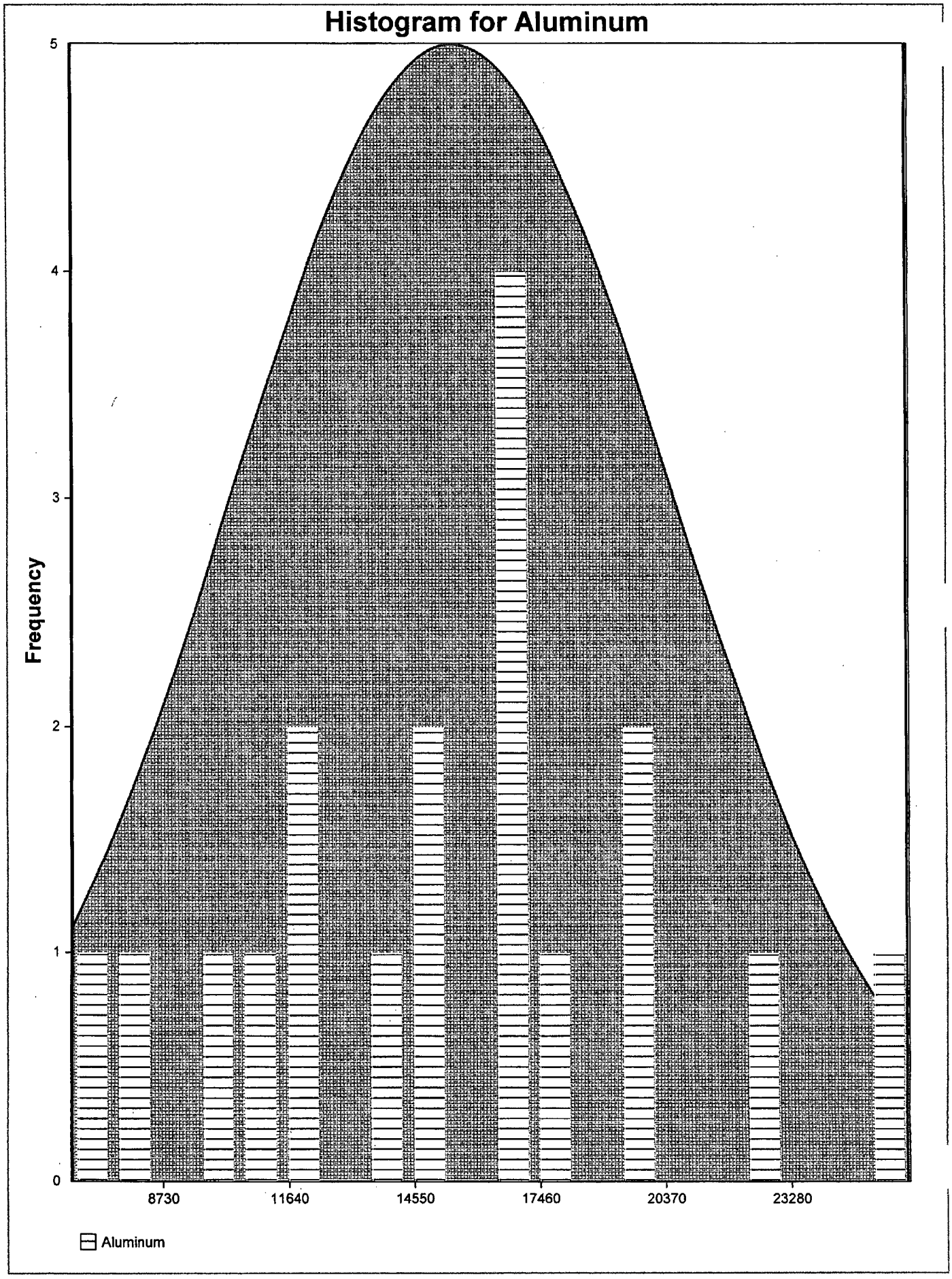
Test Statistic: 0.231

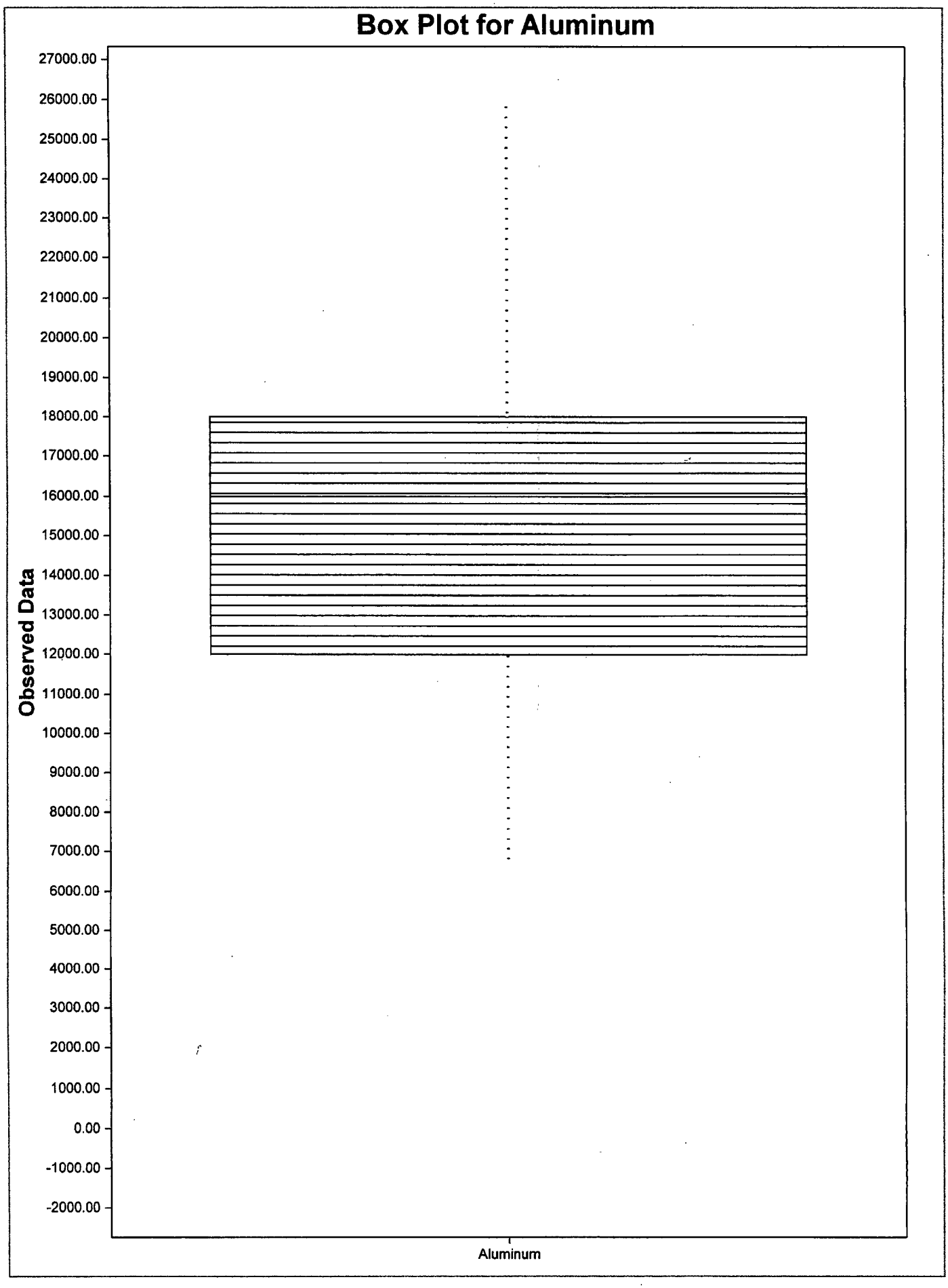
For 10% significance level, 6600 is not an outlier.

For 5% significance level, 6600 is not an outlier.

For 1% significance level, 6600 is not an outlier.


Normal Q-Q Plot for Aluminum
Ordered Observations
26000.00
25000.00
24000.00
23000.00
22000.00
21000.00
20000.00
19000.00
18000.00
17000.00
16000.00
15000.00
14000.00
13000.00
12000.00
11000.00
10000.00
9000.00
8000.00
7000.00
6000.00
5000.00
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Aluminum
Aluminum
n = 18
Mean = 15456
Sd = 5089
Slope = 5250
Intercept = 15456
Correlation, R = 0.991
Shapiro-Wilk Test
Exact Test Value = 0.981
Critical Val(0.05) = 0.897
Data Appear Normal
Approx. Test Value = 0.981
p-Value = 0.944


Histogram for Aluminum
Frequency
0
1
2
3
4
5
8730
11640
14550
17460
20370
23280
Aluminum


Box Plot for Aluminum
Observed Data
27000.00
26000.00
25000.00
24000.00
23000.00
22000.00
21000.00
20000.00
19000.00
18000.00
17000.00
16000.00
15000.00
14000.00
13000.00
12000.00
11000.00
10000.00
9000.00
8000.00
7000.00
6000.00
5000.00
4000.00
3000.00
2000.00
1000.00
0.00
-1000.00
-2000.00
Aluminum

	Normal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1

Arsenic

Raw Statistics	
Number of Valid Observations	18
Number of Distinct Observations	14
Minimum	1.4
Maximum	3.2
Second Largest	3.1
Mean	2.433
First Quartile	1.975
Median	2.55
Third Quartile	2.875
SD	0.565
Coefficient of Variation	0.232
Skewness	-0.559

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.928
5% Shapiro Wilk Critical Value	0.897
Data appear Normal at 5% Significance Level	

Background Statistics Assuming Normal Distribution	
90% Percentile (z)	3.157
95% Percentile (z)	3.362
99% Percentile (z)	3.747
Tolerance Factor K	2.453
95% UTL with 95% Coverage	3.818
95% UPL (t)	3.443

From File: WorkSheet.wst

Summary Statistics for Raw Full Dataset

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
Arsenic	18	1.4	3.2	2.433	2.55	0.319	0.565	0.593	-0.559	-0.836	0.232

Percentiles for Raw Full Dataset

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Arsenic	18	1.485	1.57	1.9	1.975	2.55	2.875	2.96	3.03	3.115	3.183

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Arsenic

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 3.2 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.125

For 10% significance level, 3.2 is not an outlier.

For 5% significance level, 3.2 is not an outlier.

For 1% significance level, 3.2 is not an outlier.

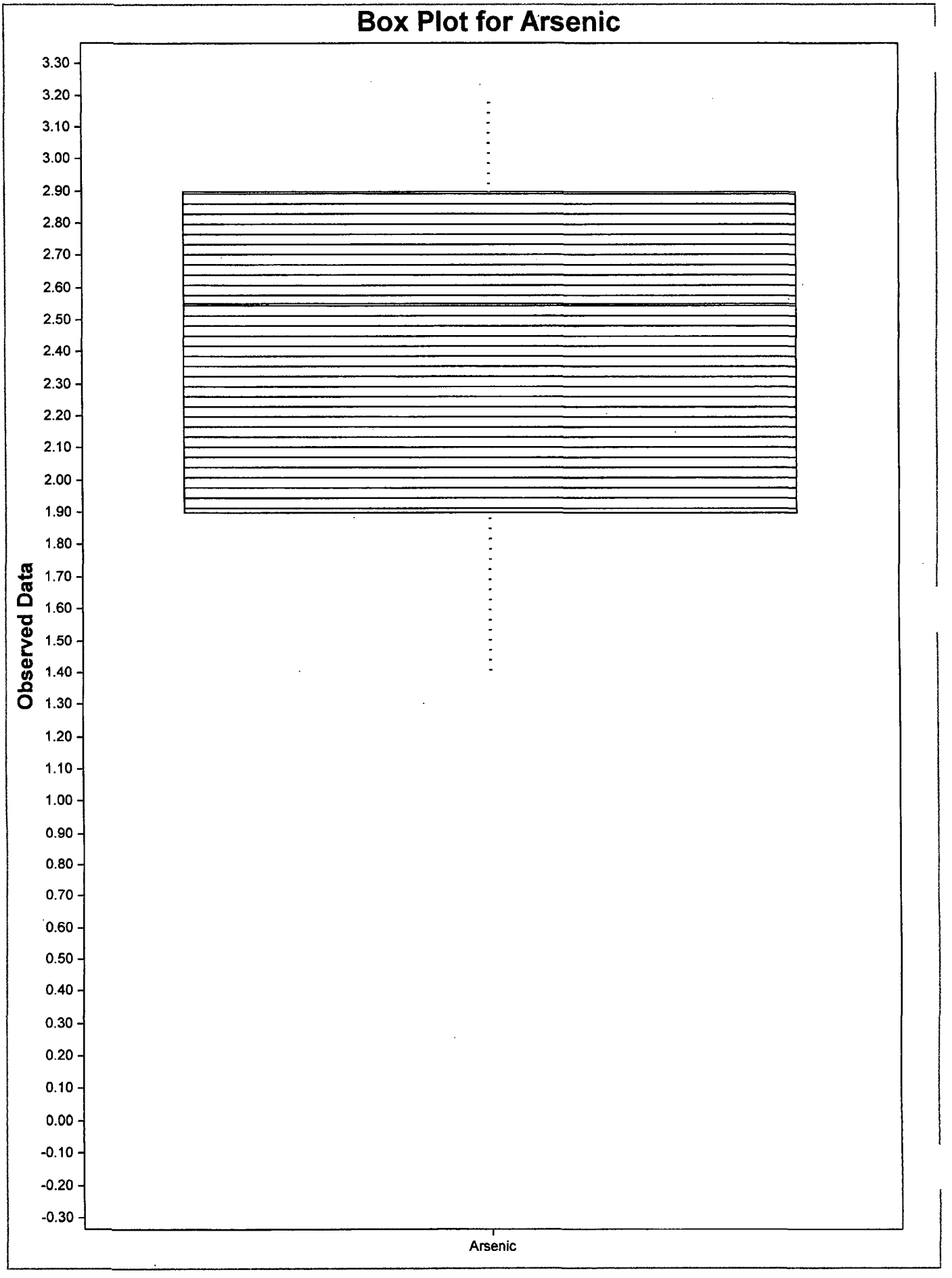
2. Data Value 1.4 is a Potential Outlier (Lower Tail)?

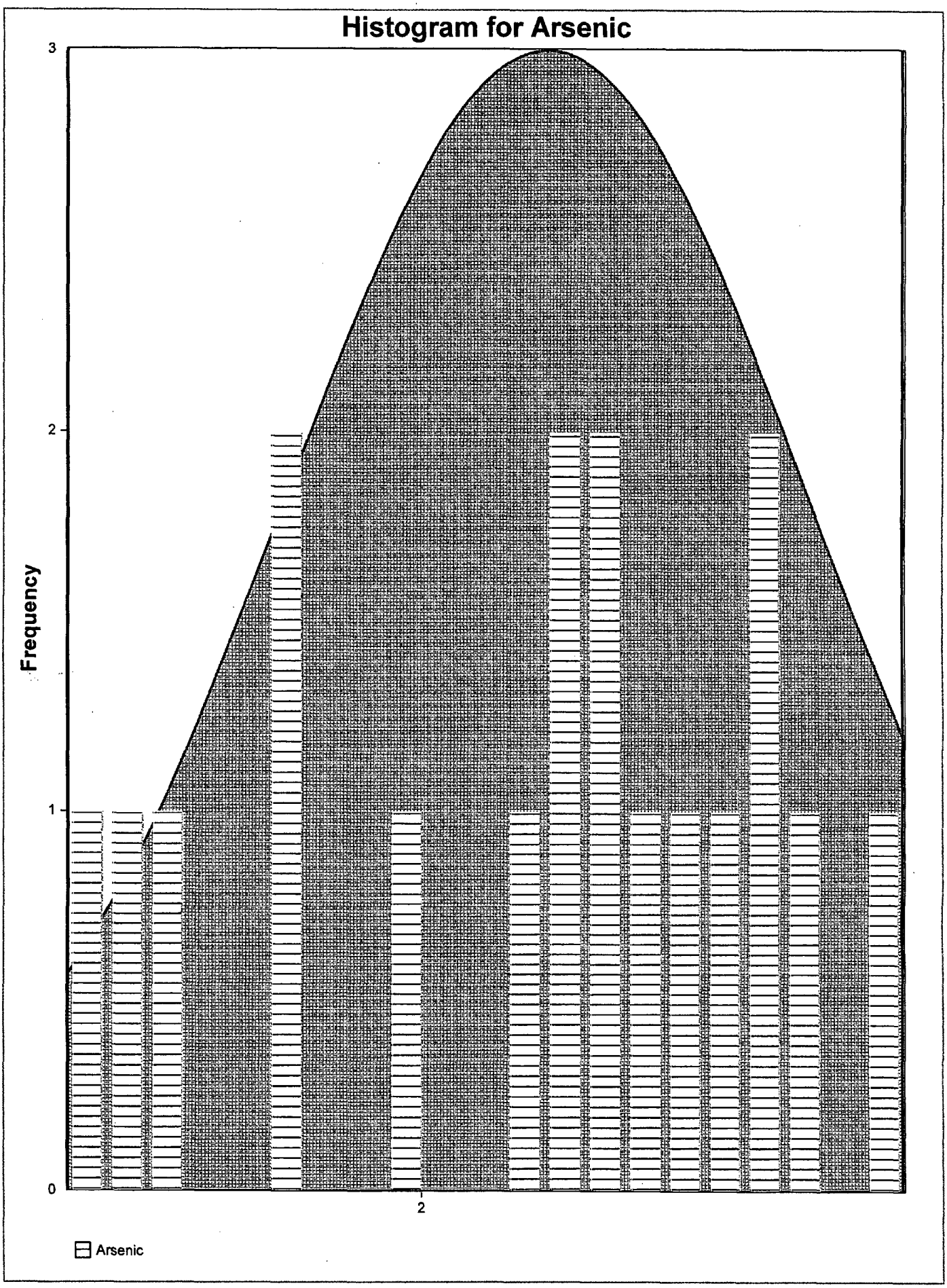
st Statistic: 0.125

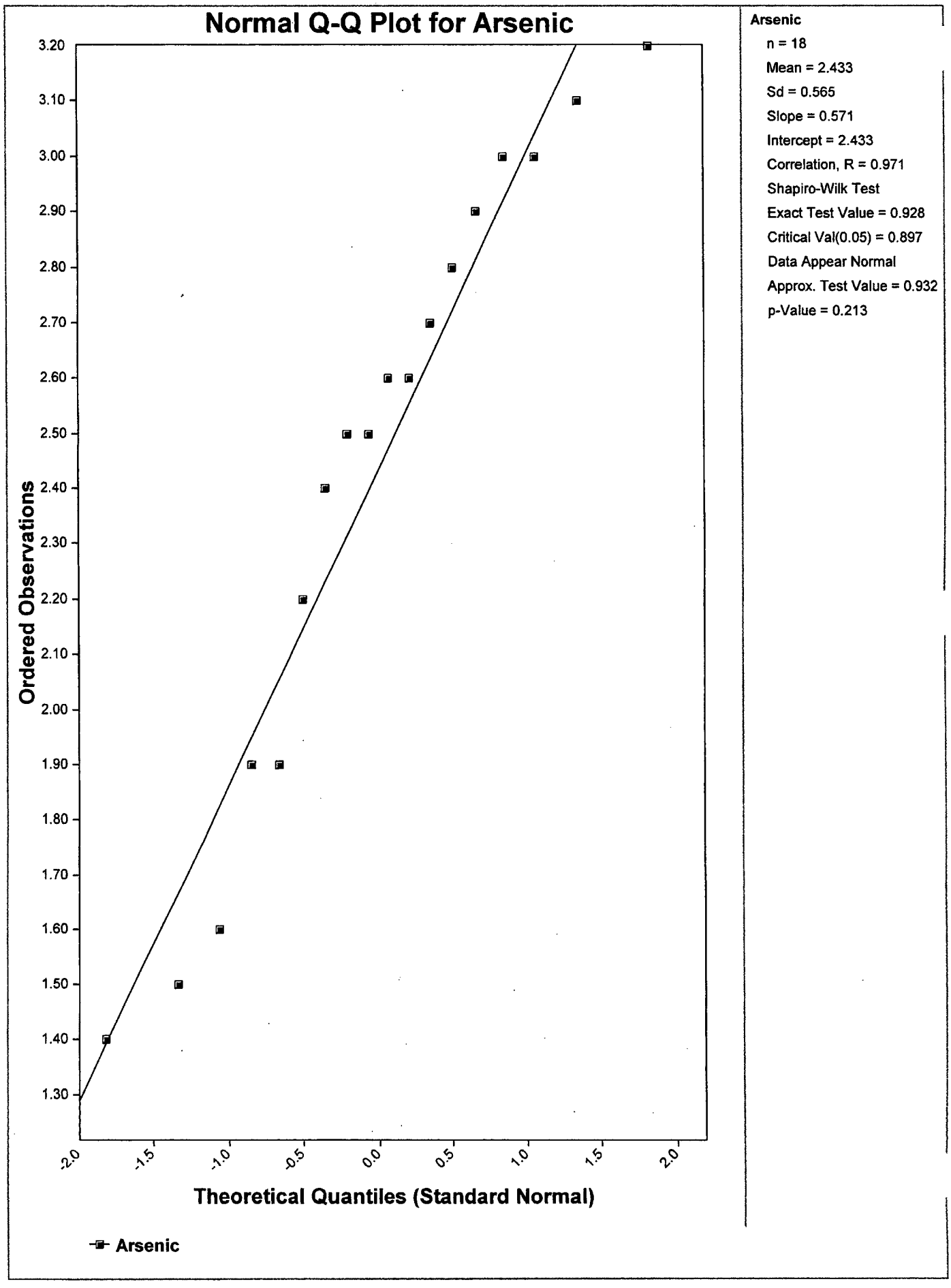
For 10% significance level, 1.4 is not an outlier.

For 5% significance level, 1.4 is not an outlier.

For 1% significance level, 1.4 is not an outlier.

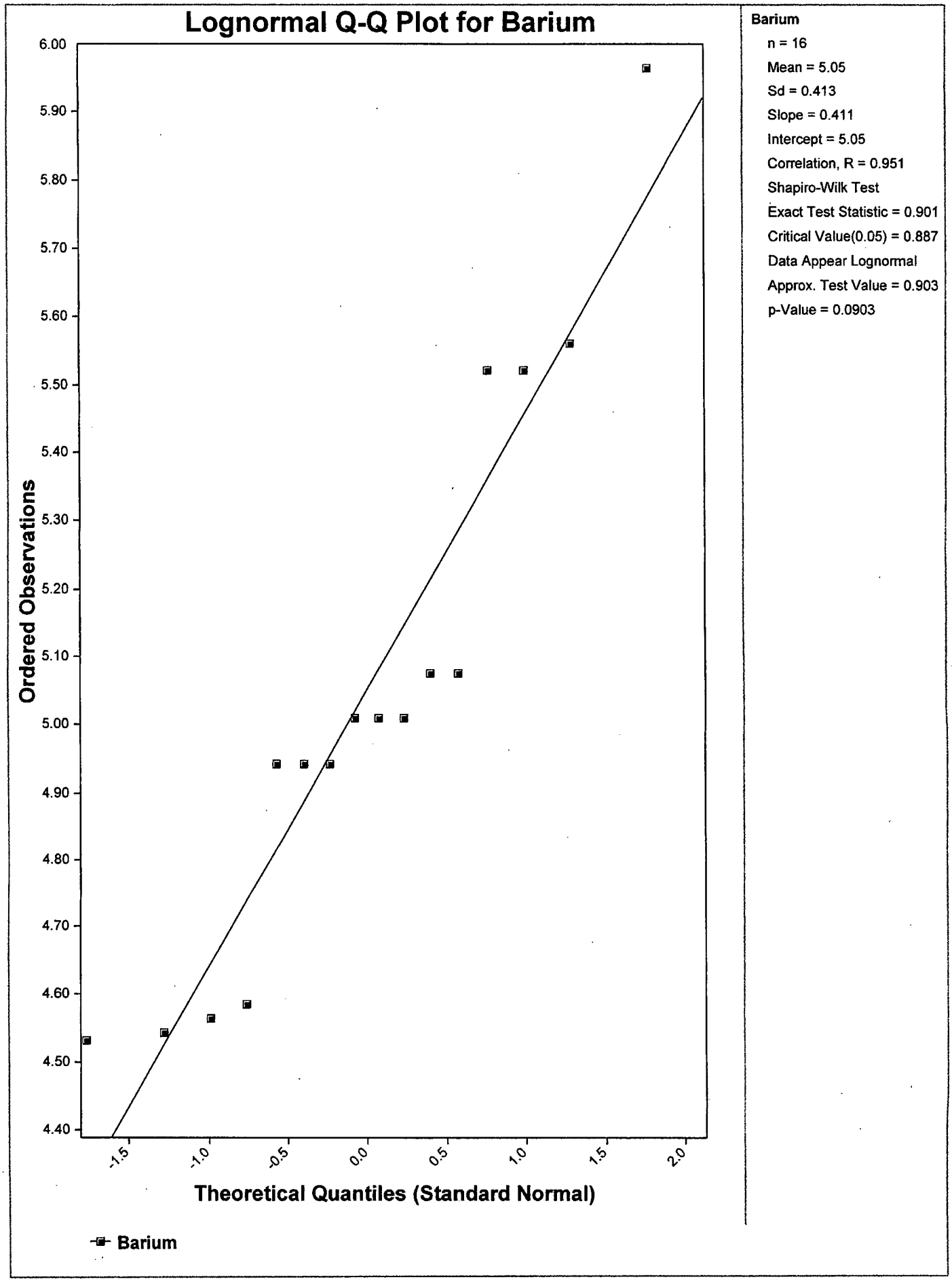

Box Plot for Arsenic
Observed Data
3.30
3.20
3.10
3.00
2.90
2.80
2.70
2.60
2.50
2.40
2.30
2.20
2.10
2.00
1.90
1.80
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
-0.10
-0.20
-0.30
Arsenic


Histogram for Arsenic
Frequency
3
2
1
0
2
Arsenic


Normal Q-Q Plot for Arsenic
Ordered Observations
3.20
3.10
3.00
2.90
2.80
2.70
2.60
2.50
2.40
2.30
2.20
2.10
2.00
1.90
1.80
1.70
1.60
1.50
1.40
1.30
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Arsenic
Arsenic
n = 18
Mean = 2.433
Sd = 0.565
Slope = 0.571
Intercept = 2.433
Correlation, R = 0.971
Shapiro-Wilk Test
Exact Test Value = 0.928
Critical Val(0.05) = 0.897
Data Appear Normal
Approx. Test Value = 0.932
p-Value = 0.213

	Lognormal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1
Number of Bootstrap Operations	2000

Barium	
Log-Transformed Statistics	
Number of Valid Observations	16
Number of Distinct Observations	10
Minimum	4.533
Maximum	5.966
Second Largest	5.561
Mean	5.05
First Quartile	4.852
Median	5.011
Third Quartile	5.187
SD	0.413
Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.901
5% Shapiro Wilk Critical Value	0.887
Data appear Lognormal at 5% Significance Level	
Background Statistics Assuming Lognormal Distribution	
90% Percentile (z)	265
95% Percentile (z)	308
99% Percentile (z)	408.2
95% UPL	329.3
Tolerance Factor K	2.524
95% UTL with 95% Coverage	442.9
Some Nonparametric Background Statistics	
95% Chebyshev UPL	529.1
95% Bootstrap BCA UTL with 95% Coverage	390
95% Percentile Bootstrap UTL with 95% Coverage	390


Lognormal Q-Q Plot for Barium
Ordered Observations
6.00
5.90
5.80
5.70
5.60
5.50
5.40
5.30
5.20
5.10
5.00
4.90
4.80
4.70
4.60
4.50
4.40
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Barium
Barium
n = 16
Mean = 5.05
Sd = 0.413
Slope = 0.411
Intercept = 5.05
Correlation, R = 0.951
Shapiro-Wilk Test
Exact Test Statistic = 0.901
Critical Value(0.05) = 0.887
Data Appear Lognormal
Approx. Test Value = 0.903
p-Value = 0.0903

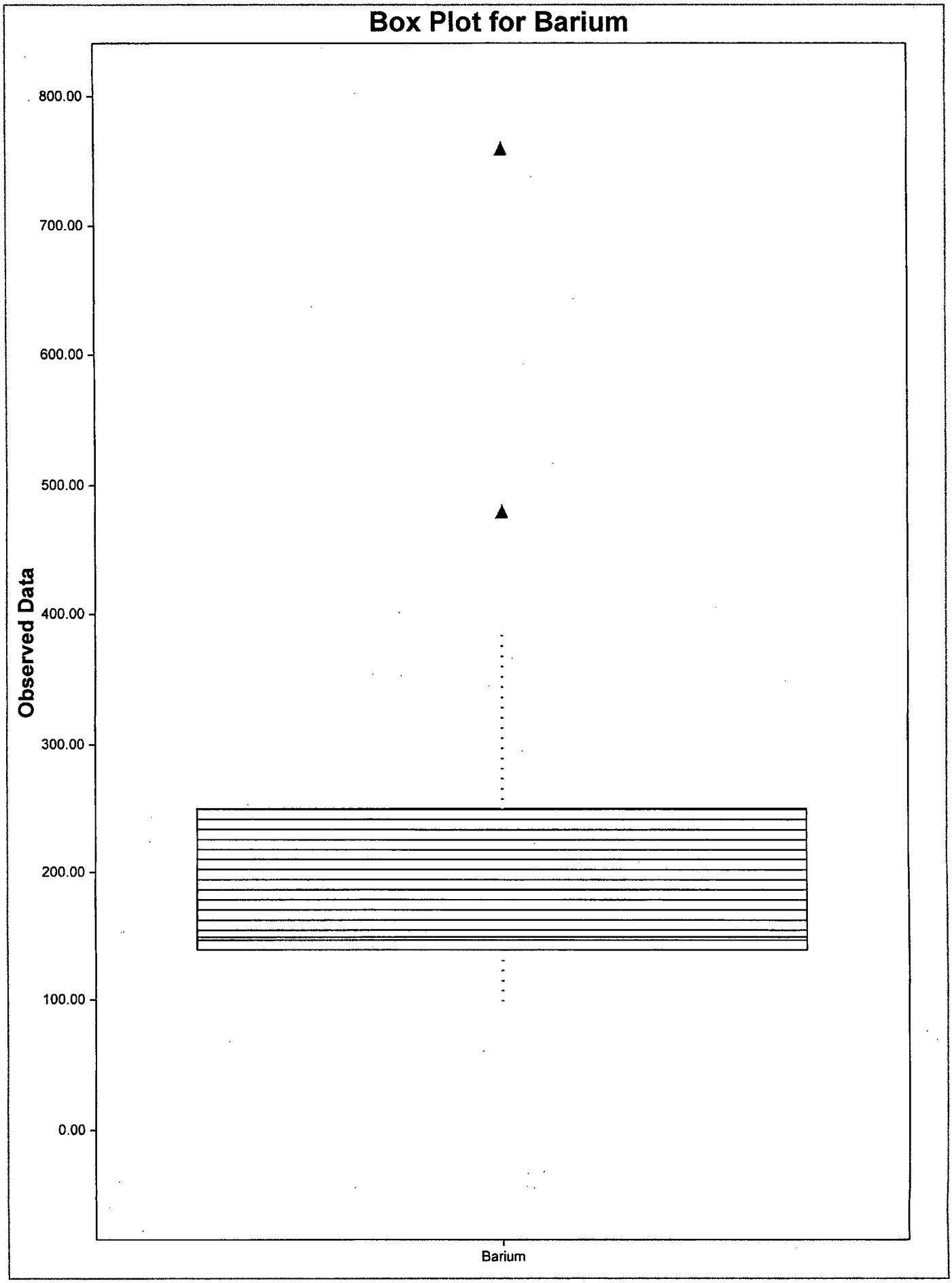
From File: WorkSheet.wst

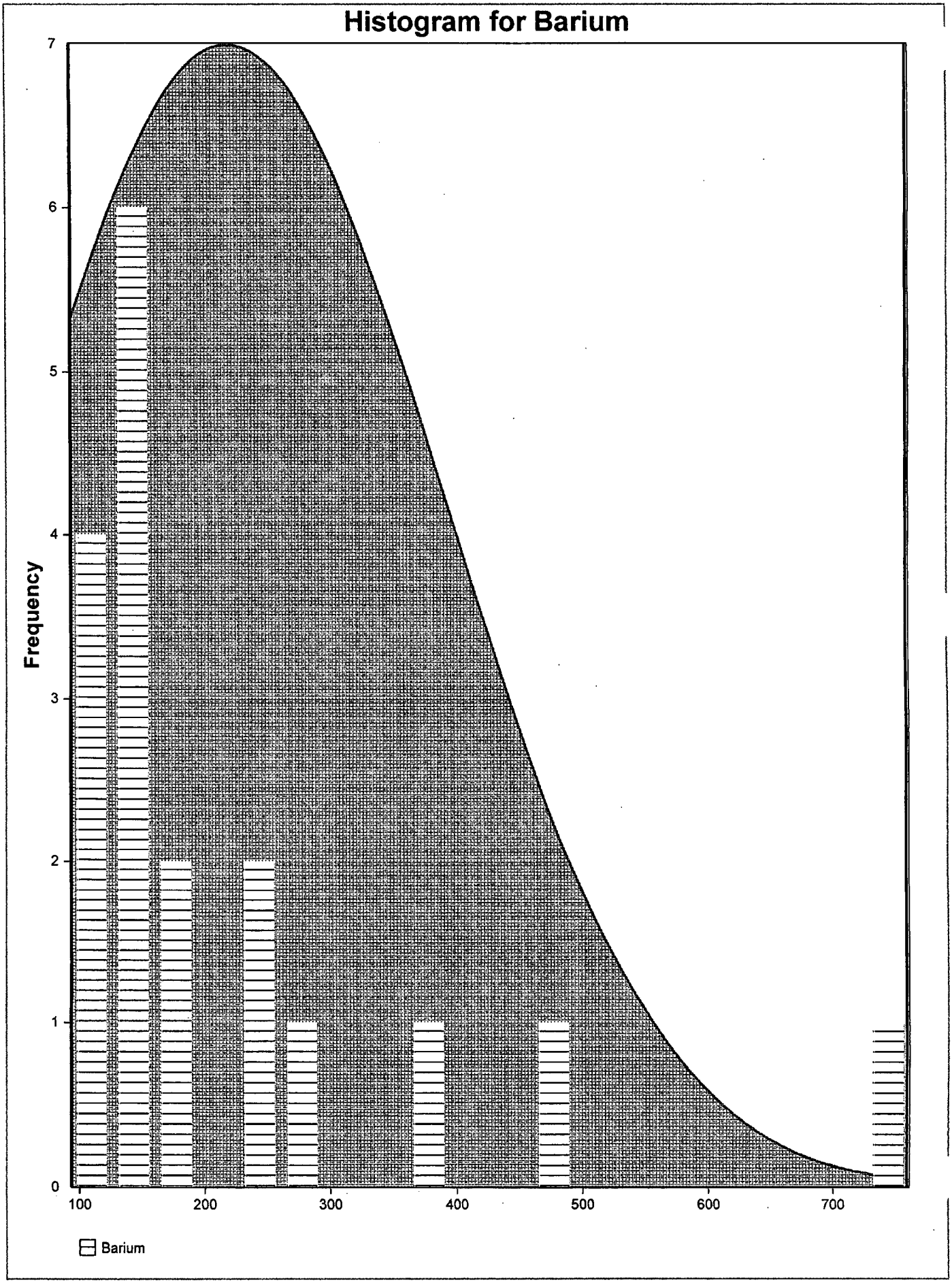
Summary Statistics for Raw Full Dataset

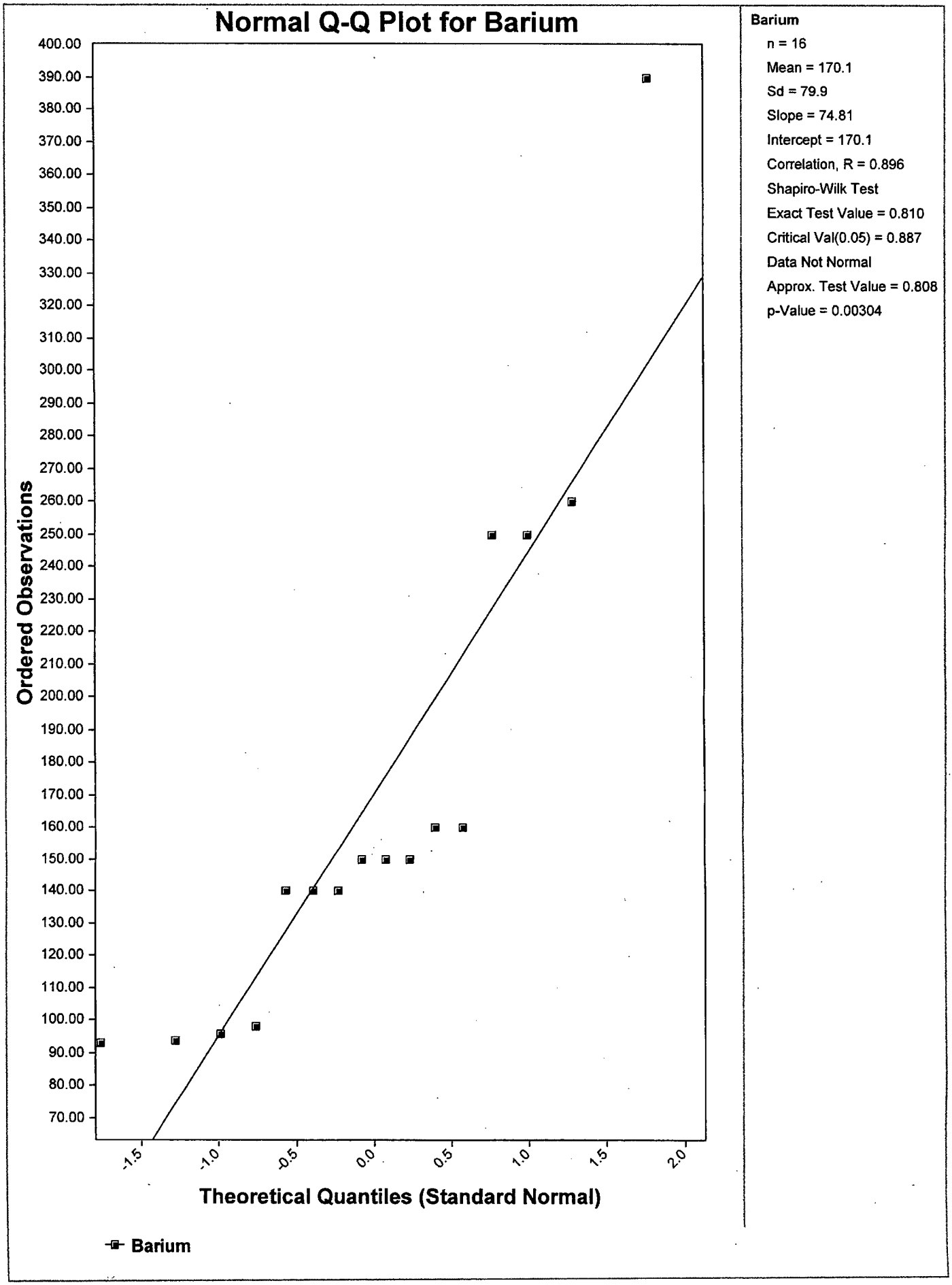
Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
Barium	18	93	760	220.1	150	29110	170.6	78.58	2.255	5.448	0.775

Percentiles for Raw Full Dataset

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Barium	18	93.85	95.4	114.8	140	150	250	256	417	522	712.4


Box Plot for Barium
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Observed Data
Barium


Histogram for Barium
Frequency
0
1
2
3
4
5
6
7
100
200
300
400
500
600
700
Barium


Normal Q-Q Plot for Barium
Ordered Observations
400.00
390.00
380.00
370.00
360.00
350.00
340.00
330.00
320.00
310.00
300.00
290.00
280.00
270.00
260.00
250.00
240.00
230.00
220.00
210.00
200.00
190.00
180.00
170.00
160.00
150.00
140.00
130.00
120.00
110.00
100.00
90.00
80.00
70.00
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Barium
Barium
n = 16
Mean = 170.1
Sd = 79.9
Slope = 74.81
Intercept = 170.1
Correlation, R = 0.896
Shapiro-Wilk Test
Exact Test Value = 0.810
Critical Val(0.05) = 0.887
Data Not Normal
Approx. Test Value = 0.808
p-Value = 0.00304

	Normal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1

Beryllium

Raw Statistics	
Number of Valid Observations	18
Number of Distinct Observations	16
Minimum	0.24
Maximum	0.67
Second Largest	0.64
Mean	0.466
First Quartile	0.4
Median	0.475
Third Quartile	0.545
SD	0.122
Coefficient of Variation	0.263
Skewness	-0.236
Normal Distribution Test	
Shapiro Wilk Test Statistic	0.973
5% Shapiro Wilk Critical Value	0.897
Data appear Normal at 5% Significance Level	
Background Statistics Assuming Normal Distribution	
90% Percentile (z)	0.622
95% Percentile (z)	0.667
99% Percentile (z)	0.75
Tolerance Factor K	2.453
95% UTL with 95% Coverage	0.766
95% UPL (t)	0.684

From File: WorkSheet.wst

Summary Statistics for Raw Full Dataset

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
Beryllium	18	0.24	0.67	0.466	0.475	0.015	0.122	0.111	-0.236	-0.445	0.263

Percentiles for Raw Full Dataset

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Beryllium	18	0.249	0.306	0.388	0.4	0.475	0.545	0.556	0.619	0.645	0.665

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Beryllium

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 0.67 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.176

For 10% significance level, 0.67 is not an outlier.

For 5% significance level, 0.67 is not an outlier.

For 1% significance level, 0.67 is not an outlier.

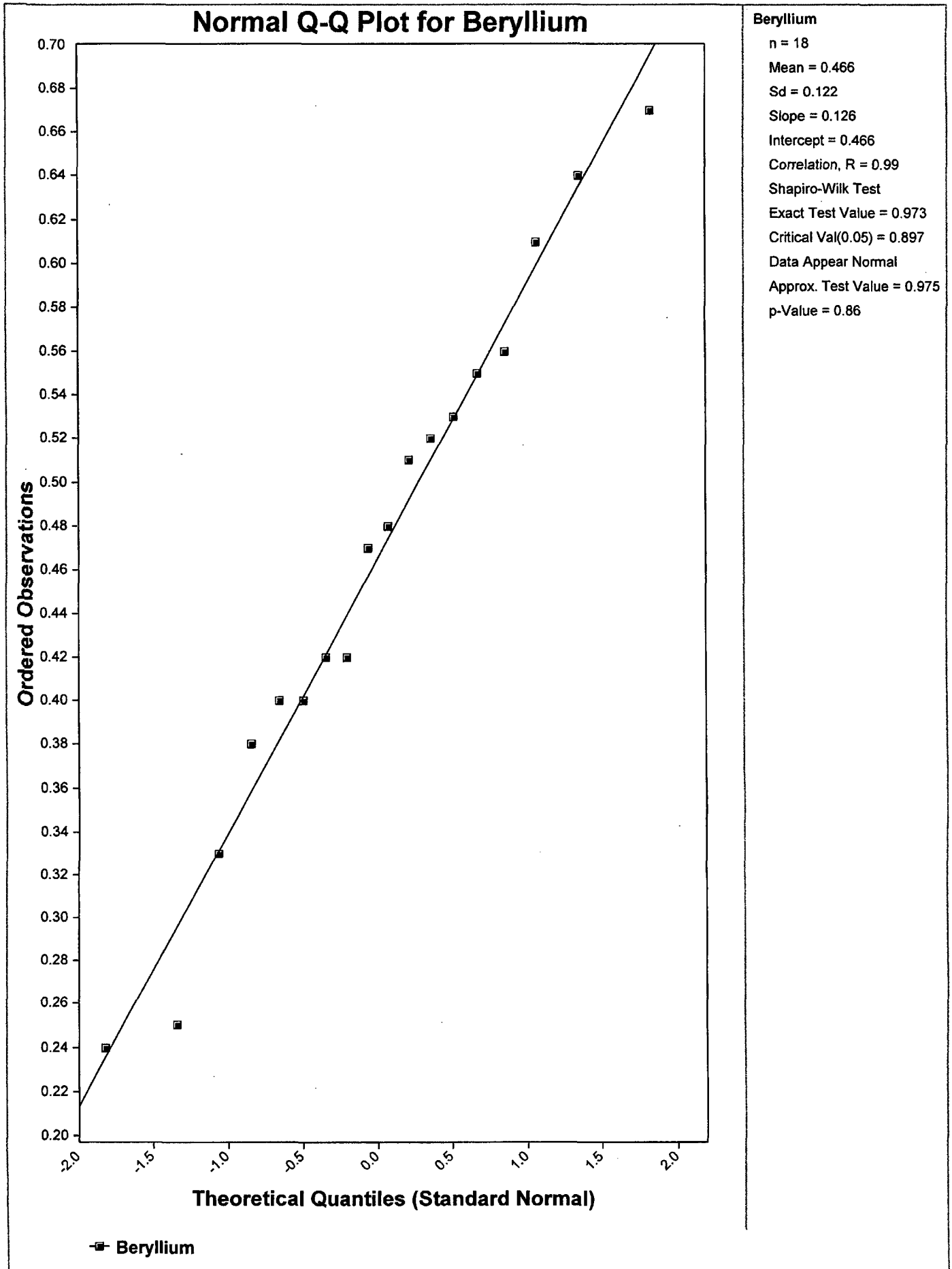
2. Data Value 0.24 is a Potential Outlier (Lower Tail)?

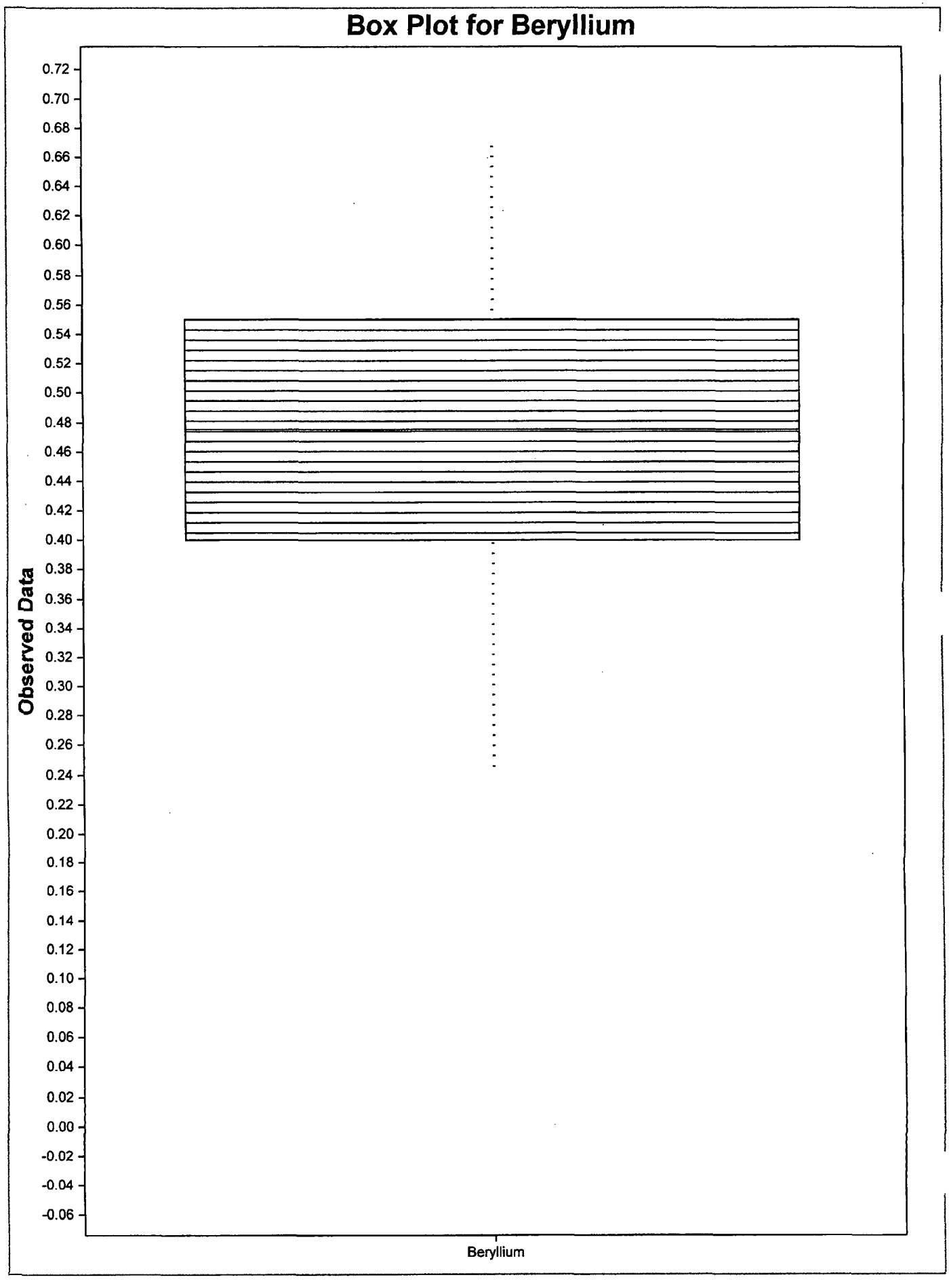
Test Statistic: 0.243

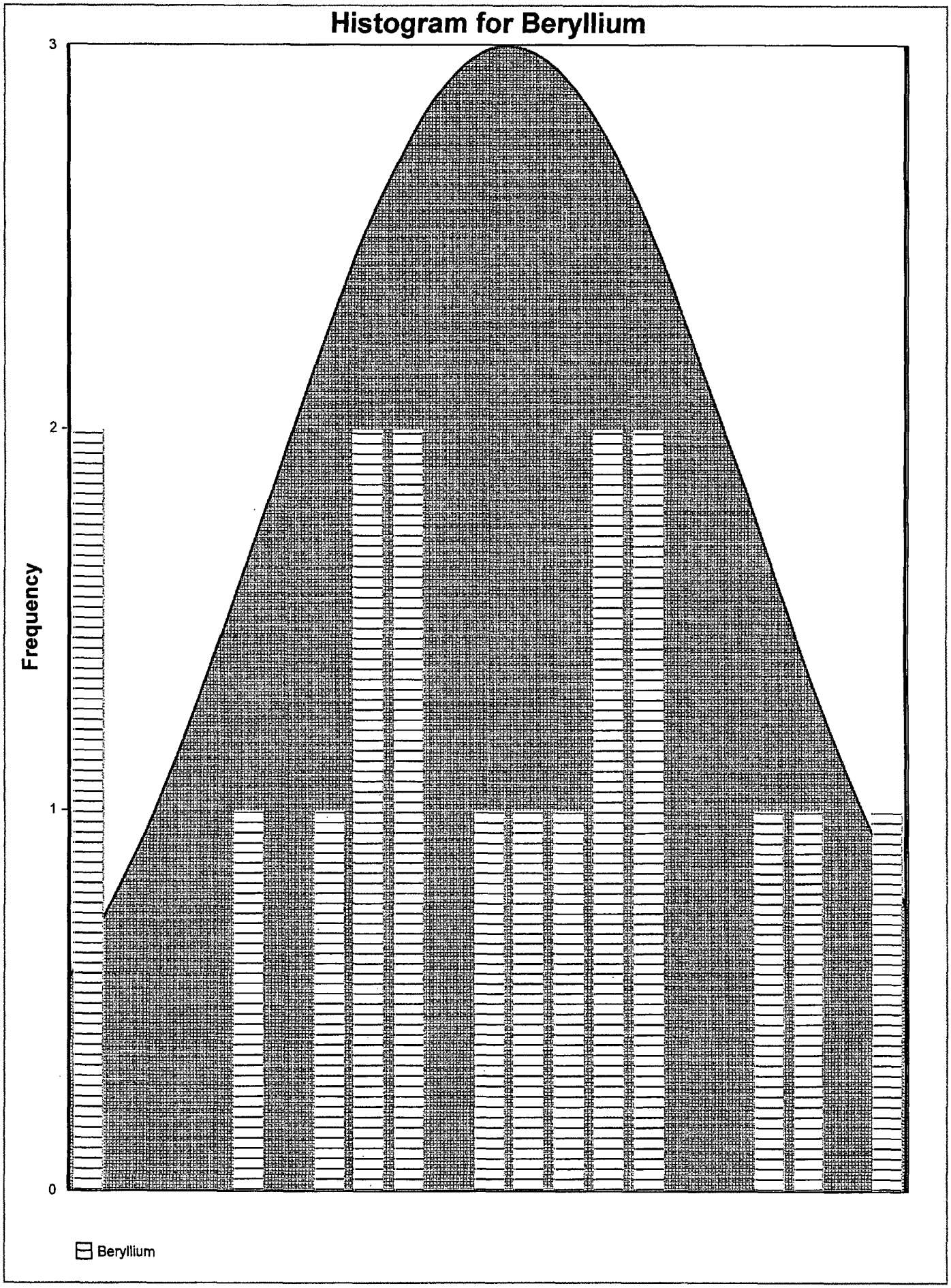
For 10% significance level, 0.24 is not an outlier.

For 5% significance level, 0.24 is not an outlier.

For 1% significance level, 0.24 is not an outlier.


Normal Q-Q Plot for Beryllium
Ordered Observations
0.70
0.68
0.66
0.64
0.62
0.60
0.58
0.56
0.54
0.52
0.50
0.48
0.46
0.44
0.42
0.40
0.38
0.36
0.34
0.32
0.30
0.28
0.26
0.24
0.22
0.20
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Beryllium
Beryllium
n = 18
Mean = 0.466
Sd = 0.122
Slope = 0.126
Intercept = 0.466
Correlation, R = 0.99
Shapiro-Wilk Test
Exact Test Value = 0.973
Critical Val(0.05) = 0.897
Data Appear Normal
Approx. Test Value = 0.975
p-Value = 0.86


Box Plot for Beryllium
Observed Data
0.72
0.70
0.68
0.66
0.64
0.62
0.60
0.58
0.56
0.54
0.52
0.50
0.48
0.46
0.44
0.42
0.40
0.38
0.36
0.34
0.32
0.30
0.28
0.26
0.24
0.22
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
-0.02
-0.04
-0.06
Beryllium


Histogram for Beryllium
Frequency
3
2
1
0
Beryllium

	Normal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1

Boron

Raw Statistics	
Number of Valid Observations	17
Number of Distinct Observations	15
Minimum	3.8
Maximum	9.9
Second Largest	8.2
Mean	6.035
First Quartile	4.3
Median	5.5
Third Quartile	7.4
SD	1.814
Coefficient of Variation	0.301
Skewness	0.569
Normal Distribution Test	
Shapiro Wilk Test Statistic	0.929
5% Shapiro Wilk Critical Value	0.892
Data appear Normal at 5% Significance Level	
Background Statistics Assuming Normal Distribution	
90% Percentile (z)	8.36
95% Percentile (z)	9.019
99% Percentile (z)	10.25
Tolerance Factor K	2.486
95% UTL with 95% Coverage	10.54
95% UPL (t)	9.294

From File: WorkSheet.wst

Summary Statistics for Raw Full Dataset

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
Boron	17	3.8	9.9	6.035	5.5	3.29	1.814	1.927	0.569	-0.592	0.301

Percentiles for Raw Full Dataset

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Boron	17	3.96	4.06	4.22	4.3	5.5	7.4	7.88	8.2	8.54	9.628

From File: WorkSheet.wst

Summary Statistics for Raw Full Dataset

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
Boron	18	3.8	12	6.367	5.95	5.073	2.252	2.52	1.006	0.761	0.354

Percentiles for Raw Full Dataset

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Boron	18	3.97	4.07	4.24	4.475	5.95	7.85	8.12	8.71	10.22	11.64

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Boron

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 12 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.481

For 10% significance level, 12 is an outlier.

For 5% significance level, 12 is an outlier.

For 1% significance level, 12 is not an outlier.

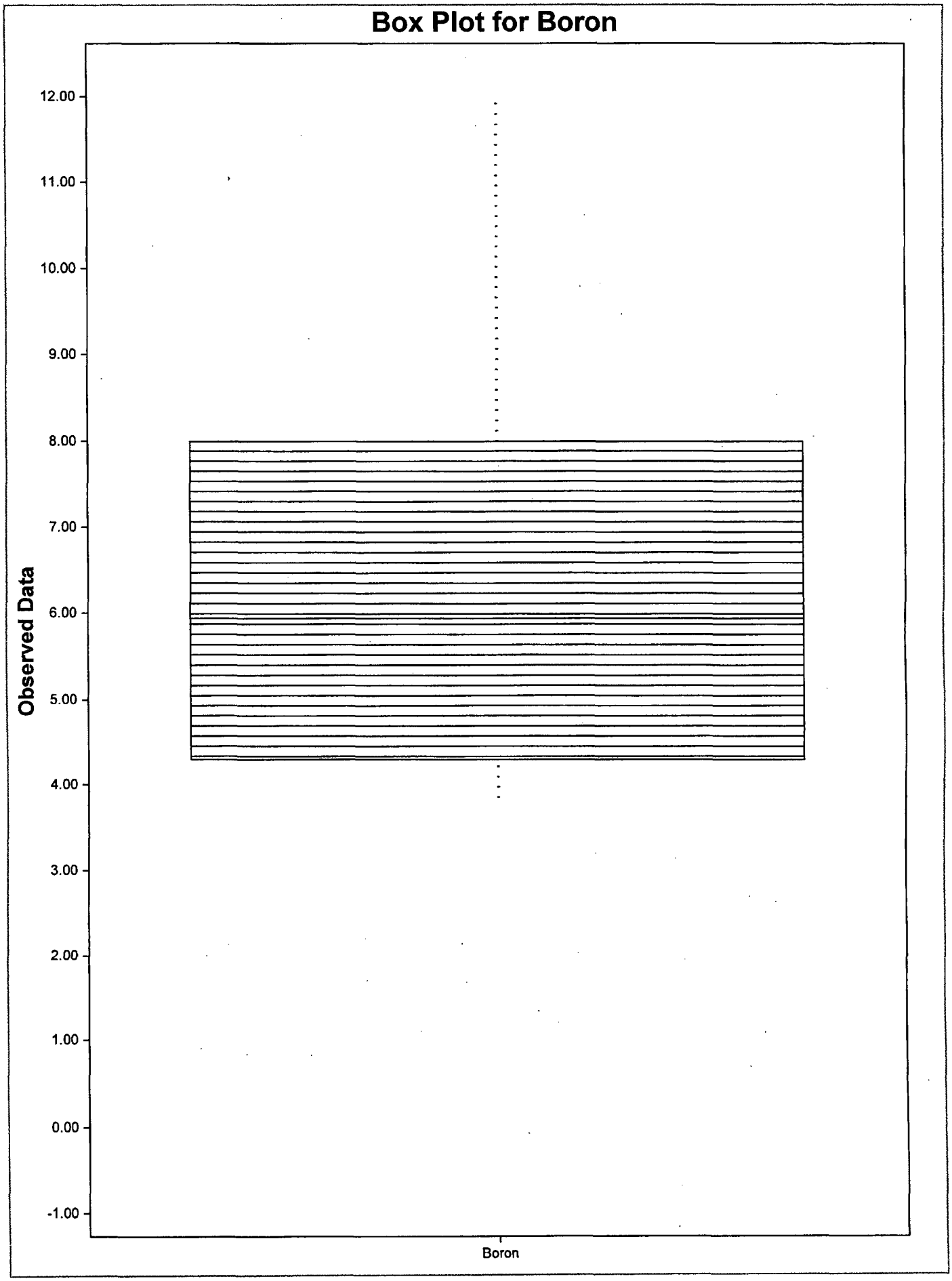
2. Data Value 3.8 is a Potential Outlier (Lower Tail)?

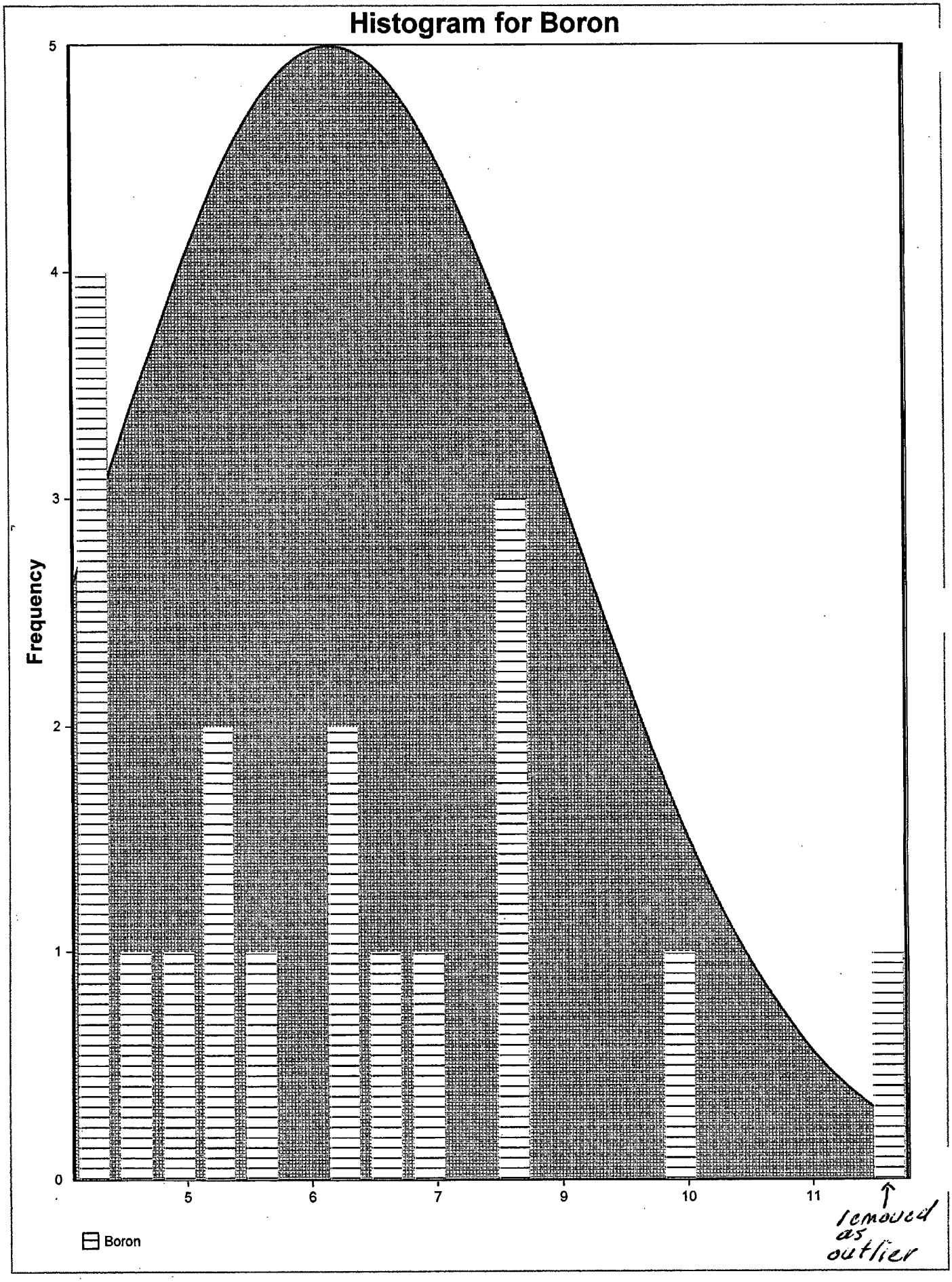
Test Statistic: 0.068

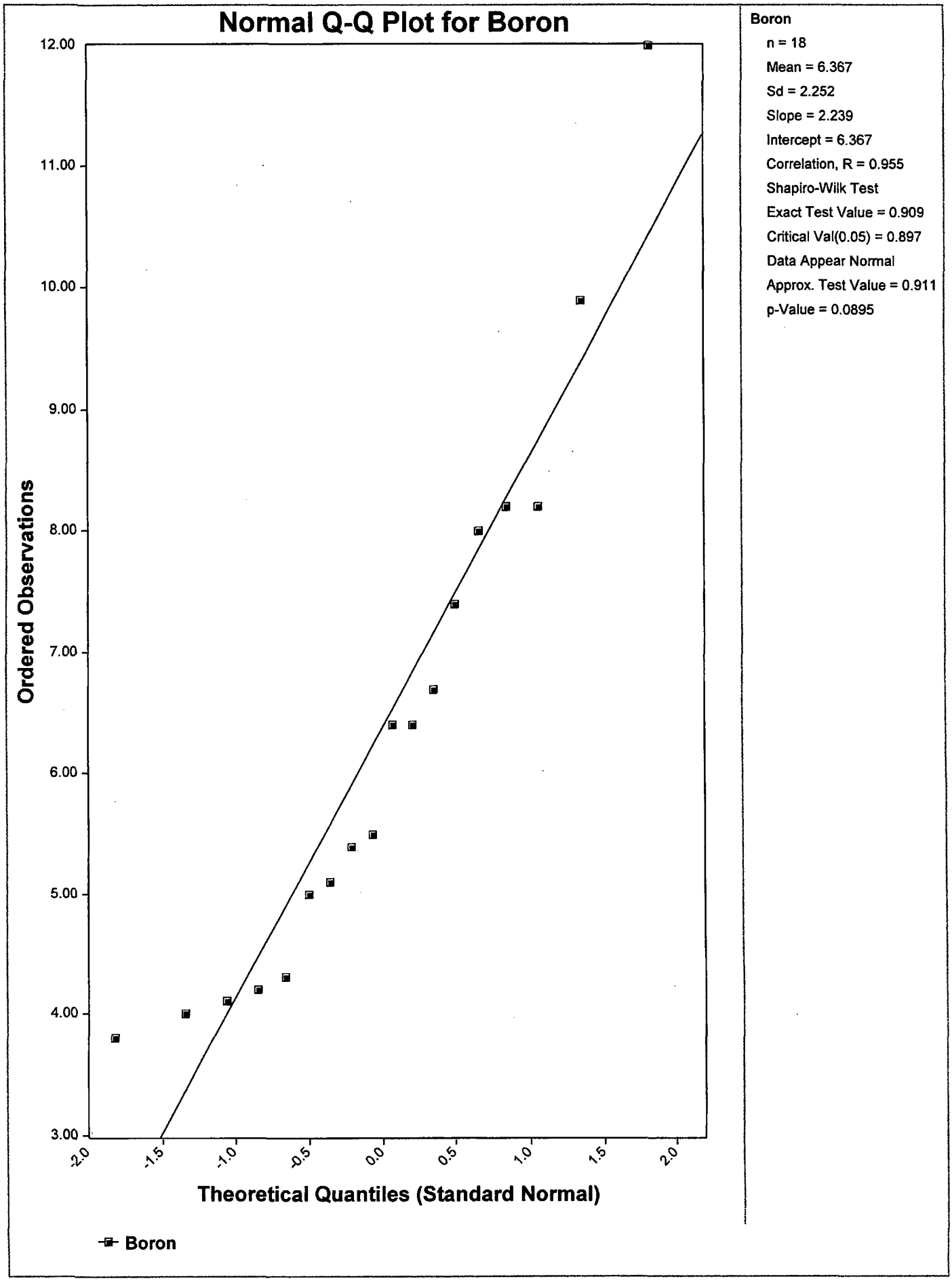
For 10% significance level, 3.8 is not an outlier.

For 5% significance level, 3.8 is not an outlier.

For 1% significance level, 3.8 is not an outlier.


Box Plot for Boron
Observed Data
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
Boron


Histogram for Boron
Frequency
0
1
2
3
4
5
5
6
7
9
10
11
removed as outlier
Boron


Normal Q-Q Plot for Boron
Ordered Observations
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Boron
Boron
n = 18
Mean = 6.367
Sd = 2.252
Slope = 2.239
Intercept = 6.367
Correlation, R = 0.955
Shapiro-Wilk Test
Exact Test Value = 0.909
Critical Val(0.05) = 0.897
Data Appear Normal
Approx. Test Value = 0.911
p-Value = 0.0895

	Normal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1

Chromium

Raw Statistics	
Number of Valid Observations	18
Number of Distinct Observations	15
Minimum	3.5
Maximum	9.3
Second Largest	8.5
Mean	6.672
First Quartile	5.725
Median	6.65
Third Quartile	7.875
SD	1.595
Coefficient of Variation	0.239
Skewness	-0.273

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.971
5% Shapiro Wilk Critical Value	0.897
Data appear Normal at 5% Significance Level	

Background Statistics Assuming Normal Distribution	
90% Percentile (z)	8.716
95% Percentile (z)	9.296
99% Percentile (z)	10.38
Tolerance Factor K	2.453
95% UTL with 95% Coverage	10.59
95% UPL (t)	9.523

From File: WorkSheet.wst

Summary Statistics for Raw Full Dataset

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
Chromium	18	3.5	9.3	6.672	6.65	2.544	1.595	1.779	-0.273	-0.711	0.239

Percentiles for Raw Full Dataset

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Chromium	18	4.435	4.6	5.4	5.725	6.65	7.875	8.14	8.43	8.62	9.164

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Chromium

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 9.3 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.191

For 10% significance level, 9.3 is not an outlier.

For 5% significance level, 9.3 is not an outlier.

For 1% significance level, 9.3 is not an outlier.

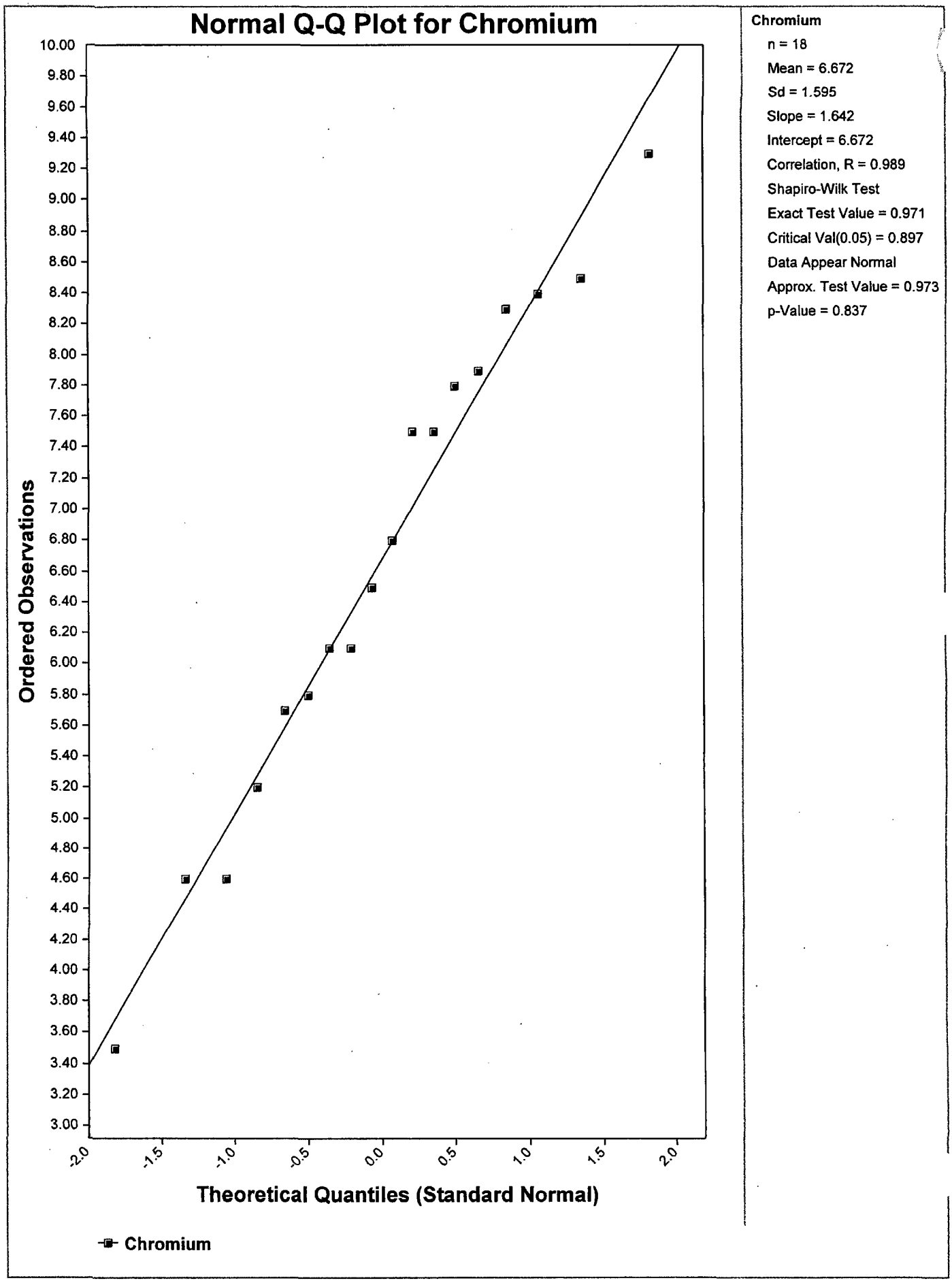
2. Data Value 3.5 is a Potential Outlier (Lower Tail)?

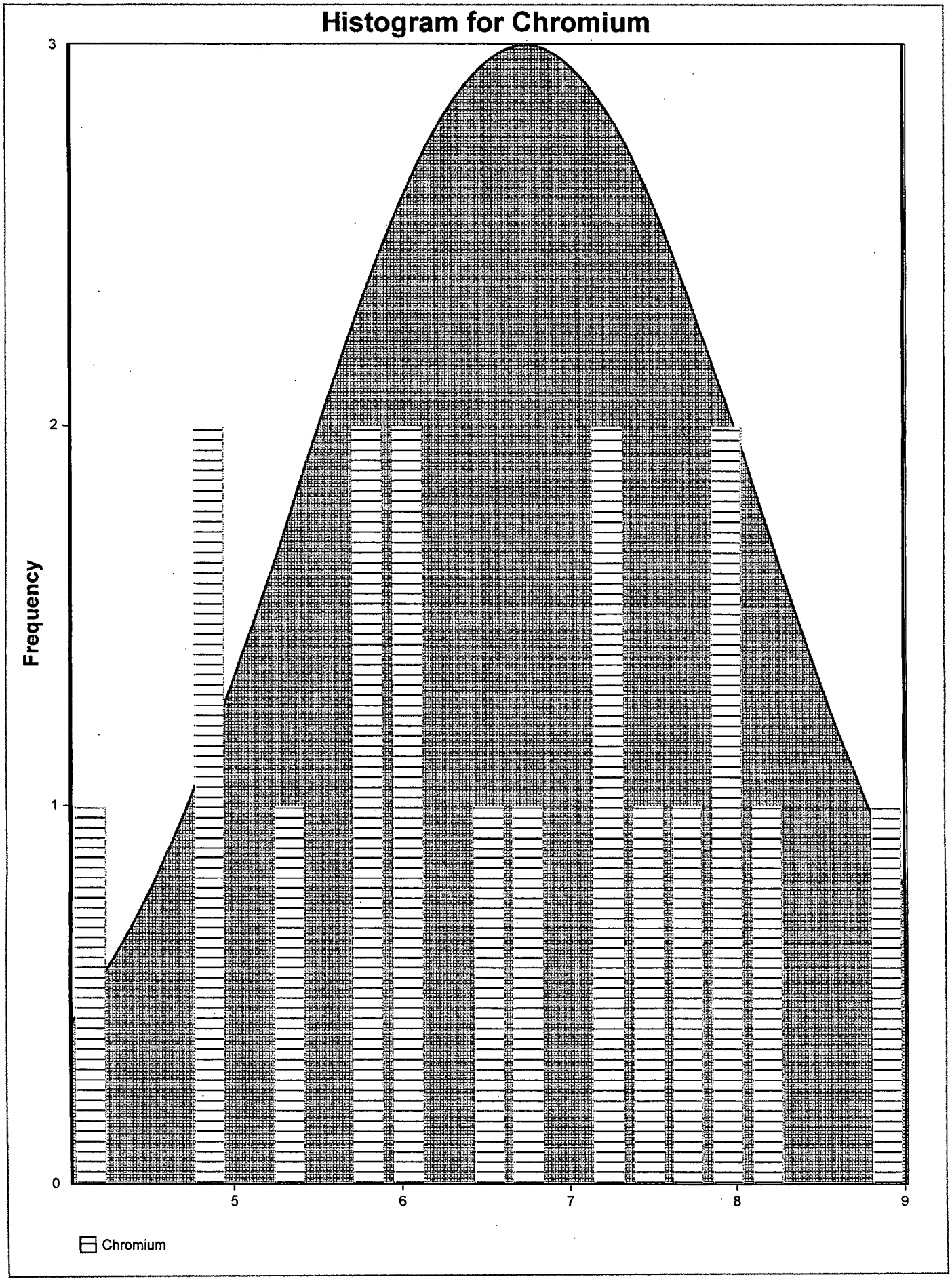
st Statistic: 0.224

For 10% significance level, 3.5 is not an outlier.

For 5% significance level, 3.5 is not an outlier.

For 1% significance level, 3.5 is not an outlier.

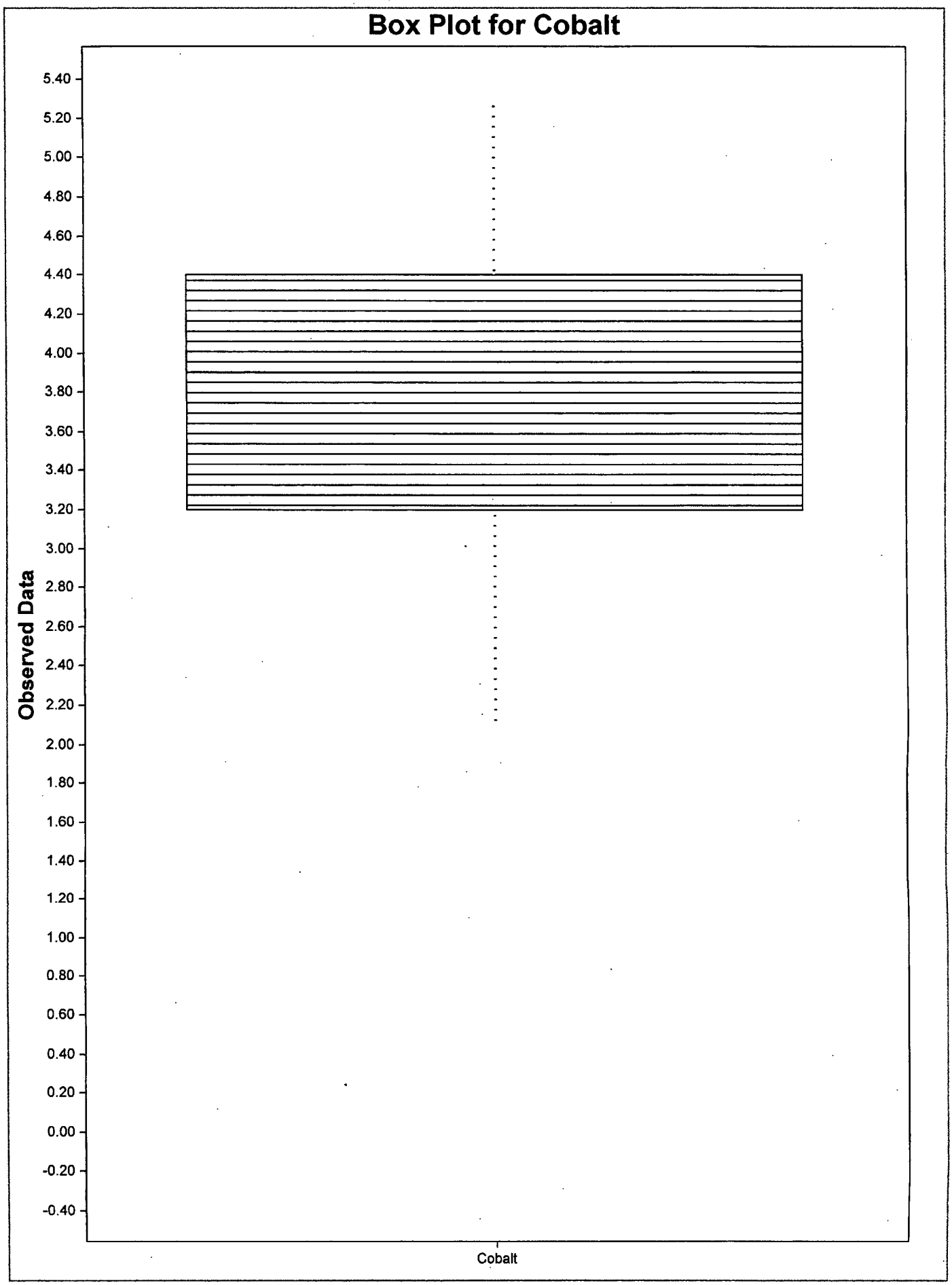

Normal Q-Q Plot for Chromium
Ordered Observations
10.00
9.80
9.60
9.40
9.20
9.00
8.80
8.60
8.40
8.20
8.00
7.80
7.60
7.40
7.20
7.00
6.80
6.60
6.40
6.20
6.00
5.80
5.60
5.40
5.20
5.00
4.80
4.60
4.40
4.20
4.00
3.80
3.60
3.40
3.20
3.00
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Chromium
Chromium
n = 18
Mean = 6.672
Sd = 1.595
Slope = 1.642
Intercept = 6.672
Correlation, R = 0.989
Shapiro-Wilk Test
Exact Test Value = 0.971
Critical Val(0.05) = 0.897
Data Appear Normal
Approx. Test Value = 0.973
p-Value = 0.837

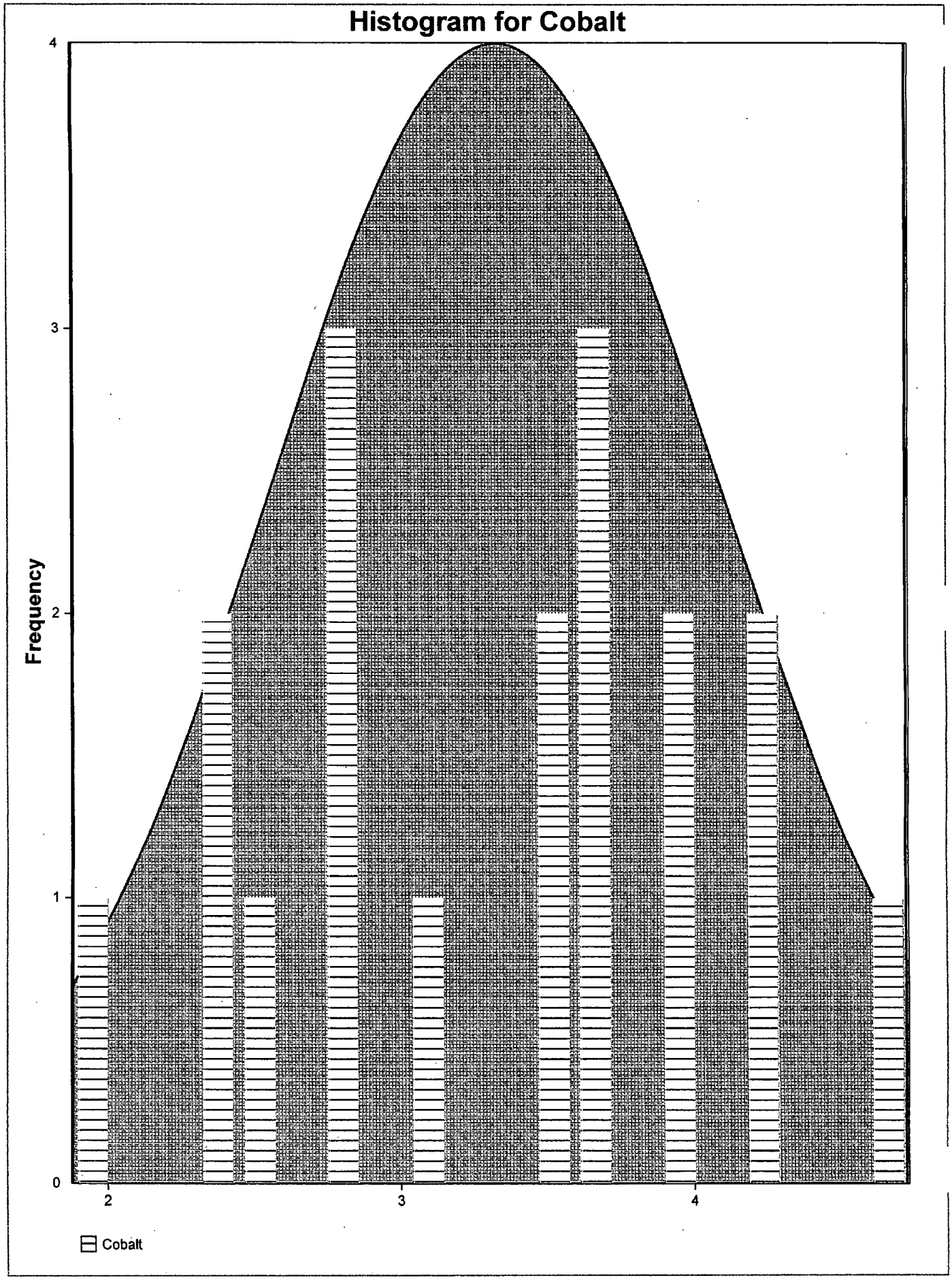

Histogram for Chromium
Frequency
3
2
1
0
5
6
7
8
9
Chromium

	Normal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1

Cobalt

Raw Statistics	
Number of Valid Observations	18
Number of Distinct Observations	11
Minimum	2.1
Maximum	5.3
Second Largest	4.8
Mean	3.728
First Quartile	3.2
Median	3.9
Third Quartile	4.325
SD	0.866
Coefficient of Variation	0.232
Skewness	-0.0766
Normal Distribution Test	
Shapiro Wilk Test Statistic	0.976
5% Shapiro Wilk Critical Value	0.897
Data appear Normal at 5% Significance Level	
Background Statistics Assuming Normal Distribution	
90% Percentile (z)	4.838
95% Percentile (z)	5.153
99% Percentile (z)	5.743
Tolerance Factor K	2.453
95% UTL with 95% Coverage	5.853
95% UPL (t)	5.276


Box Plot for Cobalt
Observed Data
5.40
5.20
5.00
4.80
4.60
4.40
4.20
4.00
3.80
3.60
3.40
3.20
3.00
2.80
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
-0.20
-0.40
Cobalt


Histogram for Cobalt
Frequency
0
1
2
3
4
2
3
4
Cobalt

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Cobalt

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 5.3 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.192

For 10% significance level, 5.3 is not an outlier.

For 5% significance level, 5.3 is not an outlier.

For 1% significance level, 5.3 is not an outlier.

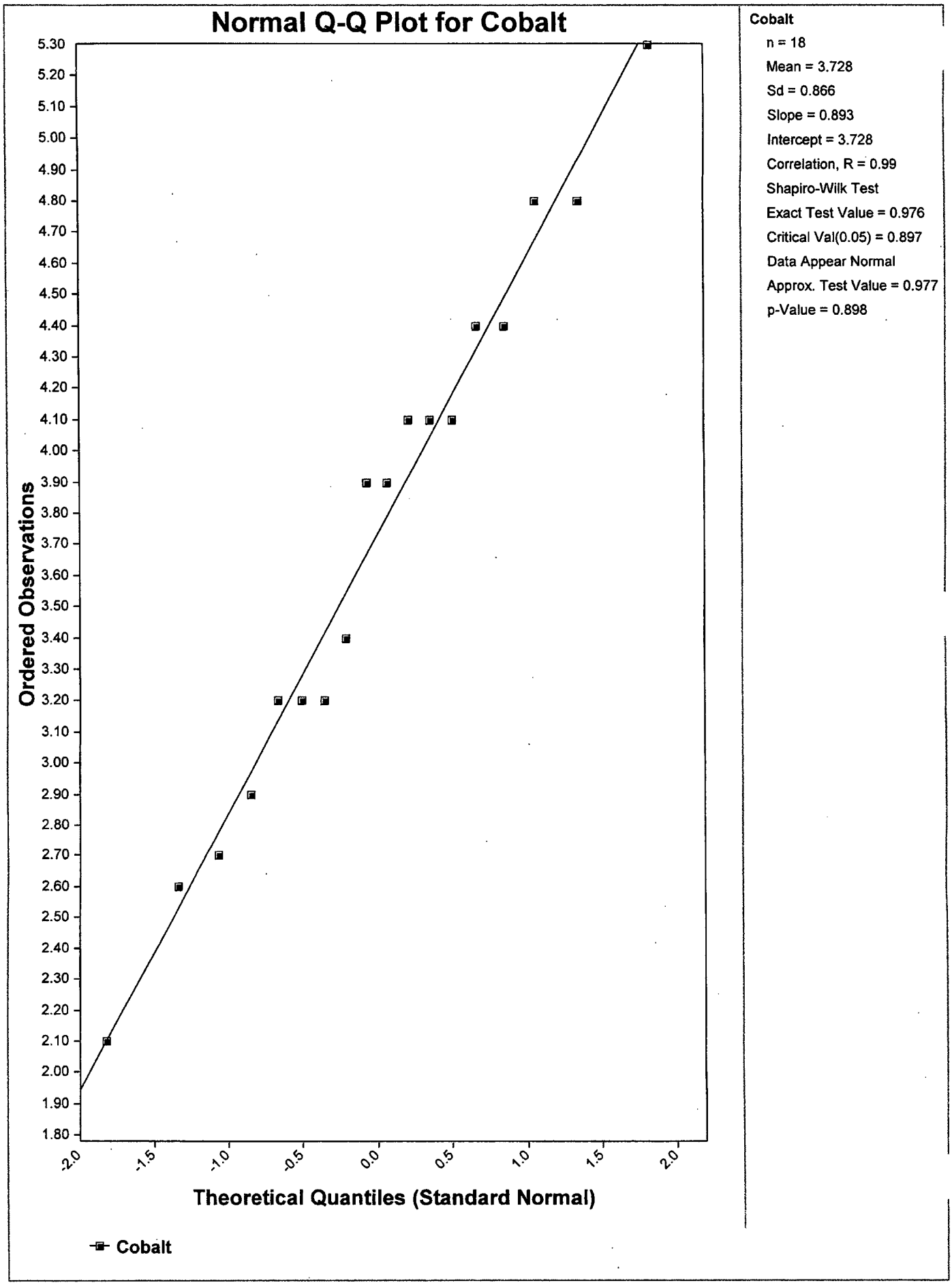
2. Data Value 2.1 is a Potential Outlier (Lower Tail)?

st Statistic: 0.222

For 10% significance level, 2.1 is not an outlier.

For 5% significance level, 2.1 is not an outlier.

For 1% significance level, 2.1 is not an outlier.


Normal Q-Q Plot for Cobalt
Ordered Observations
Theoretical Quantiles (Standard Normal)
Cobalt
5.30
5.20
5.10
5.00
4.90
4.80
4.70
4.60
4.50
4.40
4.30
4.20
4.10
4.00
3.90
3.80
3.70
3.60
3.50
3.40
3.30
3.20
3.10
3.00
2.90
2.80
2.70
2.60
2.50
2.40
2.30
2.20
2.10
2.00
1.90
1.80
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Cobalt
n = 18
Mean = 3.728
Sd = 0.866
Slope = 0.893
Intercept = 3.728
Correlation, R = 0.99
Shapiro-Wilk Test
Exact Test Value = 0.976
Critical Val(0.05) = 0.897
Data Appear Normal
Approx. Test Value = 0.977
p-Value = 0.898

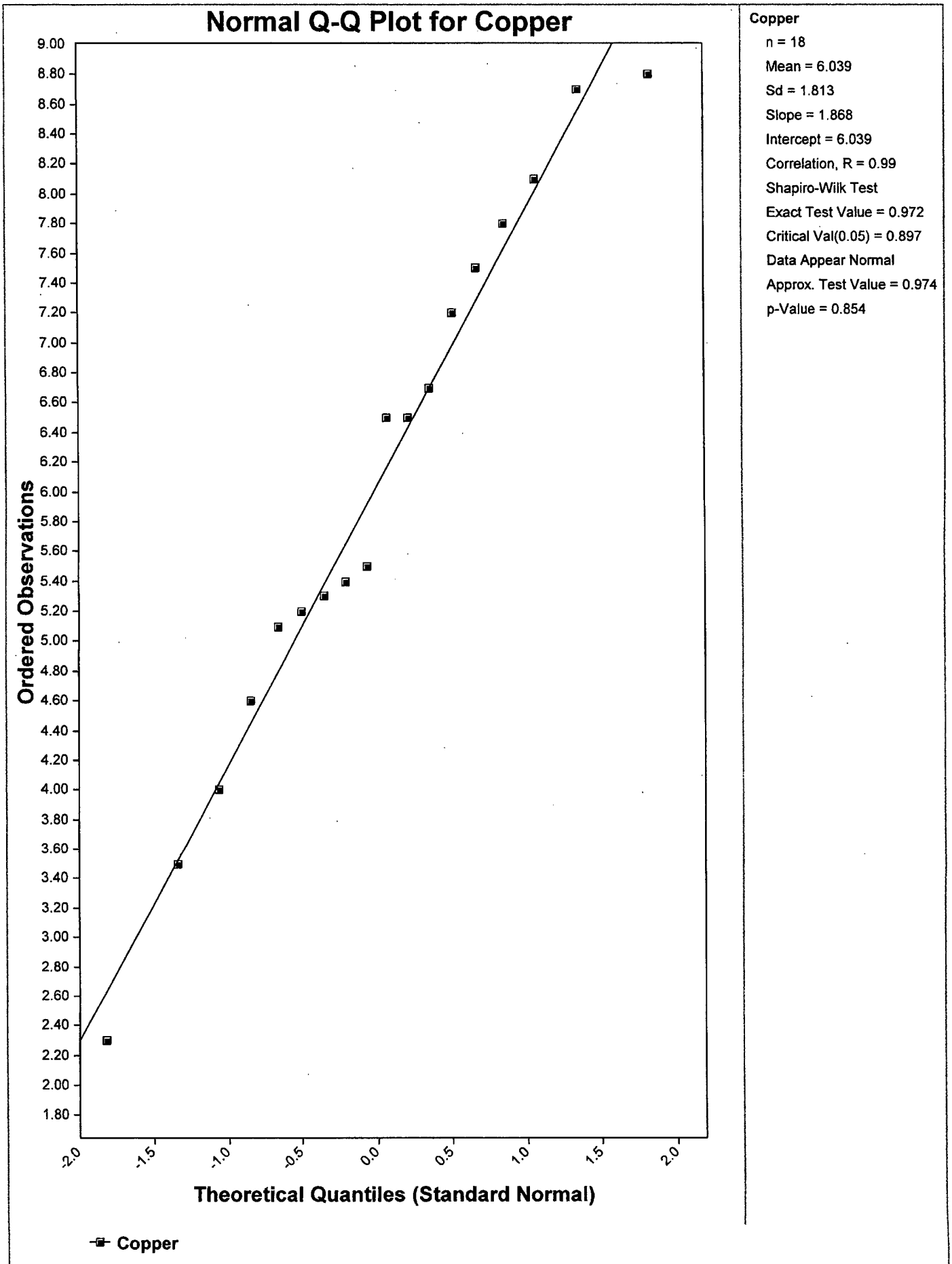
	Normal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1

Copper

Raw Statistics	
Number of Valid Observations	18
Number of Distinct Observations	17
Minimum	2.3
Maximum	8.8
Second Largest	8.7
Mean	6.039
First Quartile	5.125
Median	6
Third Quartile	7.425
SD	1.813
Coefficient of Variation	0.3
Skewness	-0.256

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.972
5% Shapiro Wilk Critical Value	0.897
Data appear Normal at 5% Significance Level	

Background Statistics Assuming Normal Distribution	
90% Percentile (z)	8.362
95% Percentile (z)	9.021
99% Percentile (z)	10.26
Tolerance Factor K	2.453
95% UTL with 95% Coverage	10.49
95% UPL (t)	9.279


Normal Q-Q Plot for Copper
Ordered Observations
Theoretical Quantiles (Standard Normal)
Copper
Copper
n = 18
Mean = 6.039
Sd = 1.813
Slope = 1.868
Intercept = 6.039
Correlation, R = 0.99
Shapiro-Wilk Test
Exact Test Value = 0.972
Critical Val(0.05) = 0.897
Data Appear Normal
Approx. Test Value = 0.974
p-Value = 0.854

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Copper

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 8.8 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.146

For 10% significance level, 8.8 is not an outlier.

For 5% significance level, 8.8 is not an outlier.

For 1% significance level, 8.8 is not an outlier.

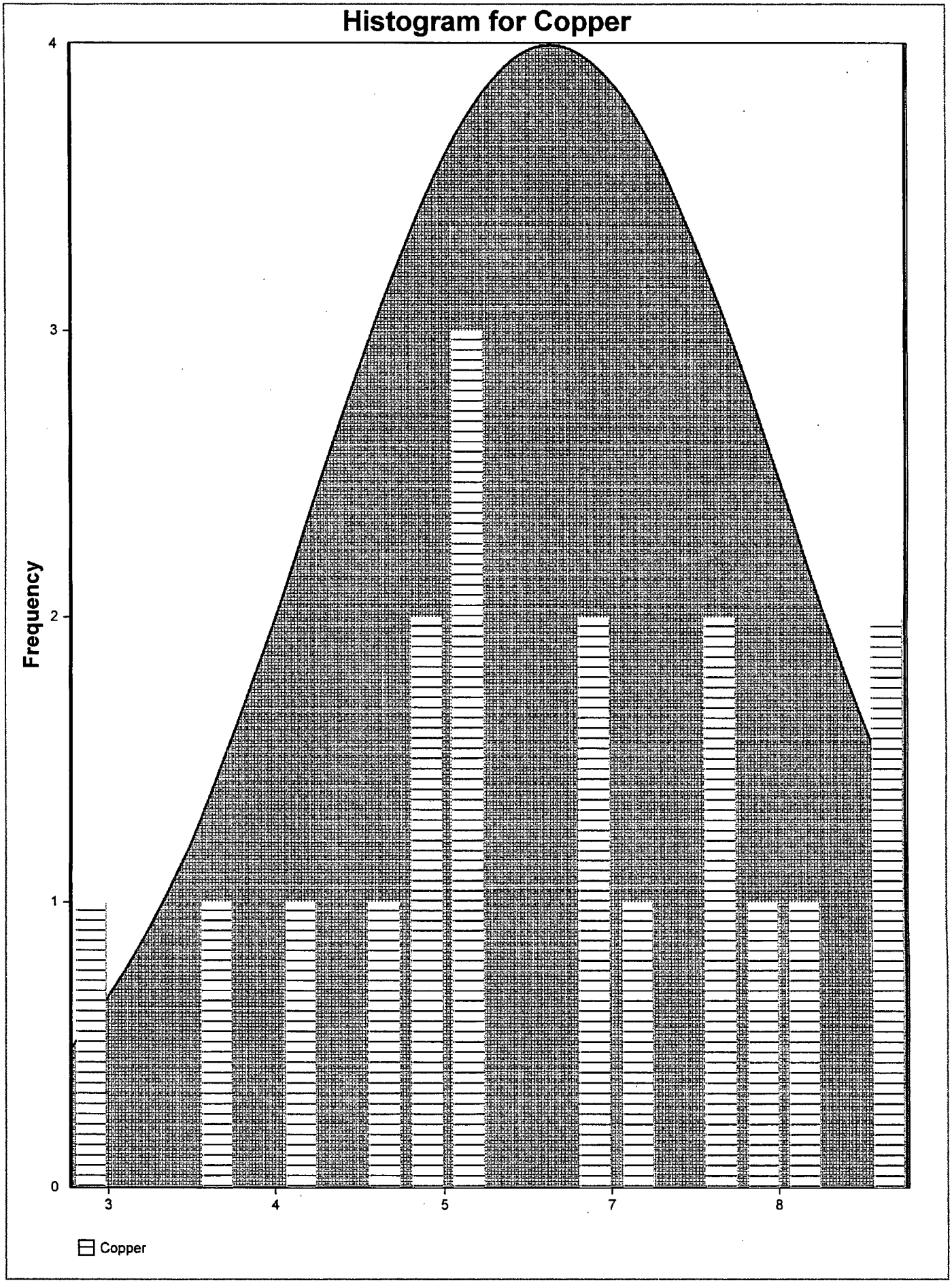
2. Data Value 2.3 is a Potential Outlier (Lower Tail)?

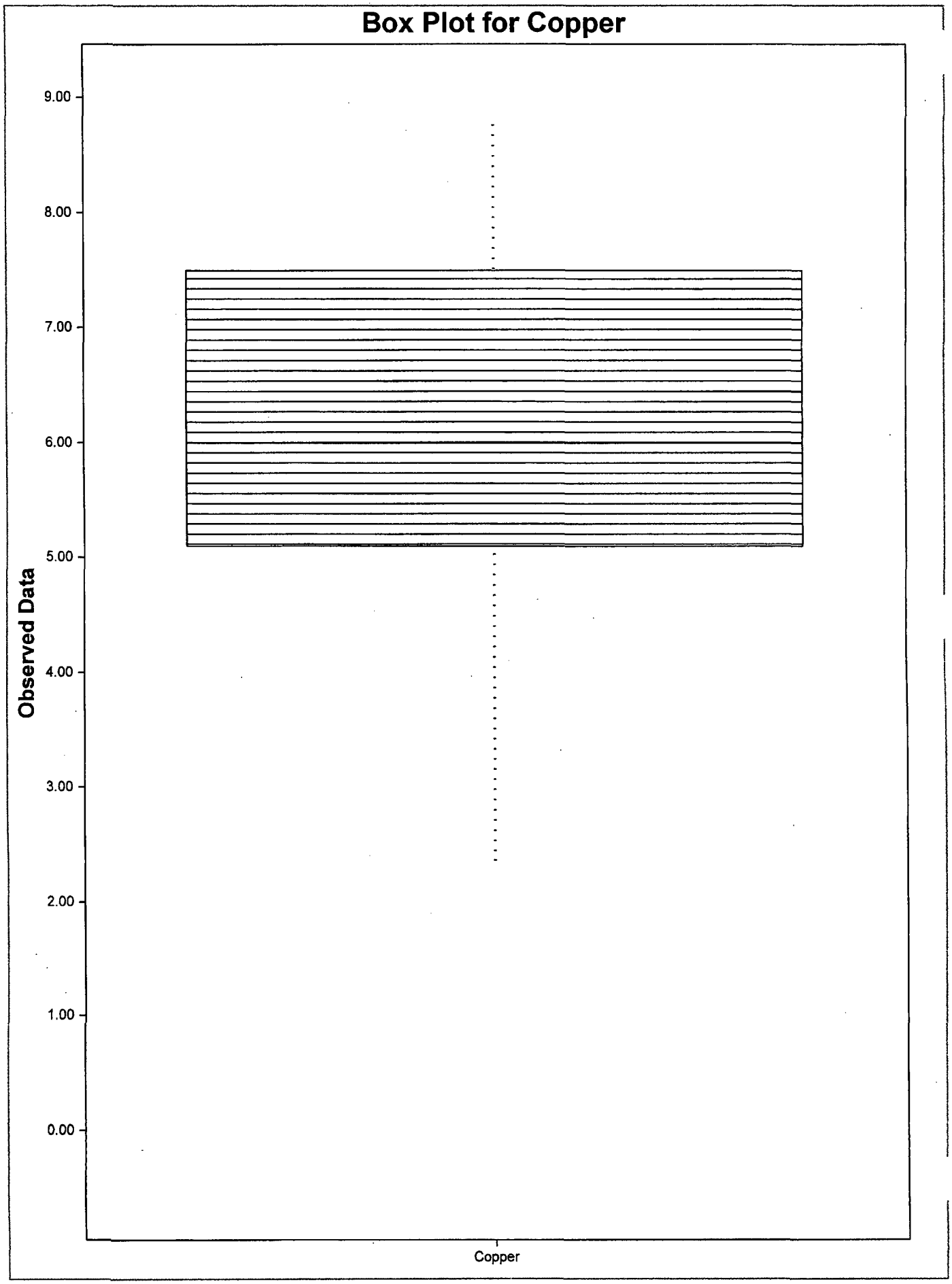
Test Statistic: 0.293

For 10% significance level, 2.3 is not an outlier.

For 5% significance level, 2.3 is not an outlier.

For 1% significance level, 2.3 is not an outlier.


Histogram for Copper
Frequency
0
1
2
3
4
3
4
5
7
8
Copper


Box Plot for Copper
Observed Data
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Copper

	Lognormal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1
Number of Bootstrap Operations	2000

Fluoride

Log-Transformed Statistics	
Number of Valid Observations	18
Number of Distinct Observations	17
Minimum	-0.713
Maximum	2.485
Second Largest	2.398
Mean	0.897
First Quartile	-0.217
Median	1.082
Third Quartile	1.839
SD	1.095
Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.898
5% Shapiro Wilk Critical Value	0.897
Data appear Lognormal at 5% Significance Level	
Background Statistics Assuming Lognormal Distribution	
90% Percentile (z)	9.978
95% Percentile (z)	14.85
99% Percentile (z)	31.32
95% UPL	17.36
Tolerance Factor K	2.453
95% UTL with 95% Coverage	35.98
Some Nonparametric Background Statistics	
95% Chebyshev UPL	20.81
95% Bootstrap BCA UTL with 95% Coverage	12
95% Percentile Bootstrap UTL with 95% Coverage	12

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	*OFF*
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Fluoride

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 12 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.302

For 10% significance level, 12 is not an outlier.

For 5% significance level, 12 is not an outlier.

For 1% significance level, 12 is not an outlier.

2. Data Value 0.49 is a Potential Outlier (Lower Tail)?

st Statistic: 0.032

For 10% significance level, 0.49 is not an outlier.

For 5% significance level, 0.49 is not an outlier.

For 1% significance level, 0.49 is not an outlier.

From File: WorkSheet.wst

Summary Statistics for Log-Transformed Full Dataset

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
Fluoride	18	-0.713	2.485	0.897	1.082	1.199	1.095	1.641	-0.00836	-1.643	1.22

Percentiles for Log-Transformed Full Dataset

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Fluoride	18	-0.375	-0.296	-0.267	-0.217	1.082	1.839	1.958	2.226	2.411	2.47

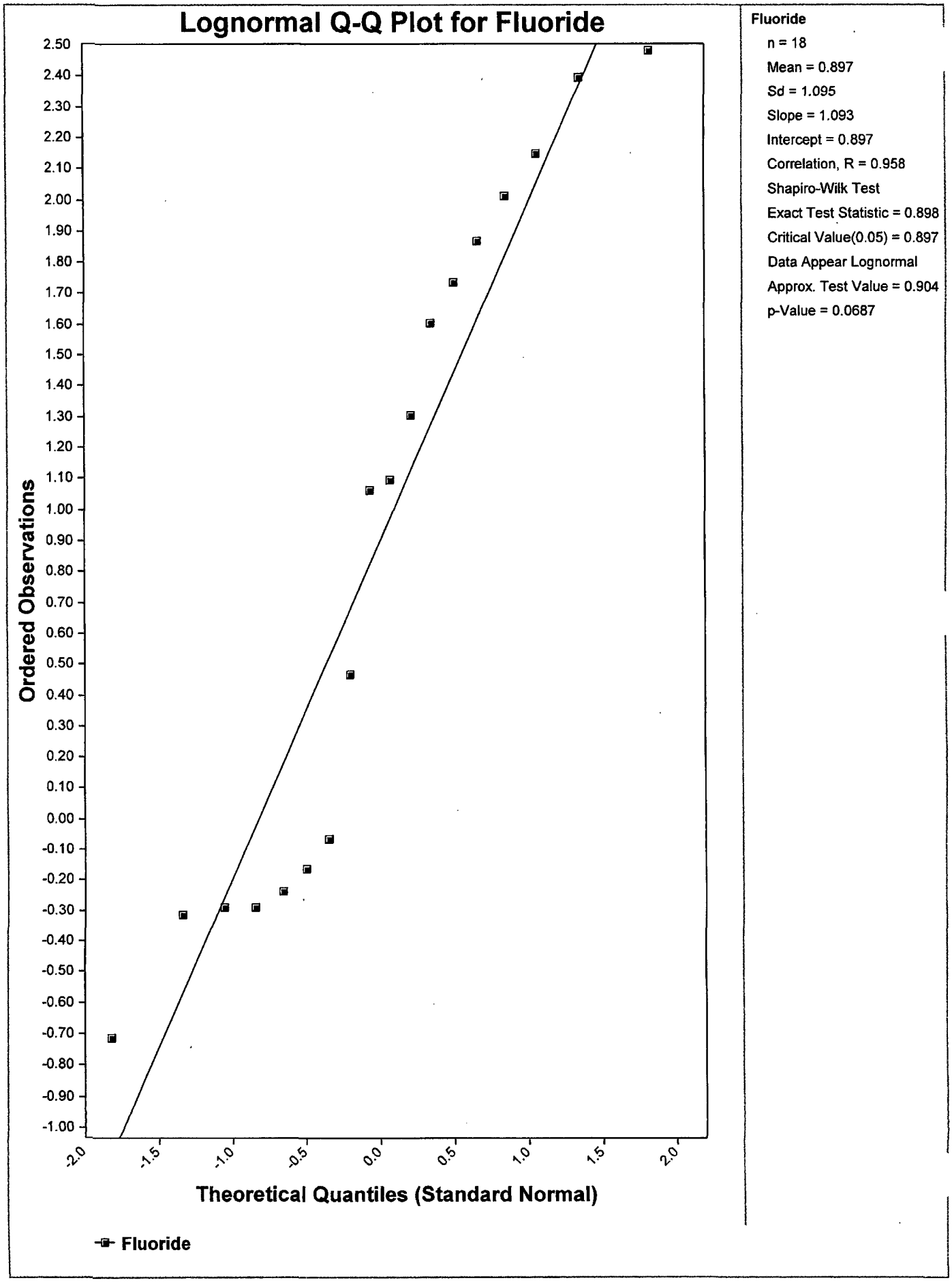
From File: WorkSheet.wst

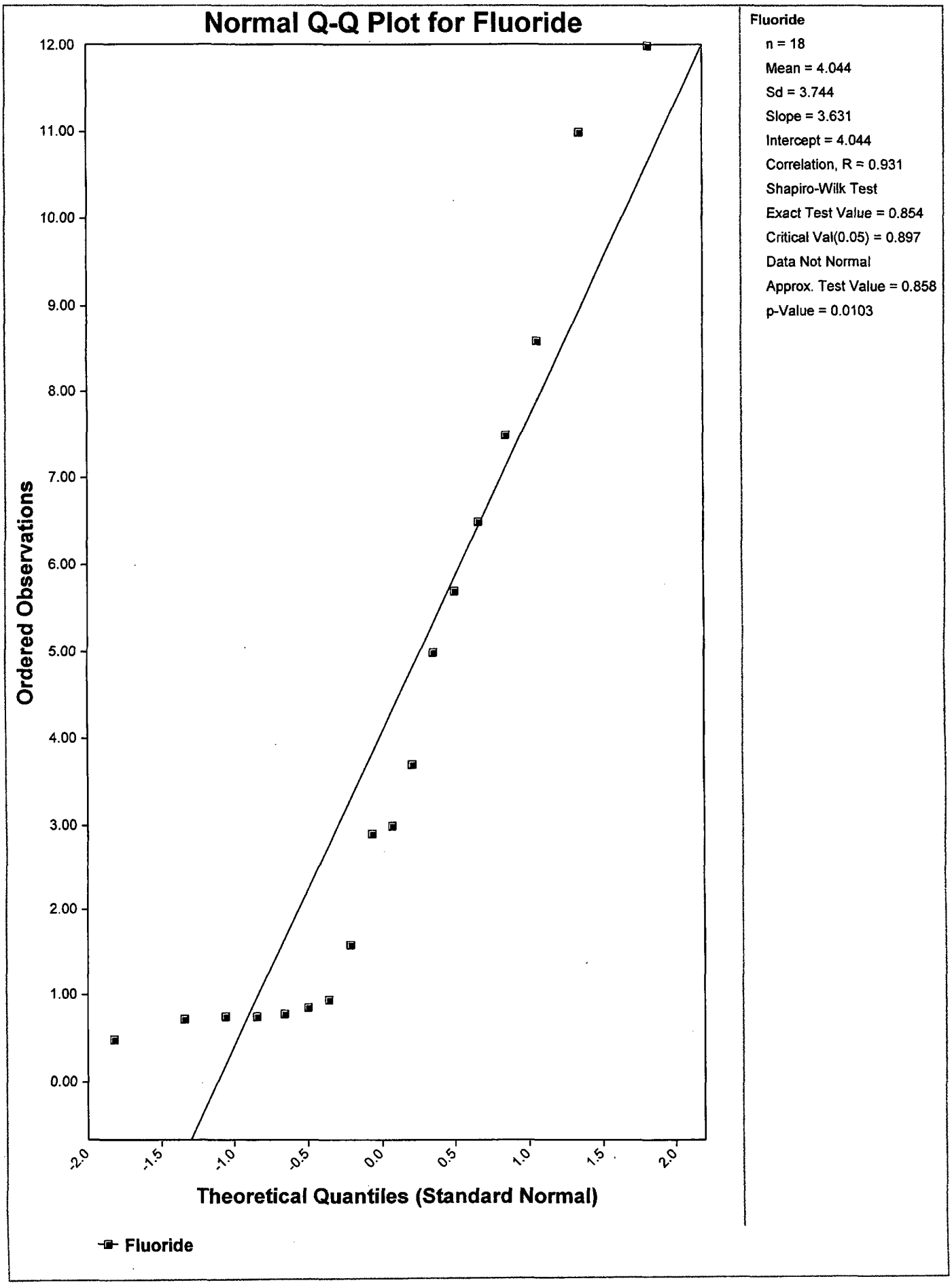
Summary Statistics for Raw Full Dataset

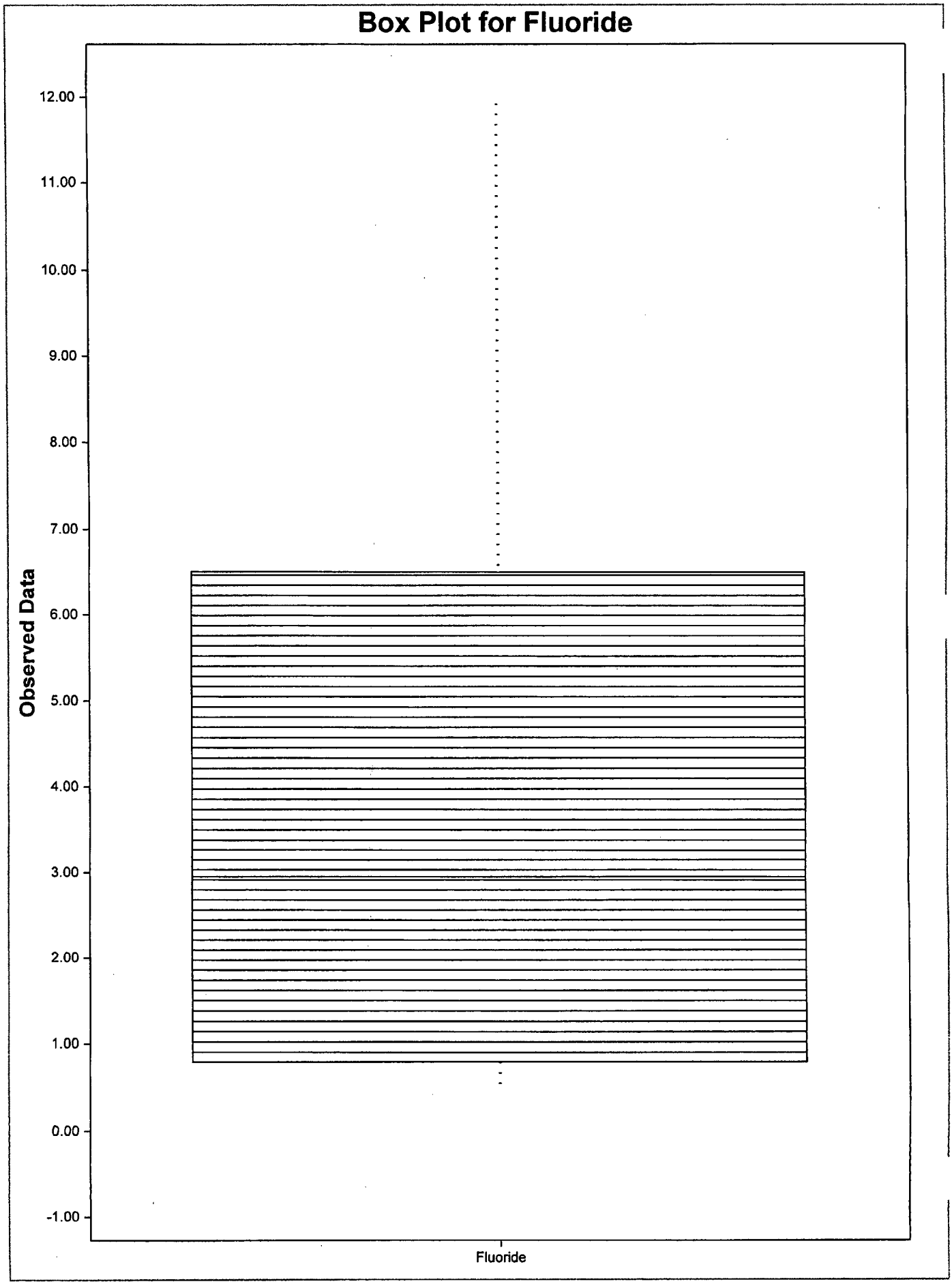
Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
Fluoride	18	0.49	12	4.044	2.95	14.02	3.744	3.262	0.919	-0.273	0.926

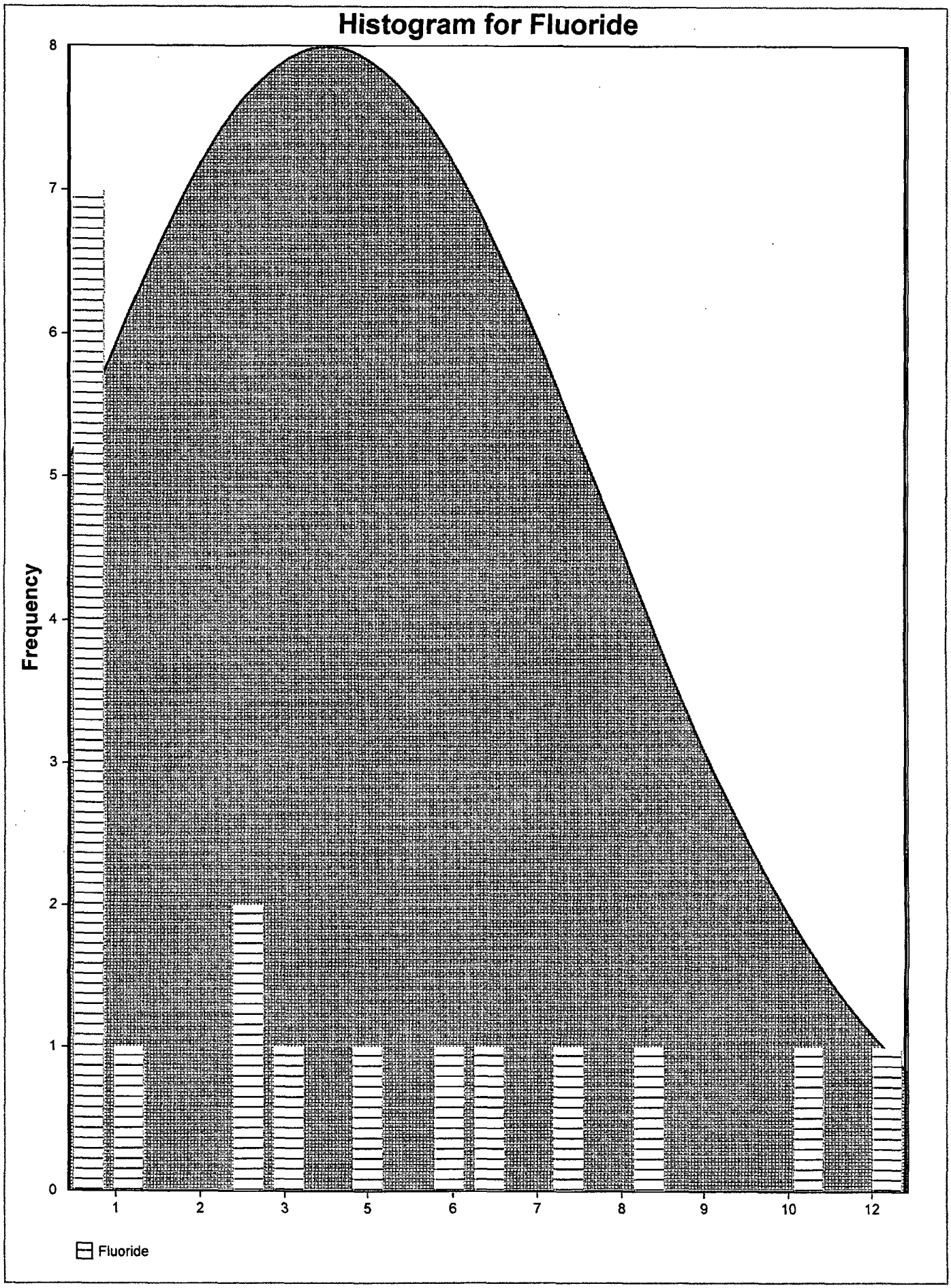
Percentiles for Raw Full Dataset

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Fluoride	18	0.694	0.744	0.766	0.805	2.95	6.3	7.1	9.32	11.15	11.83


Lognormal Q-Q Plot for Fluoride
Ordered Observations
Theoretical Quantiles (Standard Normal)
Fluoride
n = 18
Mean = 0.897
Sd = 1.095
Slope = 1.093
Intercept = 0.897
Correlation, R = 0.958
Shapiro-Wilk Test
Exact Test Statistic = 0.898
Critical Value(0.05) = 0.897
Data Appear Lognormal
Approx. Test Value = 0.904
p-Value = 0.0687
Fluoride


Normal Q-Q Plot for Fluoride
Ordered Observations
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Fluoride
Fluoride
n = 18
Mean = 4.044
Sd = 3.744
Slope = 3.631
Intercept = 4.044
Correlation, R = 0.931
Shapiro-Wilk Test
Exact Test Value = 0.854
Critical Val(0.05) = 0.897
Data Not Normal
Approx. Test Value = 0.858
p-Value = 0.0103


Box Plot for Fluoride
Observed Data
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
Fluoride


Histogram for Fluoride
Frequency
0
1
2
3
4
5
6
7
8
1
2
3
5
6
7
8
9
10
12
Fluoride

	Normal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1

Iron

Raw Statistics	
Number of Valid Observations	18
Number of Distinct Observations	12
Minimum	6500
Maximum	19000
Second Largest	18000
Mean	13539
First Quartile	11250
Median	13000
Third Quartile	17500
SD	3811
Coefficient of Variation	0.281
Skewness	-0.203

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.938
5% Shapiro Wilk Critical Value	0.897
Data appear Normal at 5% Significance Level	

Background Statistics Assuming Normal Distribution	
90% Percentile (z)	18423
95% Percentile (z)	19807
99% Percentile (z)	22404
Tolerance Factor K	2.453
95% UTL with 95% Coverage	22887
95% UPL (t)	20350

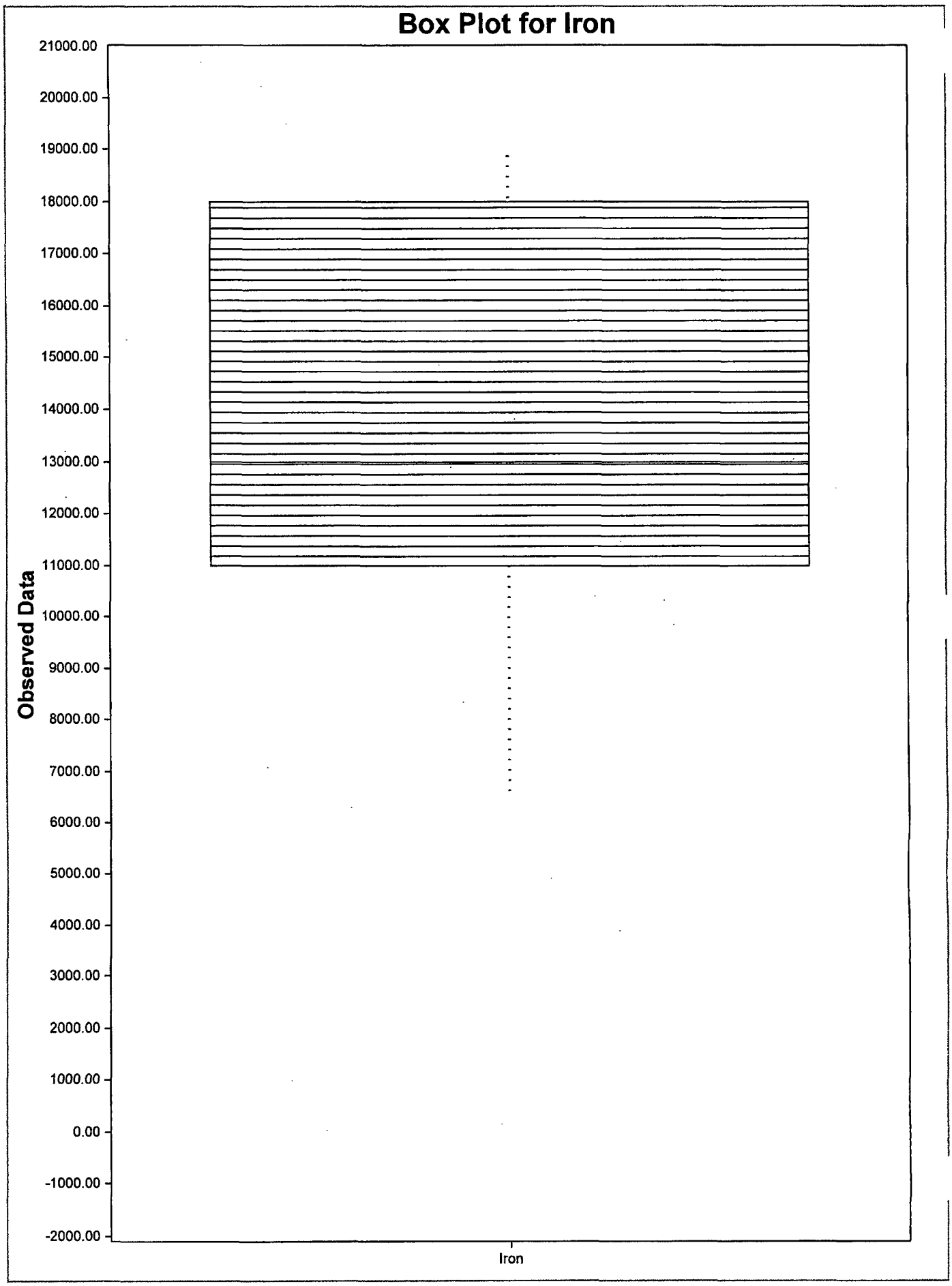
From File: WorkSheet.wst

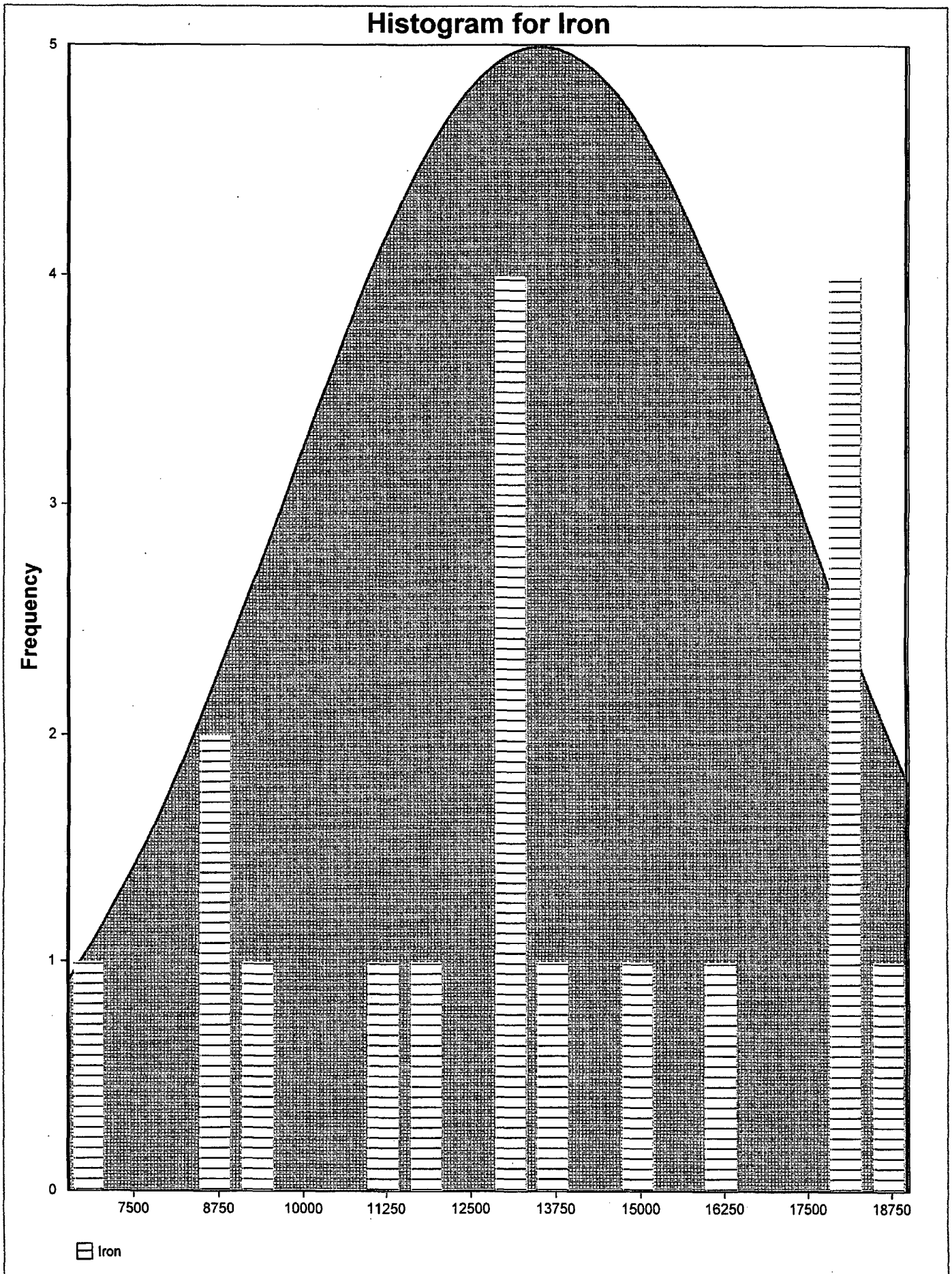
Summary Statistics for Raw Full Dataset

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
Iron	18	6500	19000	13539	13000	14522516	3811	5115	-0.203	-0.969	0.281

Percentiles for Raw Full Dataset

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Iron	18	8115	8610	9860	11250	13000	17500	18000	18000	18150	18830


Box Plot for Iron
Observed Data
21000.00
20000.00
19000.00
18000.00
17000.00
16000.00
15000.00
14000.00
13000.00
12000.00
11000.00
10000.00
9000.00
8000.00
7000.00
6000.00
5000.00
4000.00
3000.00
2000.00
1000.00
0.00
-1000.00
-2000.00
Iron


Histogram for Iron
Frequency
0
1
2
3
4
5
7500
8750
10000
11250
12500
13750
15000
16250
17500
18750
Iron

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Iron

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 19000 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.097

For 10% significance level, 19000 is not an outlier.

For 5% significance level, 19000 is not an outlier.

For 1% significance level, 19000 is not an outlier.

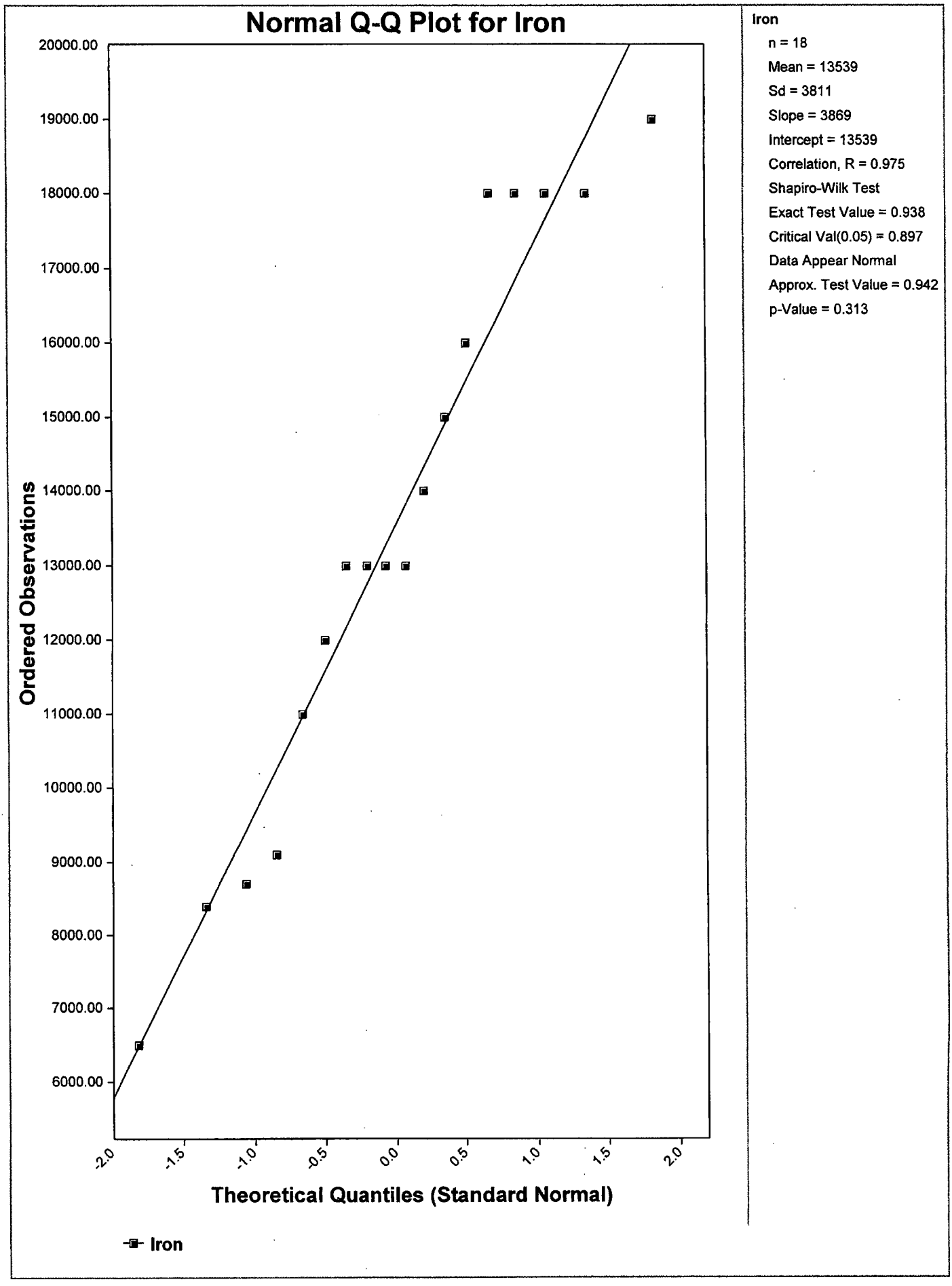
2. Data Value 6500 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.191

For 10% significance level, 6500 is not an outlier.

For 5% significance level, 6500 is not an outlier.

For 1% significance level, 6500 is not an outlier.


Normal Q-Q Plot for Iron
20000.00
19000.00
18000.00
17000.00
16000.00
15000.00
14000.00
13000.00
12000.00
11000.00
10000.00
9000.00
8000.00
7000.00
6000.00
Ordered Observations
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Iron
Iron
n = 18
Mean = 13539
Sd = 3811
Slope = 3869
Intercept = 13539
Correlation, R = 0.975
Shapiro-Wilk Test
Exact Test Value = 0.938
Critical Val(0.05) = 0.897
Data Appear Normal
Approx. Test Value = 0.942
p-Value = 0.313

	Normal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1

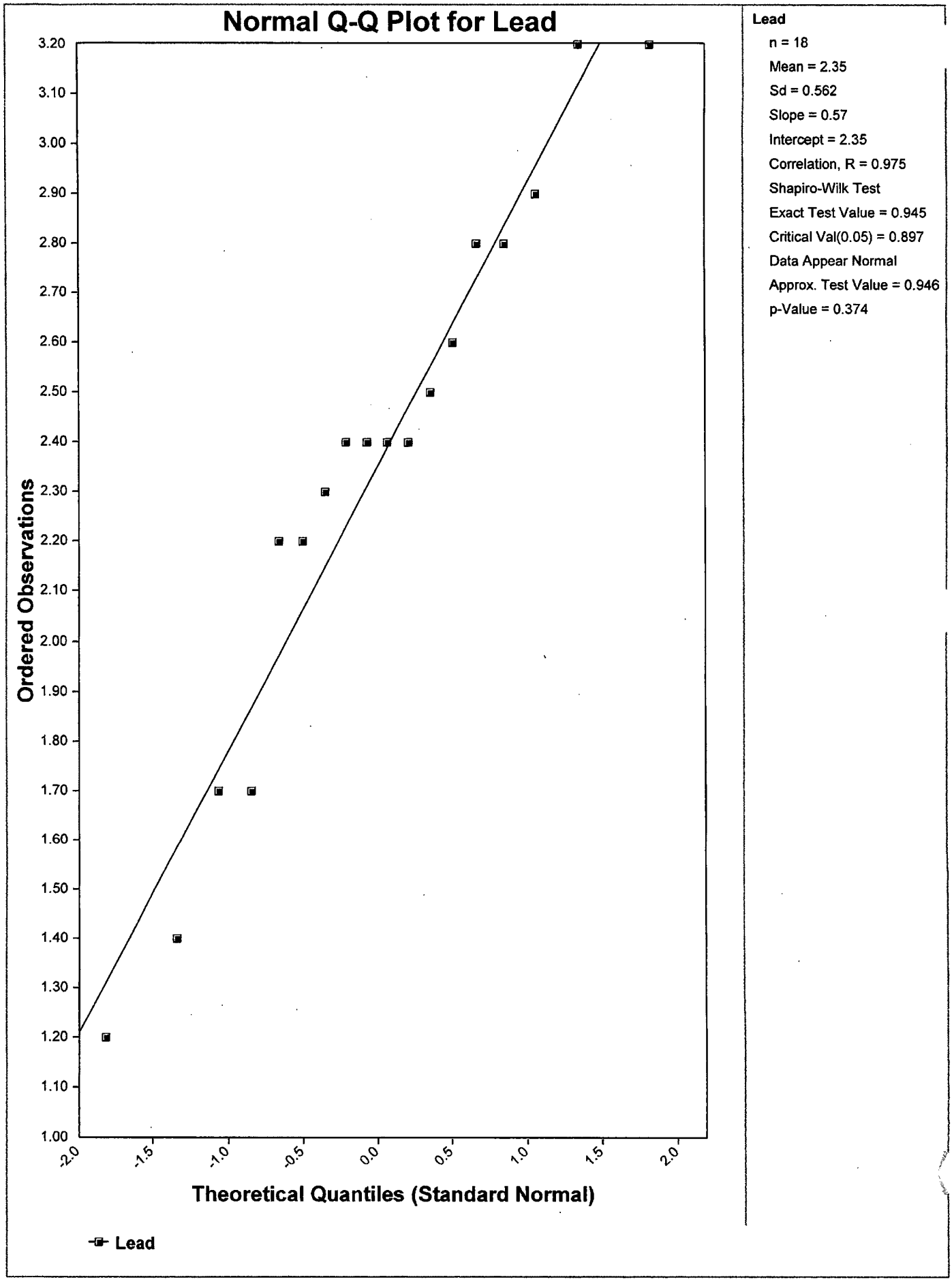
Lead

Raw Statistics	
Number of Valid Observations	18
Number of Distinct Observations	11
Minimum	1.2
Maximum	3.2
Second Largest	3.2
Mean	2.35
First Quartile	2.2
Median	2.4
Third Quartile	2.75
SD	0.562
Coefficient of Variation	0.239
Skewness	-0.499

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.945
5% Shapiro Wilk Critical Value	0.897

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution	
90% Percentile (z)	3.07
95% Percentile (z)	3.274
99% Percentile (z)	3.657
Tolerance Factor K	2.453
95% UTL with 95% Coverage	3.728
95% UPL (t)	3.354


Normal Q-Q Plot for Lead
Ordered Observations
3.20
3.10
3.00
2.90
2.80
2.70
2.60
2.50
2.40
2.30
2.20
2.10
2.00
1.90
1.80
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Lead
Lead
n = 18
Mean = 2.35
Sd = 0.562
Slope = 0.57
Intercept = 2.35
Correlation, R = 0.975
Shapiro-Wilk Test
Exact Test Value = 0.945
Critical Val(0.05) = 0.897
Data Appear Normal
Approx. Test Value = 0.946
p-Value = 0.374

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Lead

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 3.2 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.200

For 10% significance level, 3.2 is not an outlier.

For 5% significance level, 3.2 is not an outlier.

For 1% significance level, 3.2 is not an outlier.

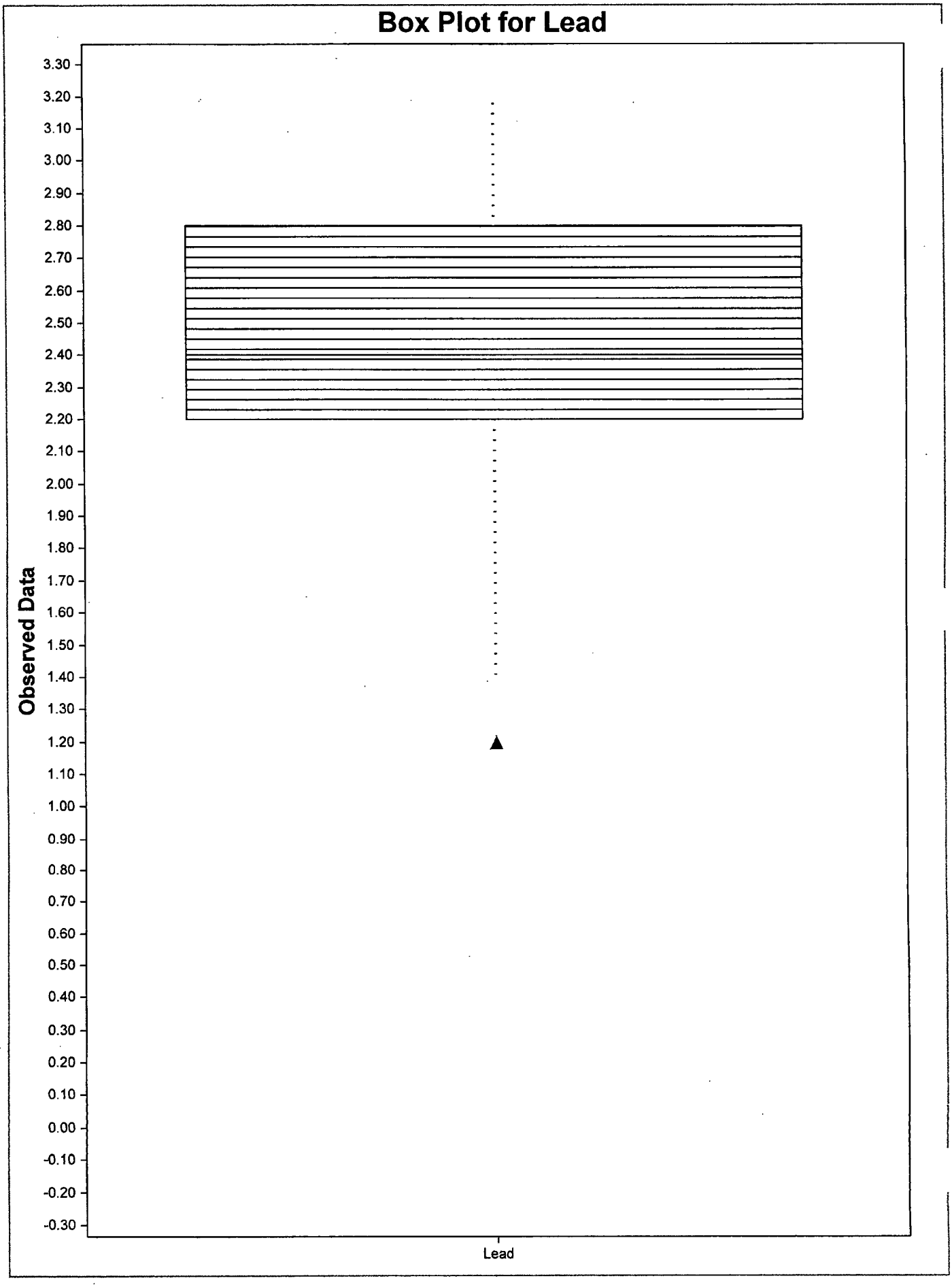
2. Data Value 1.2 is a Potential Outlier (Lower Tail)?

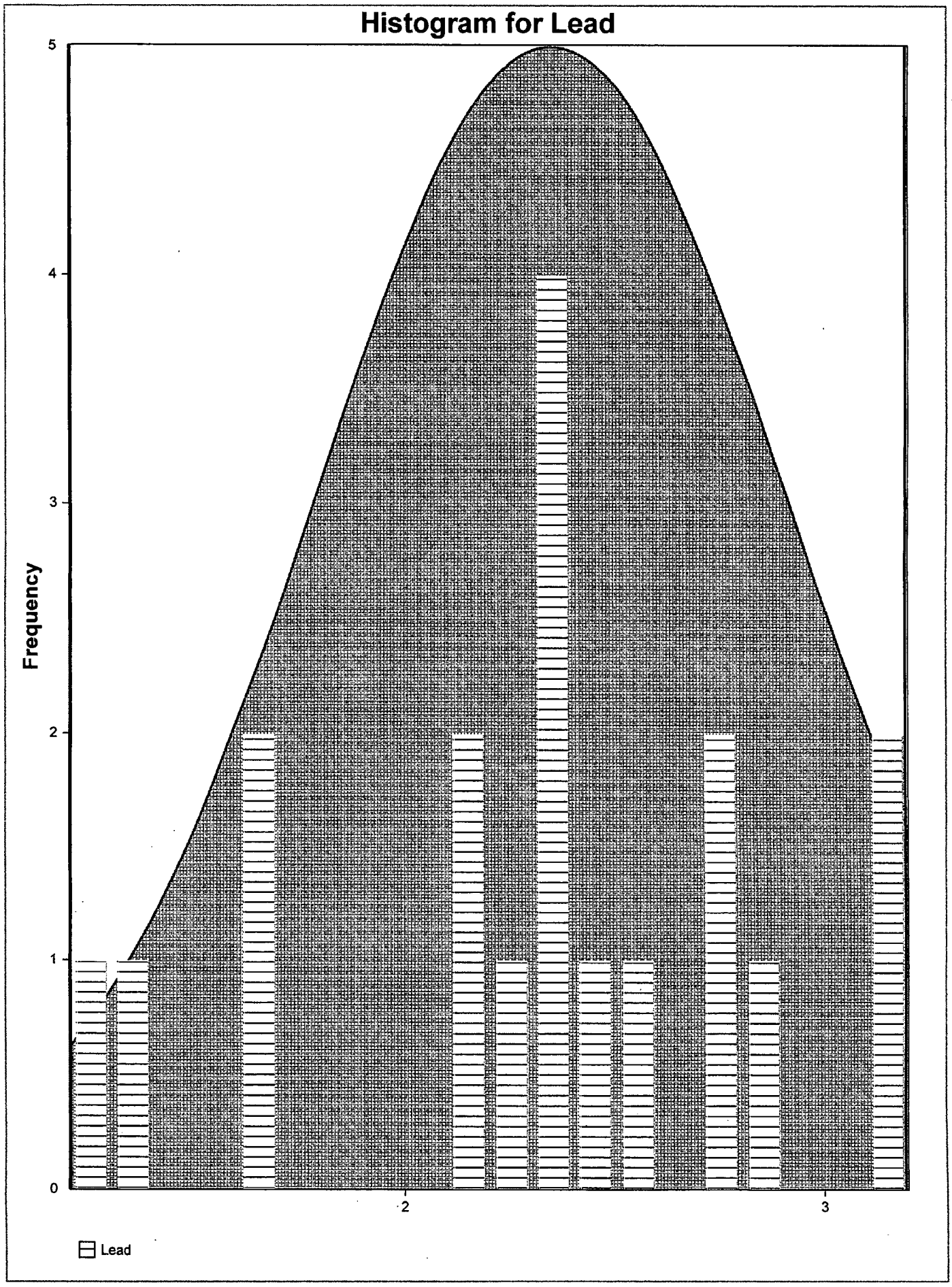
st Statistic: 0.294

For 10% significance level, 1.2 is not an outlier.

For 5% significance level, 1.2 is not an outlier.

For 1% significance level, 1.2 is not an outlier.


Box Plot for Lead
Observed Data
3.30
3.20
3.10
3.00
2.90
2.80
2.70
2.60
2.50
2.40
2.30
2.20
2.10
2.00
1.90
1.80
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
-0.10
-0.20
-0.30
Lead


Histogram for Lead
Frequency
5
4
3
2
1
0
2
3
Lead

	Normal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1

Manganese

Raw Statistics	
Number of Valid Observations	18
Number of Distinct Observations	12
Minimum	130
Maximum	360
Second Largest	290
Mean	240.6
First Quartile	200
Median	255
Third Quartile	280
SD	57.75
Coefficient of Variation	0.24
Skewness	-0.0857

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.962
5% Shapiro Wilk Critical Value	0.897
Data appear Normal at 5% Significance Level	

Background Statistics Assuming Normal Distribution	
90% Percentile (z)	314.6
95% Percentile (z)	335.5
99% Percentile (z)	374.9
Tolerance Factor K	2.453
95% UTL with 95% Coverage	382.2
95% UPL (t)	343.8

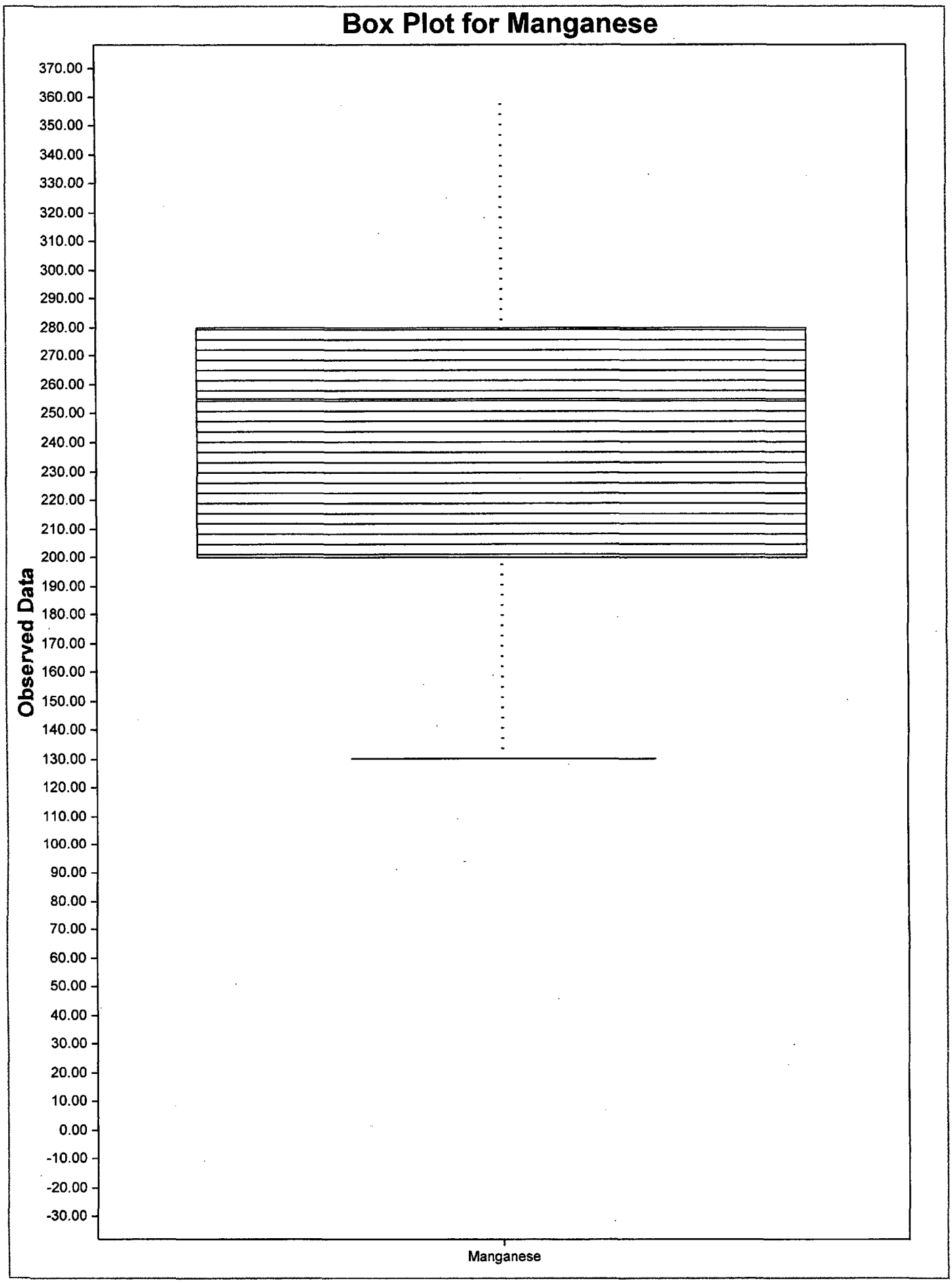
From File: WorkSheet.wst

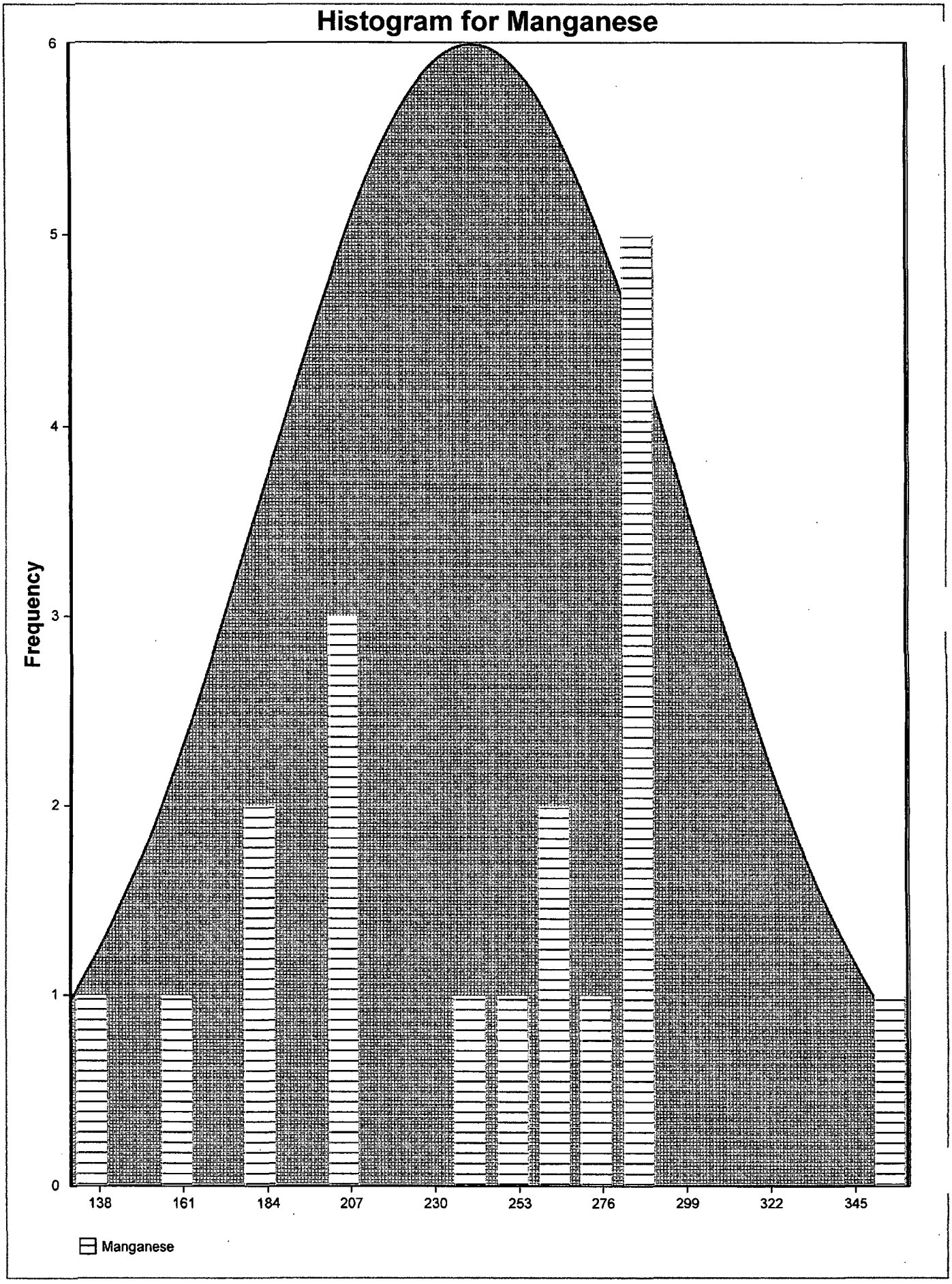
Summary Statistics for Raw Full Dataset

Variable	NumObs	Minimum	Maximum	Mean	Median	Variance	SD	MAD/0.675	Skewness	Kurtosis	CV
Manganese	18	130	360	240.6	255	3335	57.75	51.89	-0.0857	-0.206	0.24

Percentiles for Raw Full Dataset

Variable	NumObs	5%ile	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
Manganese	18	155.5	174	188	200	255	280	286	290	300.5	348.1


Box Plot for Manganese
Observed Data
370.00
360.00
350.00
340.00
330.00
320.00
310.00
300.00
290.00
280.00
270.00
260.00
250.00
240.00
230.00
220.00
210.00
200.00
190.00
180.00
170.00
160.00
150.00
140.00
130.00
120.00
110.00
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
Manganese


Histogram for Manganese
Frequency
0
1
2
3
4
5
6
138
161
184
207
230
253
276
299
322
345
Manganese

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Manganese

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 360 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.389

For 10% significance level, 360 is not an outlier.

For 5% significance level, 360 is not an outlier.

For 1% significance level, 360 is not an outlier.

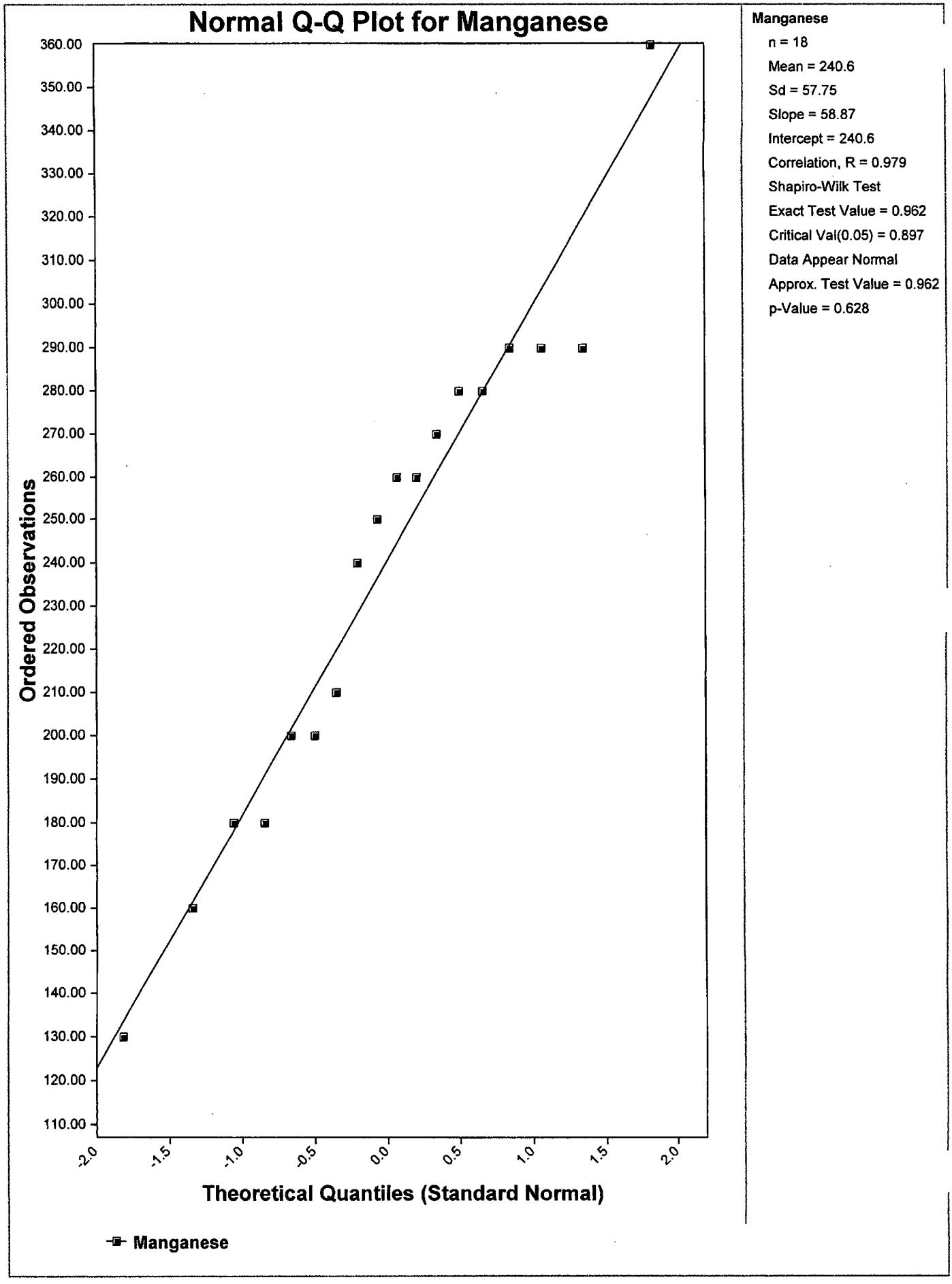
2. Data Value 130 is a Potential Outlier (Lower Tail)?

st Statistic: 0.313

For 10% significance level, 130 is not an outlier.

For 5% significance level, 130 is not an outlier.

For 1% significance level, 130 is not an outlier.


Normal Q-Q Plot for Manganese
Ordered Observations
360.00
350.00
340.00
330.00
320.00
310.00
300.00
290.00
280.00
270.00
260.00
250.00
240.00
230.00
220.00
210.00
200.00
190.00
180.00
170.00
160.00
150.00
140.00
130.00
120.00
110.00
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Manganese
Manganese
n = 18
Mean = 240.6
Sd = 57.75
Slope = 58.87
Intercept = 240.6
Correlation, R = 0.979
Shapiro-Wilk Test
Exact Test Value = 0.962
Critical Val(0.05) = 0.897
Data Appear Normal
Approx. Test Value = 0.962
p-Value = 0.628

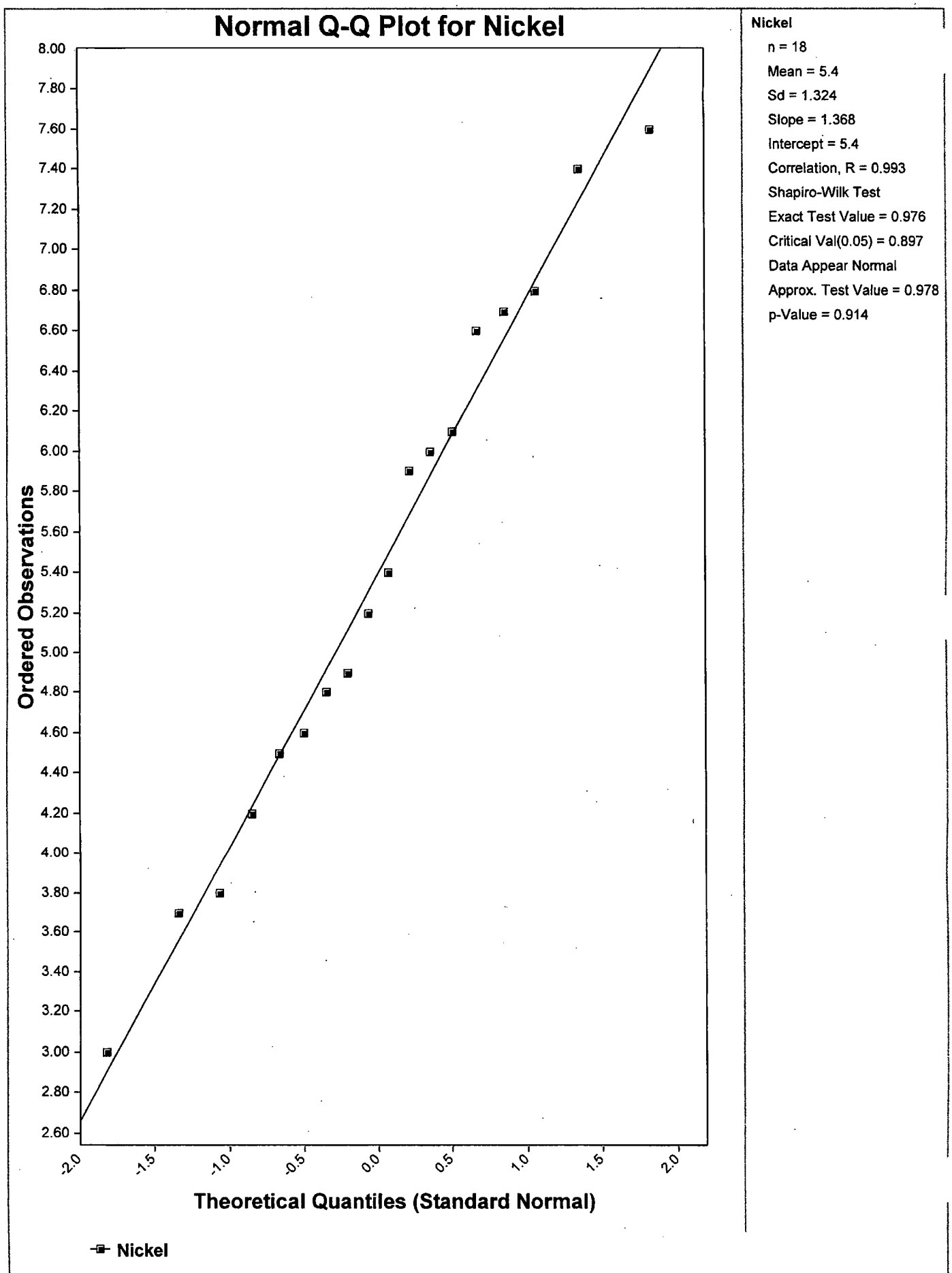
	Normal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1

Nickel

Raw Statistics	
Number of Valid Observations	18
Number of Distinct Observations	18
Minimum	3
Maximum	7.6
Second Largest	7.4
Mean	5.4
First Quartile	4.525
Median	5.3
Third Quartile	6.475
SD	1.324
Coefficient of Variation	0.245
Skewness	-0.00428

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.976
5% Shapiro Wilk Critical Value	0.897
Data appear Normal at 5% Significance Level	

Background Statistics Assuming Normal Distribution	
90% Percentile (z)	7.096
95% Percentile (z)	7.577
99% Percentile (z)	8.479
Tolerance Factor K	2.453
95% UTL with 95% Coverage	8.647
95% UPL (t)	7.766


Normal Q-Q Plot for Nickel
Ordered Observations
8.00
7.80
7.60
7.40
7.20
7.00
6.80
6.60
6.40
6.20
6.00
5.80
5.60
5.40
5.20
5.00
4.80
4.60
4.40
4.20
4.00
3.80
3.60
3.40
3.20
3.00
2.80
2.60
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Nickel
Nickel
n = 18
Mean = 5.4
Sd = 1.324
Slope = 1.368
Intercept = 5.4
Correlation, R = 0.993
Shapiro-Wilk Test
Exact Test Value = 0.976
Critical Val(0.05) = 0.897
Data Appear Normal
Approx. Test Value = 0.978
p-Value = 0.914

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Nickel

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 7.6 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.211

For 10% significance level, 7.6 is not an outlier.

For 5% significance level, 7.6 is not an outlier.

For 1% significance level, 7.6 is not an outlier.

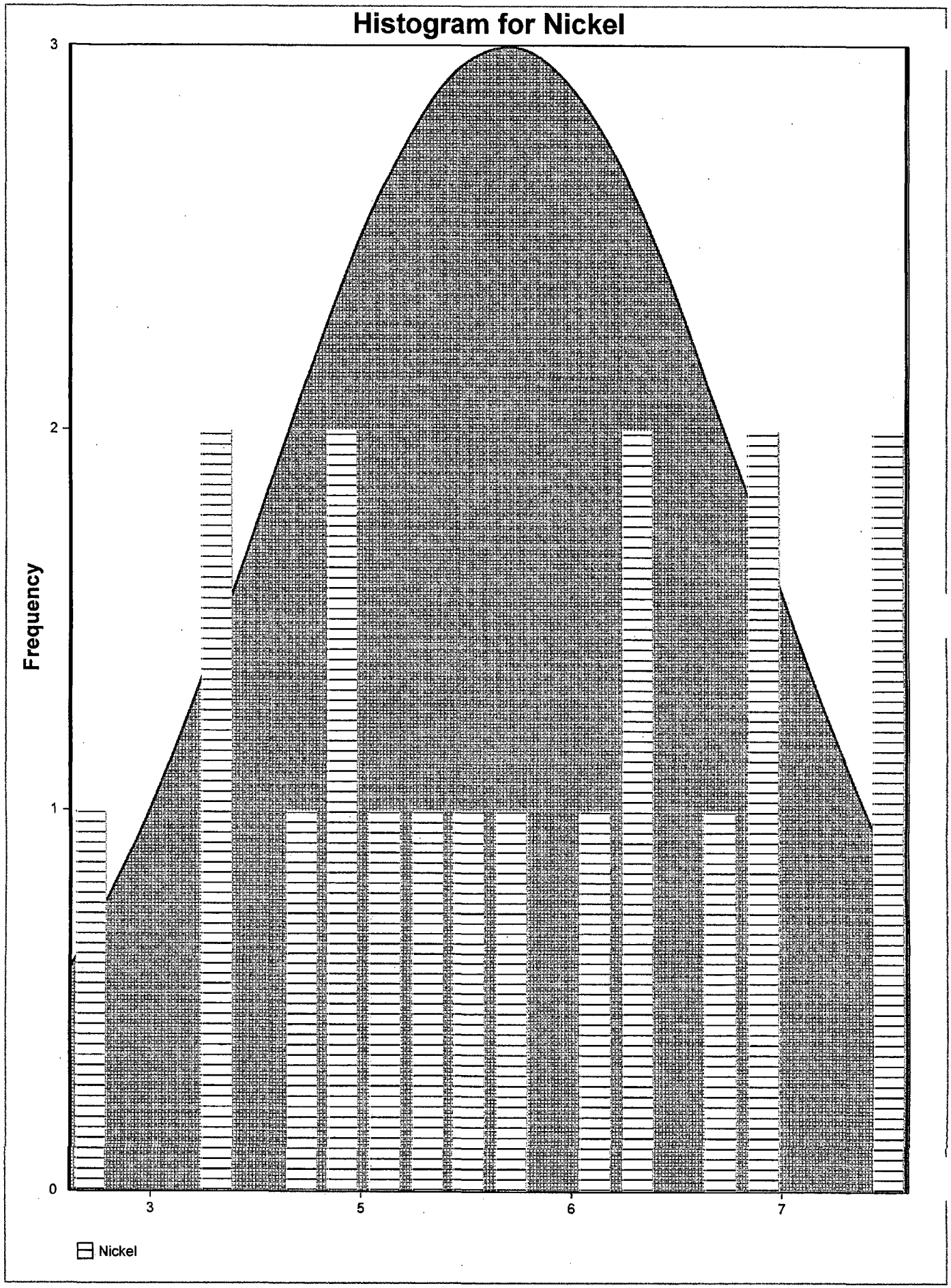
2. Data Value 3 is a Potential Outlier (Lower Tail)?

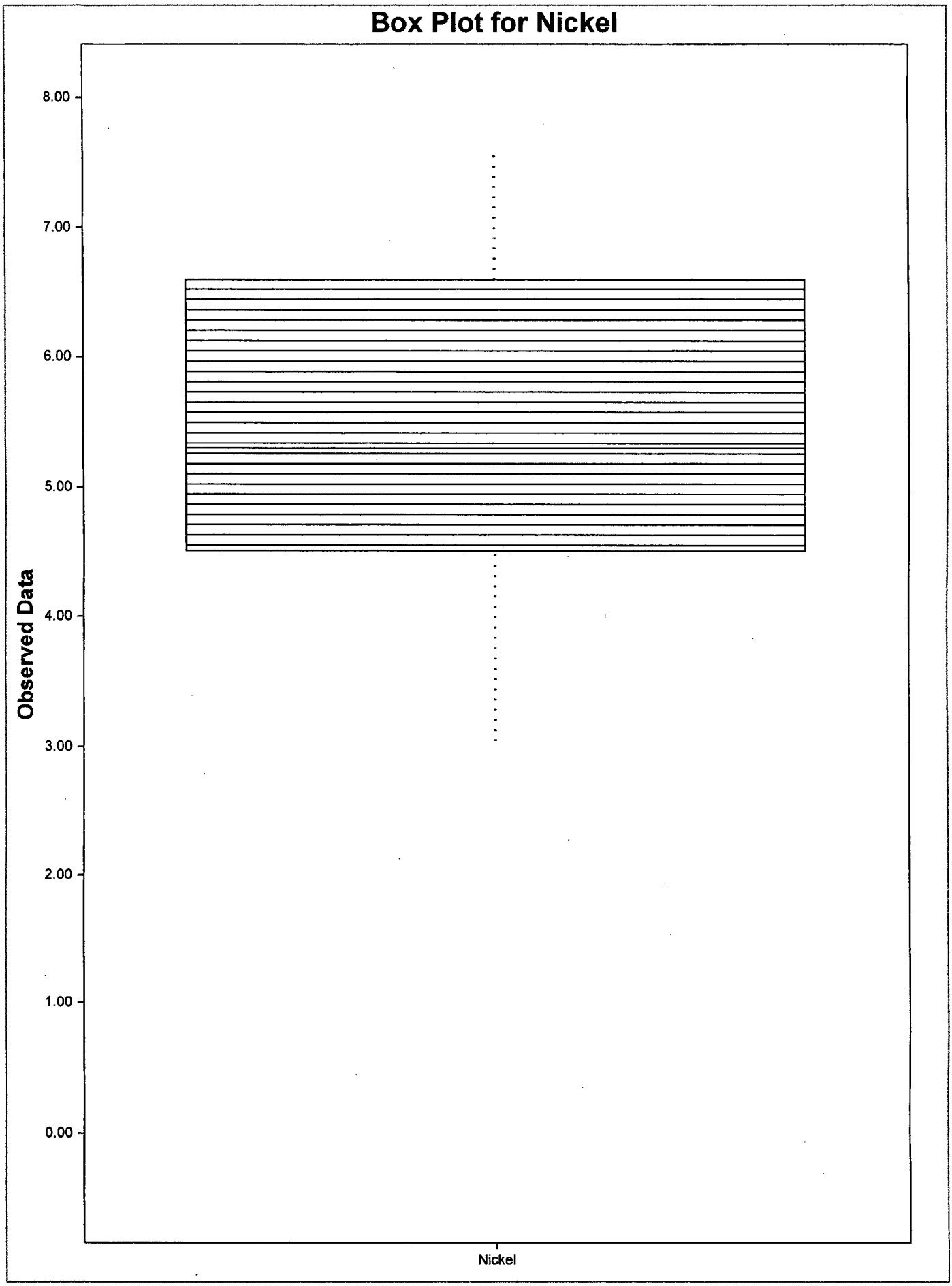
st Statistic: 0.211

For 10% significance level, 3 is not an outlier.

For 5% significance level, 3 is not an outlier.

For 1% significance level, 3 is not an outlier.


Histogram for Nickel
Frequency
3
2
1
0
3
5
6
7
Nickel


Box Plot for Nickel
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Observed Data
Nickel

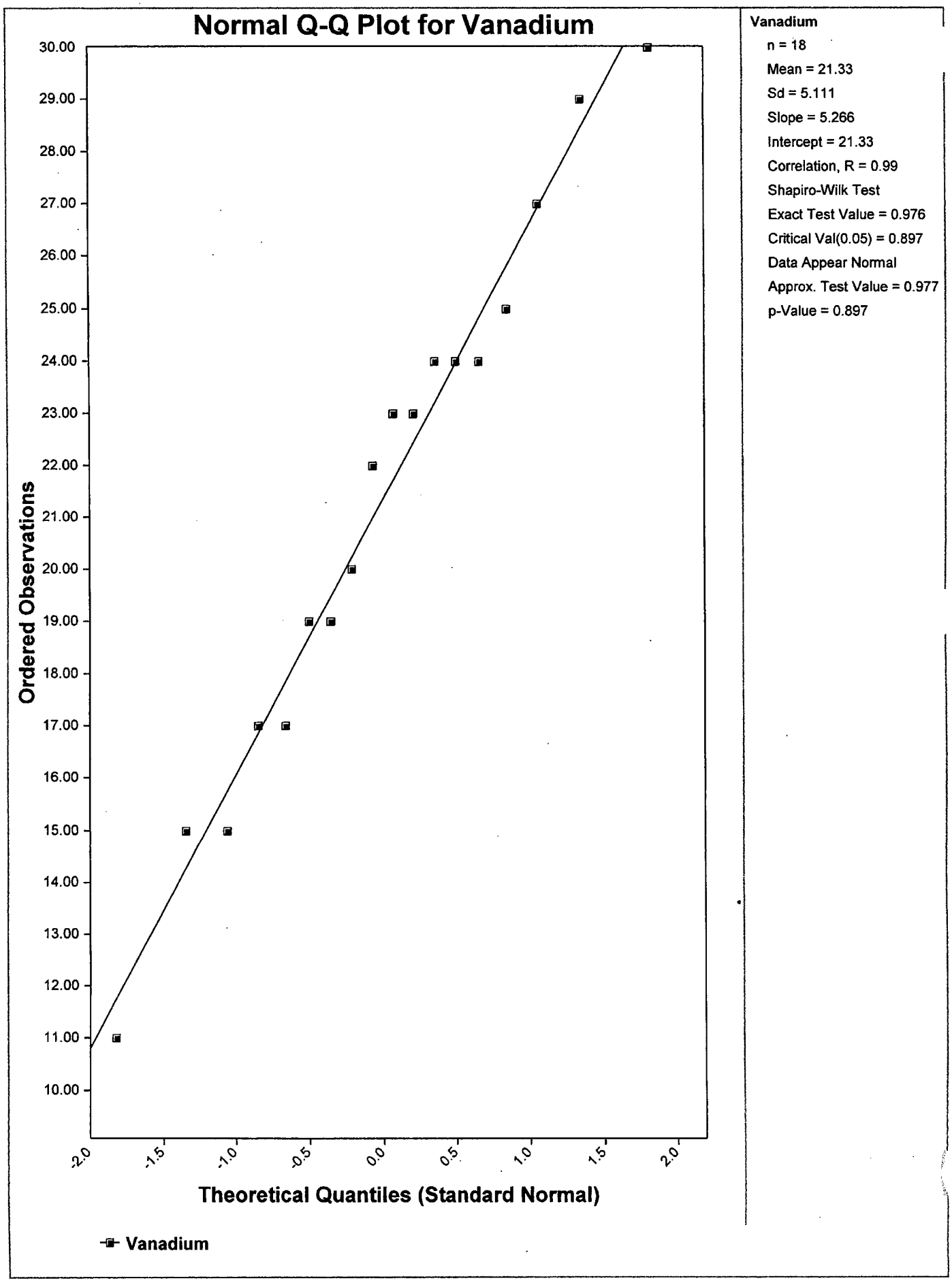
	Normal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1

Vanadium

Raw Statistics	
Number of Valid Observations	18
Number of Distinct Observations	12
Minimum	11
Maximum	30
Second Largest	29
Mean	21.33
First Quartile	17.5
Median	22.5
Third Quartile	24
SD	5.111
Coefficient of Variation	0.24
Skewness	-0.2

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.976
5% Shapiro Wilk Critical Value	0.897
Data appear Normal at 5% Significance Level	

Background Statistics Assuming Normal Distribution	
90% Percentile (z)	27.88
95% Percentile (z)	29.74
99% Percentile (z)	33.22
Tolerance Factor K	2.453
95% UTL with 95% Coverage	33.87
95% UPL (t)	30.47


Normal Q-Q Plot for Vanadium
Ordered Observations
30.00
29.00
28.00
27.00
26.00
25.00
24.00
23.00
22.00
21.00
20.00
19.00
18.00
17.00
16.00
15.00
14.00
13.00
12.00
11.00
10.00
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Vanadium
Vanadium
n = 18
Mean = 21.33
Sd = 5.111
Slope = 5.266
Intercept = 21.33
Correlation, R = 0.99
Shapiro-Wilk Test
Exact Test Value = 0.976
Critical Val(0.05) = 0.897
Data Appear Normal
Approx. Test Value = 0.977
p-Value = 0.897

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Vanadium

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 30 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.200

For 10% significance level, 30 is not an outlier.

For 5% significance level, 30 is not an outlier.

For 1% significance level, 30 is not an outlier.

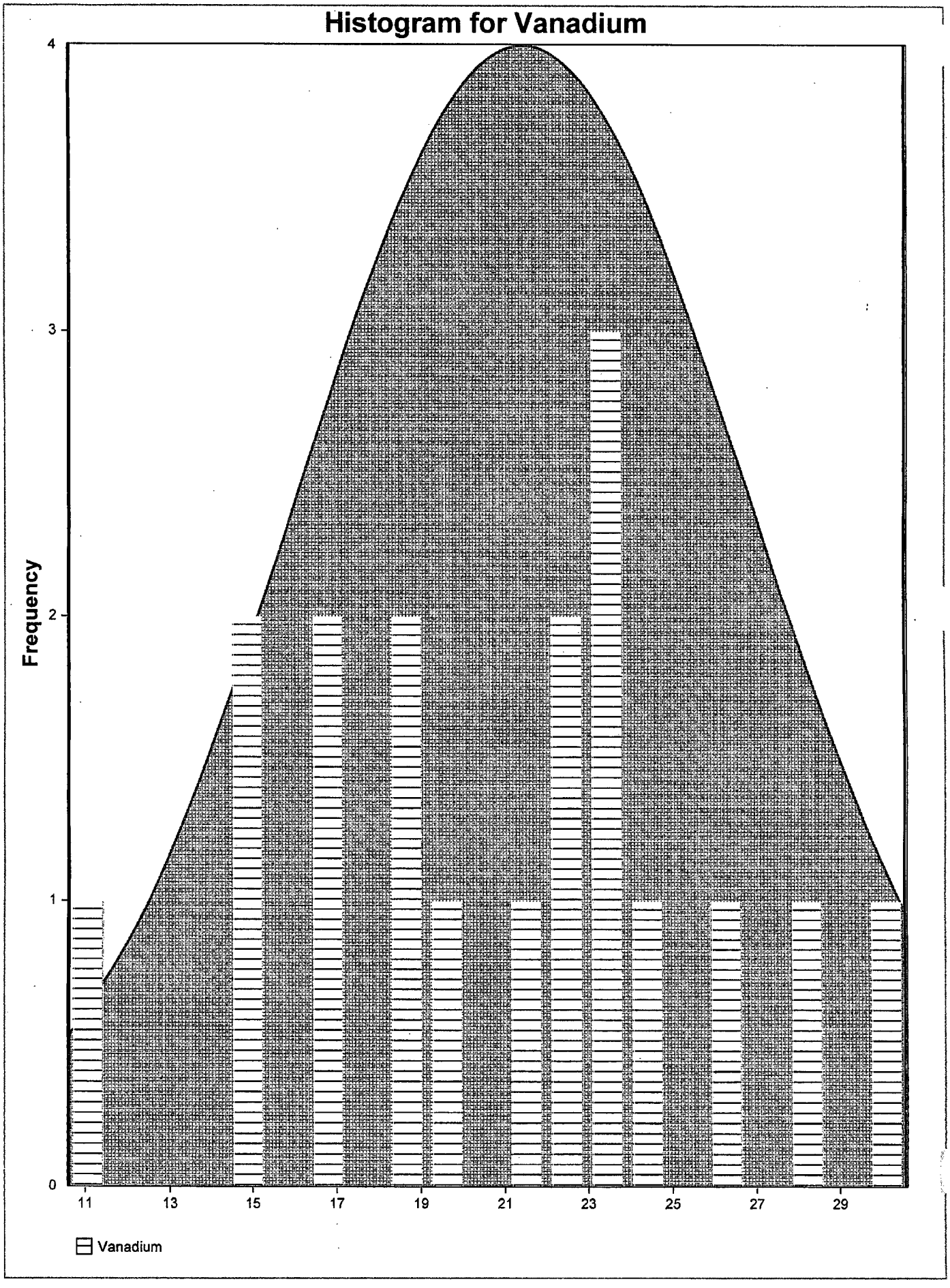
2. Data Value 11 is a Potential Outlier (Lower Tail)?

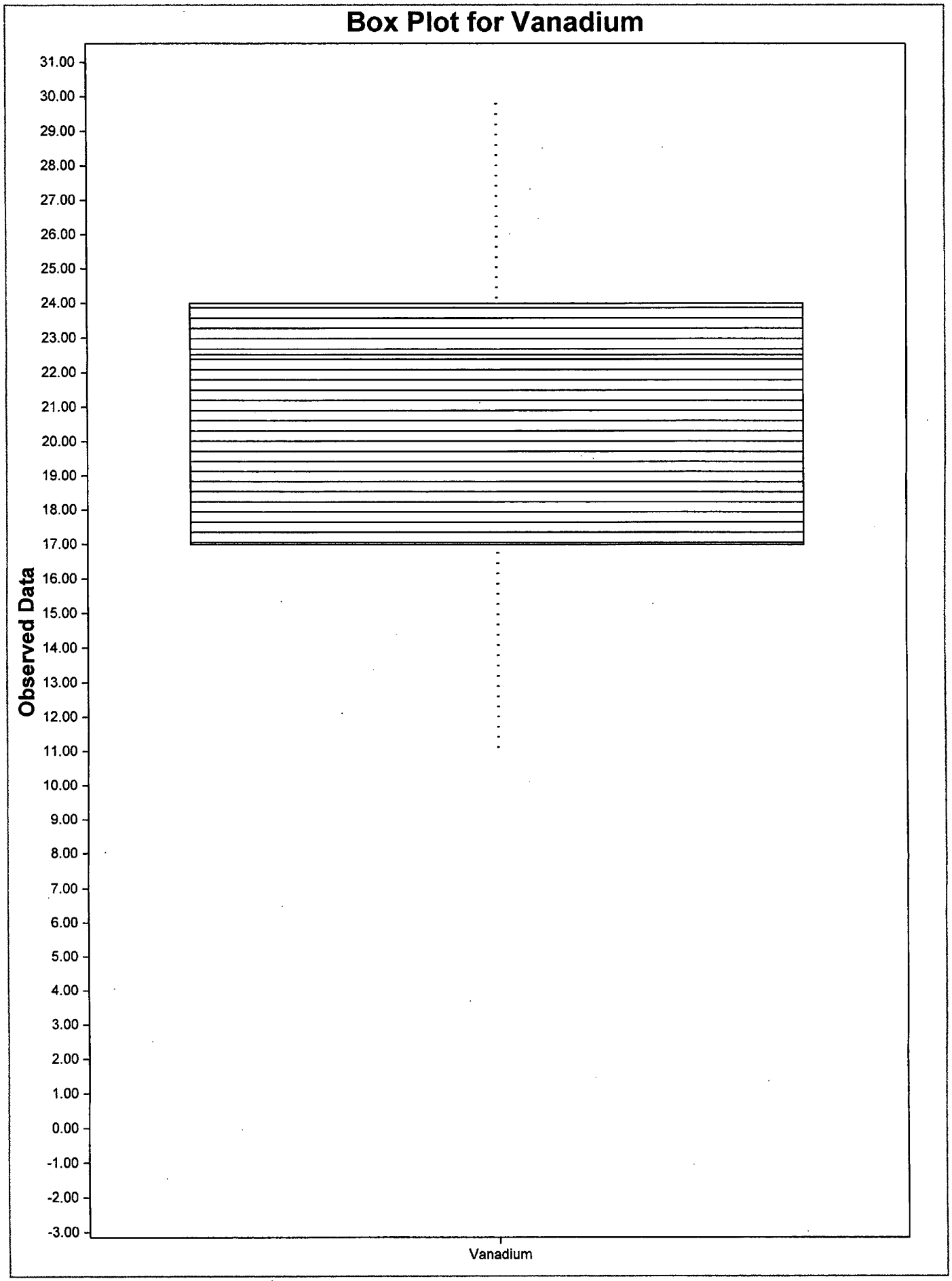
st Statistic: 0.250

For 10% significance level, 11 is not an outlier.

For 5% significance level, 11 is not an outlier.

For 1% significance level, 11 is not an outlier.


Histogram for Vanadium
Frequency
0
1
2
3
4
11
13
15
17
19
21
23
25
27
29
Vanadium


Box Plot for Vanadium
Observed Data
31.00
30.00
29.00
28.00
27.00
26.00
25.00
24.00
23.00
22.00
21.00
20.00
19.00
18.00
17.00
16.00
15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
Vanadium

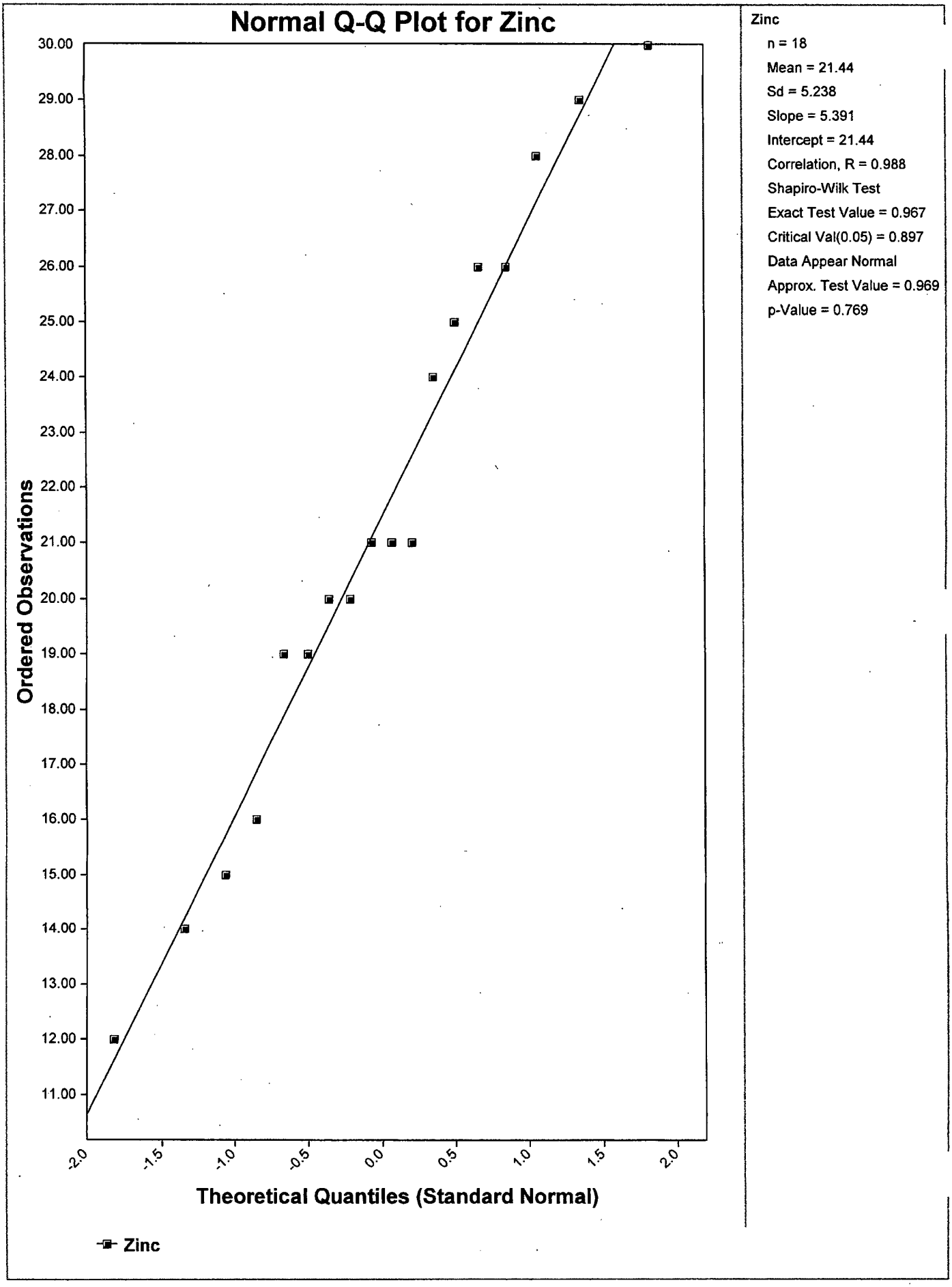
	Normal Background Statistics for Full Data Sets
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1

Zinc

Raw Statistics	
Number of Valid Observations	18
Number of Distinct Observations	13
Minimum	12
Maximum	30
Second Largest	29
Mean	21.44
First Quartile	19
Median	21
Third Quartile	25.75
SD	5.238
Coefficient of Variation	0.244
Skewness	-0.0596

Normal Distribution Test	
Shapiro Wilk Test Statistic	0.967
5% Shapiro Wilk Critical Value	0.897
Data appear Normal at 5% Significance Level	

Background Statistics Assuming Normal Distribution	
90% Percentile (z)	28.16
95% Percentile (z)	30.06
99% Percentile (z)	33.63
Tolerance Factor K	2.453
95% UTL with 95% Coverage	34.29
95% UPL (t)	30.81


Normal Q-Q Plot for Zinc
Ordered Observations
30.00
29.00
28.00
27.00
26.00
25.00
24.00
23.00
22.00
21.00
20.00
19.00
18.00
17.00
16.00
15.00
14.00
13.00
12.00
11.00
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Theoretical Quantiles (Standard Normal)
Zinc
Zinc
n = 18
Mean = 21.44
Sd = 5.238
Slope = 5.391
Intercept = 21.44
Correlation, R = 0.988
Shapiro-Wilk Test
Exact Test Value = 0.967
Critical Val(0.05) = 0.897
Data Appear Normal
Approx. Test Value = 0.969
p-Value = 0.769

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for Zinc

Number of data = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Data Value 30 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.133

For 10% significance level, 30 is not an outlier.

For 5% significance level, 30 is not an outlier.

For 1% significance level, 30 is not an outlier.

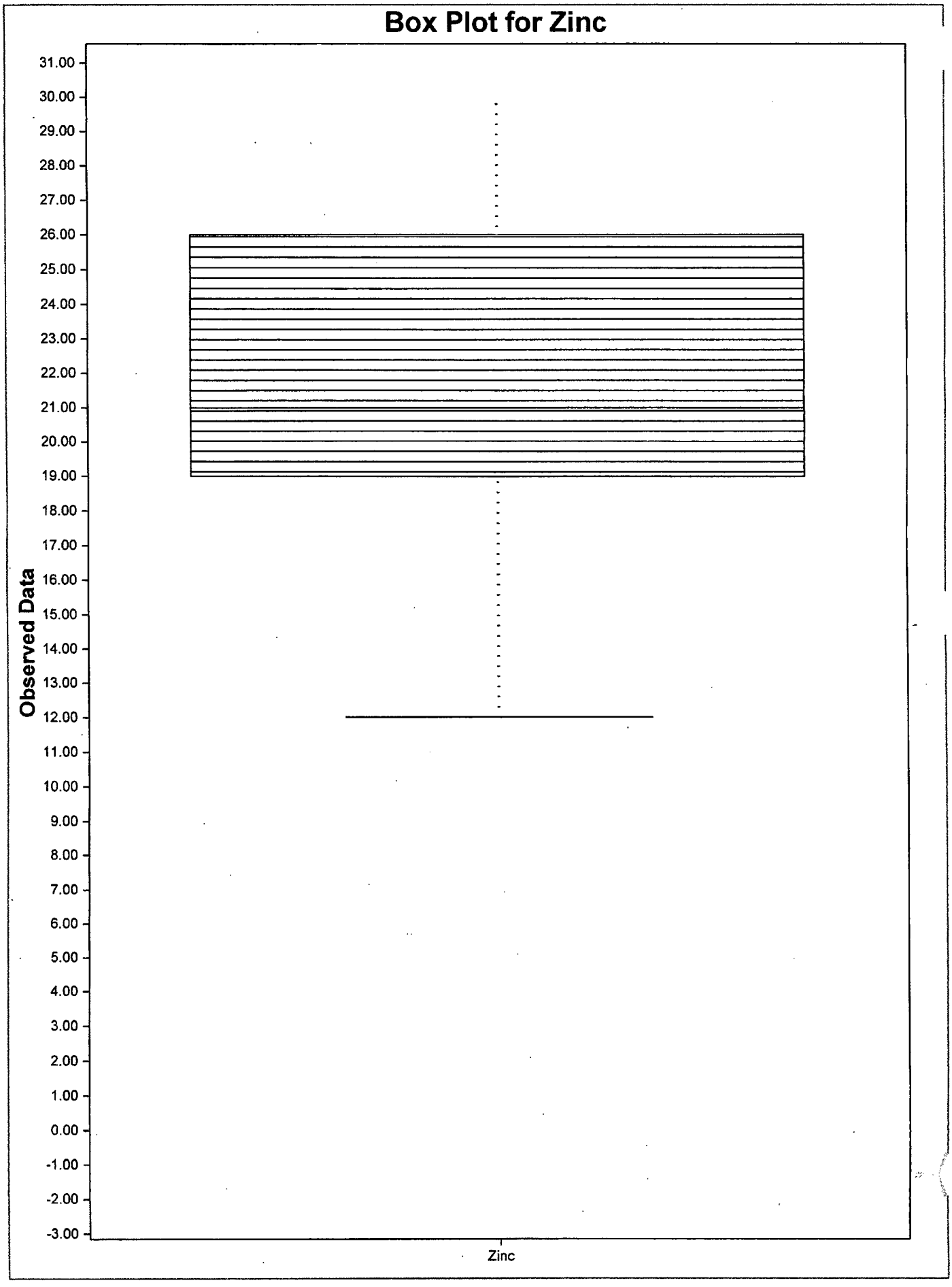
2. Data Value 12 is a Potential Outlier (Lower Tail)?

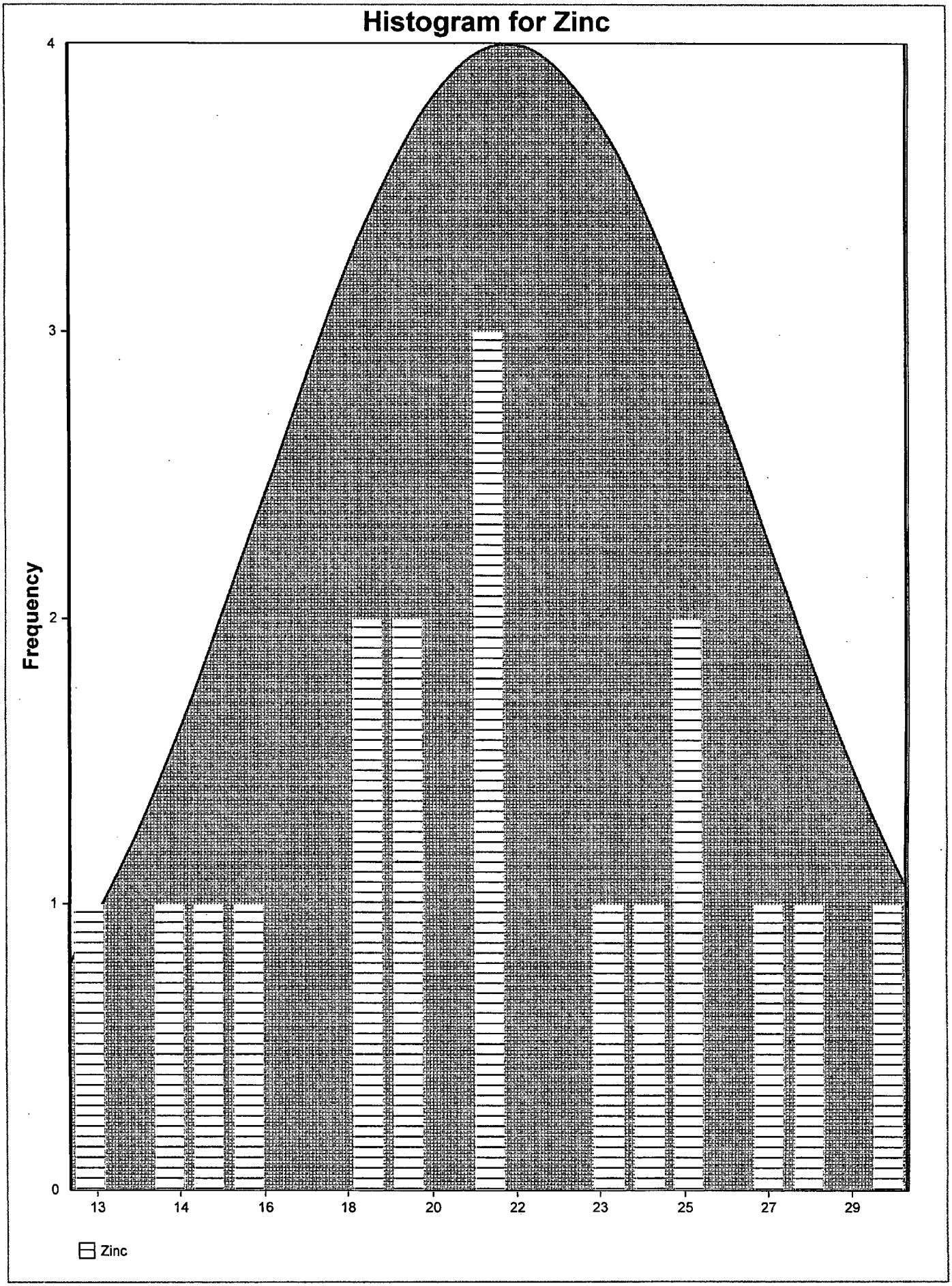
st Statistic: 0.188

For 10% significance level, 12 is not an outlier.

For 5% significance level, 12 is not an outlier.

For 1% significance level, 12 is not an outlier.


Box Plot for Zinc
Observed Data
31.00
30.00
29.00
28.00
27.00
26.00
25.00
24.00
23.00
22.00
21.00
20.00
19.00
18.00
17.00
16.00
15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
Zinc


Histogram for Zinc
Frequency
0
1
2
3
4
13
14
16
18
20
22
23
25
27
29
Zinc

Western Refining

WNR LISTED NYSE

RECEIVED OCD

2011 DEC -7 P 1:30

December 5, 2011

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

Certified Mail #: 7009 2250 0002 3833 5117 (Addressed to NMED)

Re: Background Investigation Report - Extension Request
Western Refining Southwest, Inc., Bloomfield Refinery
EPA ID# NMD089416416

Dear Mr. Kieling:

Over the past several months, Western Refining Southwest, Inc., Bloomfield Refinery has been working to finalize contracts with the contractors necessary to complete the investigation field work outlined in the approved Background Investigation Work Plan and Group 8 Investigation Work Plan. Unfortunately at this time, Western has not been able to finalize the contracts necessary to mobilize to the field.

In a letter from the New Mexico Environment Department (NMED) dated March 30, 2011, NMED issued a deadline of January 31, 2012 for submittal of the Background Investigation Report that is to include a summary of the soil results from the respective background investigation activities. At this time due to the up-coming holidays and continued need to finalize the necessary contracts, Western is not optimistic that field work will be able to commence before the end of December 2011.

Therefore, Western is respectfully requesting a 90-day deadline extension for the submittal of the Background Investigation Report. Western is optimistic that this extension will provide sufficient time to finalize contract discussions, complete field activities, and develop the respective Background Investigation Report for NMED's review. If you have any questions or would like to discuss this request in more detail, please contact Randy Schmaltz at (505) 632-4171.

Sincerely,

Victor R McDaniel

Victor McDaniel
Site Manager
Western Refining Southwest, Inc. – Bloomfield Refinery

cc: Dave Cobrain – NMED HWB
Leona Tsinnajinnie – NMED HWB
Carl Chavez - NMOCD ✓
Allen Hains – Western Refining El Paso
Scott Crouch - RPS

Western Refining

WNR LISTED NYSE

August 25, 2011

RECEIVED OCD

2011 AUG 26 P 11:45

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

Certified Mailer #: 7010 3090 0001 3450 2630

Re: Response to June 7, 2011 APPROVAL WITH MODIFICATIONS
Investigation Work Plan Group 8
Western Refining Southwest, Inc., Bloomfield Refinery
EPA ID# NMD089416416
HWB-WRB-10-008

Dear Mr. Kieling:

Western Refining Southwest, Inc., Bloomfield Refinery has prepared the following responses to your comments received on the referenced investigation work plan.

NMED Comment 1 - Section 5.2 (Soil Sampling), page 12:

a) *Clarify why the wastewater line that runs along the south side of the Raw Water Pond would not be susceptible to degradation or damage.*

b) *Explain how it was determined there were no indications of historical releases along the pipeline that was removed (e.g., visual and olfactory examinations).*

c) *Submit replacement page(s) responding to items a and b above.*

Response to Comment 1:

a) The discussion in Section 5.2 explains the reasoning used to select potential soil boring locations along the underground piping. As stated on page 11, "The locations most likely to have releases from underground piping include pipe connections (e.g., fittings and valves) and areas most likely to result in corrosion of steel lines (e.g., locations with corrosive soils)." The discussion in the second paragraph on page 12 explains that the wastewater line that runs along the south side of the Raw Water Pond is a PVC pipeline and thus is not susceptible to corrosion like a steel pipeline would be in an area of potentially high soil moisture levels. Therefore, as stated in the first sentence of the second paragraph on page 12, "The proposed soil boring locations are concentrated at pipeline connections." Regarding potential damage to the PVC line on the south side of the Raw Water Pond, the pipeline is buried a minimum depth of four feet to reduce any potential for damage to the line. The text in Section 5.2 (page 12, second paragraph) has been revised to stress that there were no historic steel lines near the Raw Water Ponds and to discuss the potential for damage to the PVC pipeline.

b) When the new steel line was installed on the western side of the Raw Water Pond, the previously existing PVC line was fully excavated and removed. During this process, there were no indications of releases from the line (e.g., areas with abnormally high soil moisture levels, any presence of petroleum hydrocarbon odors, or stained soils). The text in the second paragraph on page 12 has been revised to

further clarify the discussion on potential indications of historical releases from this pipeline.

c) Replacements are enclosed for pages 12 through 17. Changes were only made to the second paragraph of page 12 but the additional text caused a shift that carries through page 17. A revised table of contents is also provided, as some of the subsections shifted onto another page.

NMED Comment 2 - Section 5.2 (Soil Sampling), page 12, paragraph 2:

Borings to be installed near the inactive underground piping must be installed within three feet instead of five feet, if possible. This must be documented in the Investigation Report.

Response to Comment 2:

Borings to be completed near inactive underground pipelines will be installed within three feet of the inactive line where possible. This will be documented in the Investigation Report.

NMED Comment 3 - Figures

a) NMED has added additional soil boring locations to Figure 9 (see attached Figure 9).

b) The legend in Figures 2 and 9 contain dotted green lines that states "Under Ground Wastewater Piping (SWMU No. 3)." As written this could indicate that SWMU 3 only consists of underground wastewater piping. SWMU No. 3 also includes underground piping associated with the transfer of product, the above ground storage tank farm, and the wastewater treatment system as described in the July 2007 Order. Revise the legends of Figures 2 and 9 to indentify all aspects of SWMU 3.

c) Submit replacement figures with the required changes described in items a and b above.

Response to Comment 3:

a. Figure 9 has been revised to include the four additional borings.

b. The legends of Figures 2 and 9 have been revised to show the various symbols used to indicate the different types of underground piping associated with SWMU 3 (i.e., hydrocarbon piping and wastewater piping).

c. Revised Figures 2 and 9 are enclosed.

If you have questions regarding the above responses or the enclosures, please contact me at (505) 632-4171.

Sincerely,

James R. Schmaltz
Health, Safety, Environmental, and Regulatory Director
Western Refining Southwest, Inc. - Bloomfield Refinery

cc: Dave Cobrain – NMED HWB
Leona Tsinnajinnie – NMED HWB
Carl Chavez - NMOCD
Allen Hains – Western Refining El Paso
Scott Crouch - RPS

Group 8 Investigation Work Plan
Replacement Pages

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along pipelines is pipeline integrity testing. Western routinely tests underground pipelines for leaks and as noted in Table 1, all recent tests have passed and thus no potential target investigation locations have been determined from integrity test results.

The proposed soil boring locations are concentrated at pipeline connections (Figure 9). There is an area of potentially high soil moisture levels near the Raw Water Pond; however, no steel pipelines were historically used in this area. A PVC wastewater lines runs along the south side of the Raw Water Pond but would not be susceptible to corrosion from elevated moisture levels. A carbon steel line runs along the western side of the Raw Water Ponds from Tank #38 to northeast of Tank #31; however, this new steel line was just installed in August of 2010. A PVC line was present before the new line was installed and as part of the installation process the old pipeline was fully excavated and removed. There were no indications of any historical releases along this pipeline, such as areas of abnormally high soil moisture levels, petroleum hydrocarbon odors in the excavation, or the presence of stained soil. These pipelines are buried to a minimum depth of four feet to prevent any potential damage to the lines from surface operations. No new borings are proposed along this new steel pipeline.

There are 13 soil borings proposed along the SWMU No. 3 wastewater pipelines and 12 soil borings proposed along the active hydrocarbon pipelines. Three soil borings are proposed along the SWMU No. 6 abandoned pipelines (Figure 9). Borings located along the pipelines will be spaced off the pipeline to avoid hitting the pipeline while drilling but kept within a maximum of five feet of the pipelines, as possible considering necessary safety concerns. All soil borings will be extended to a minimum depth of six feet below the depth of the adjacent pipeline. Most of the hydrocarbons pipelines are anticipated to be from two to four feet below the land surface, while wastewater lines may be up to eight feet in depth. If there is screening evidence of impacted soils (e.g., petroleum odor, staining, or elevated photo-ionization detector or a combustible gas indicator readings) at six feet below the pipeline, then the boring will be extended deeper until either there is no evidence of impacts or groundwater is encountered, whichever occurs first.

The decision to use a hand auger vs. a drilling rig will be based on accessibility, although most locations are anticipated to be completed using a drilling rig. A decontaminated split-barrel sampler or continuous five-foot core barrel will be used to obtain samples during the drilling of each boring. Soil samples may be collected using decontaminated, a hand-held stainless steel sampling device, shelby tube, or thin-wall sampler, or a pre-cleaned disposable sampling device. A portion of the samples will be placed in pre-cleaned, laboratory-prepared sample containers for

laboratory chemical analysis. The use of an Encore® Sampler or other similar device will be used during collection of soil samples for VOC analysis. The remaining portions of the sample will be used for logging and field screening as discussed in Section 5.2.1. Sample handling and chain-of-custody procedures will be in accordance with the procedures presented below in Section 5.4.

Discrete soil samples will be collected for laboratory analyses from within the following intervals:

- 1-2' below the bottom depth of the adjacent pipeline (all soil borings);
- 5-6' below the bottom depth of the adjacent pipeline or the lowermost one foot interval on soil borings penetrating deeper than six feet below the pipeline (all soil borings);
- from the interval in each soil boring with the greatest apparent degree of contamination based on field screening (only soil borings with observed potential impacts);
- From the 6" interval at the top of saturation (applicable only to borings that reach saturation); and
- Any additional intervals as determined based on field screening results.

Quality Assurance/Quality Control (QA/QC) samples will be collected to monitor the validity of the soil sample collection procedures as follows:

- Four field duplicates will be collected.

5.2.1 Soil Sample Field Screening and Logging

Samples obtained from the borings will be screened in the field on 2.5 foot intervals for evidence of contaminants. Field screening results will be recorded on the exploratory boring logs and will be used to aid in the selection of soil samples for laboratory analysis. The primary screening methods include: (1) visual examination, (2) olfactory examination, and (3) headspace vapor screening for volatile organic compounds. Additional screening for site- or release-specific characteristics such as pH or for specific compounds using field test kits may be conducted where appropriate.

Visual screening includes examination of soil samples for evidence of staining caused by petroleum-related compounds or other substances that may cause staining of natural soils such as elemental sulfur or cyanide compounds. Headspace vapor screening targets volatile organic compounds and involves placing a soil sample in a plastic sample bag or a foil sealed container allowing space for ambient air. The container will be sealed and then shaken gently to expose the

soil to the air trapped in the container. The sealed container will be allowed to rest for a minimum of 5 minutes while vapors equilibrate. Vapors present within the sample bag's headspace will then be measured by inserting the probe of the instrument in a small opening in the bag or through the foil. The maximum value and the ambient air temperature will be recorded on the field boring log for each sample.

The monitoring instruments will be calibrated each day to the manufacturer's standard for instrument operation. A photo-ionization detector (PID) equipped with a 10.6 or higher electron volt (eV) lamp or a combustible gas indicator will be used for VOC field screening. Field screening results may be site- and boring-specific and the results may vary with instrument type, the media screened, weather conditions, moisture content, soil type, and type of contaminant. Conditions capable of influencing the results of field screening will be recorded on the field logs.

The physical characteristics of the samples (such as mineralogy, ASTM soil classification, moisture content, texture, color, presence of stains or odors, and/or field screening results), depth where each sample was obtained, method of sample collection, and other observations will be recorded in the field log by a qualified geologist or engineer. Detailed logs of each boring will be completed in the field by a qualified engineer or geologist. Additional information, such as the presence of water-bearing zones and any unusual or noticeable conditions encountered during drilling, will be recorded on the logs.

5.3 Groundwater Water Monitoring

Groundwater has been sampled at monitoring wells located at the refinery from as early as 1984. Based on the fact that there are numerous wells that provide information on water quality across much of the subject investigation area, no groundwater samples are proposed under this Scope of Work.

5.4 Sample Handling

At a minimum, the following procedures will be used at all times when collecting samples during investigation, corrective action, and monitoring activities:

1. Neoprene, nitrile, or other protective gloves will be worn when collecting samples. New disposable gloves will be used to collect each sample;

2. All samples collected of each medium for chemical analysis will be transferred into clean sample containers supplied by the project analytical laboratory with the exception of soil, rock, and sediment samples obtained in Encore® samplers. 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; and

3. Sample labels and documentation will be completed for each sample following procedures discussed below. 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 below, will be followed for all samples collected. All samples will be submitted to the laboratory soon enough to allow the laboratory to conduct the analyses within the method holding times. At a minimum, all samples will be submitted to the laboratory within 48 hours after their collection.

Chain-of-custody and shipment procedures will include the following:

1. Chain-of-custody forms will be completed at the end of each sampling day, prior to the transfer of samples off site.

2. 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.

3. Each cooler or other container will be delivered directly to the analytical laboratory.

4. Glass bottles will be separated in the shipping container by cushioning material to prevent breakage.

5. Plastic containers will be protected from possible puncture during shipping using cushioning material.

6. The chain-of-custody form and sample request form will be shipped inside the sealed storage container to be delivered to the laboratory.

7. Chain-of-custody seals will be used to seal the sample-shipping container in conformance with EPA protocol.

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

9. 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 and copies will be returned to the relinquishing party.

10. Copies of all chain-of-custody forms generated as part of sampling activities will be maintained on-site.

5.5 Decontamination Procedures

The objective of the decontamination procedures is to minimize the potential for cross-contamination. A designated decontamination area will be established for decontamination of drilling equipment and reusable sampling equipment. The drilling rig will be decontaminated prior to entering the site or unit. Drilling equipment or other exploration equipment that may come in contact with the borehole will be decontaminated by high pressure washing prior to drilling each new boring.

Sampling or measurement equipment, including but not limited to stainless steel sampling tools and split-barrel or core samplers, will be decontaminated in accordance with the following procedures or other methods approved by the Department before each sampling attempt or measurement:

1. Brush equipment with a wire or other suitable brush, if necessary or practicable, to remove large particulate matter;
2. Rinse with potable tap water;
3. Wash with nonphosphate detergent or other detergent approved by the Department (examples include Fantastik™, Liqui-Nox®);
4. Rinse with potable tap water; and
5. Double rinse with deionized water.

All decontamination solutions will be collected and stored temporarily as described in Section 4.3. Decontamination procedures and the cleaning agents used will be documented in the daily field log.

5.6 Field Equipment Calibration Procedures

Field equipment requiring calibration will be calibrated to known standards, in accordance with the manufacturers' recommended schedules and procedures. At a minimum, calibration checks will be conducted daily, or at other intervals approved by the Department, 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. In the interim, a properly calibrated replacement instrument will be used.

5.7 Documentation of Field Activities

Daily field activities, including observations and field procedures, will be recorded in a field log book. The original field forms will be maintained at the facility. Copies of the completed forms will be maintained in a bound and sequentially numbered field file for reference during field activities. Indelible ink will be used to record all field activities. Photographic documentation of field activities will be performed, as appropriate. The daily record of field activities will include the following:

1. Site or unit designation;
2. Date;
3. Time of arrival and departure;
4. Field investigation team members including subcontractors and visitors;
5. Weather conditions;
6. Daily activities and times conducted;
7. Observations;
8. Record of samples collected with sample designations and locations specified;
9. Photographic log, as appropriate;
10. Field monitoring data, including health and safety monitoring;
11. Equipment used and calibration records, if appropriate;
12. List of additional data sheets and maps completed;
13. An inventory of the waste generated and the method of storage or disposal; and
14. Signature of personnel completing the field record.

5.8 Chemical Analyses

All samples collected for laboratory analysis will be submitted to an accredited laboratory. The laboratory will use the most recent standard EPA and industry-accepted analytical methods for target analytes as the testing methods for each medium sampled. Chemical analyses will be performed in accordance with the most recent EPA standard analytical methodologies and extraction methods.

All soil samples will be analyzed by the following methods:

- SW-846 Method 8260 volatile organic compounds;
- SW-846 Method 8270 semi-volatile organic compounds; and
- SW-846 Method 8015B gasoline range (C5-C10), diesel range (>C10-C28), and motor oil range (>C28-C36) organics.

Soil samples will also be analyzed for the following metals and cyanide using the indicated analytical methods.

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 12/08/10 | FILE: WestRef-B72

FIGURE 2
GROUP No. 8 SWMU LOCATIONS
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

LEGEND

- MW-1 ● MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- 7-1 ⓐ EXISTING SOIL BORING LOCATION AND IDENTIFICATION NUMBER
- RW-1 ⊙ RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- —x—x— FENCE
- SWMU No. 6 ABANDONED UNDERGROUND PIPING
- SWMU No. 3 UNDERGROUND PIPING CURRENTLY IN USE:
  - UNDERGROUND HYDROCARBON PIPING
  - UNDERGROUND WASTEWATER PIPING
- A——A' LINE OF CROSS SECTION
- FORMER TANK LOCATION

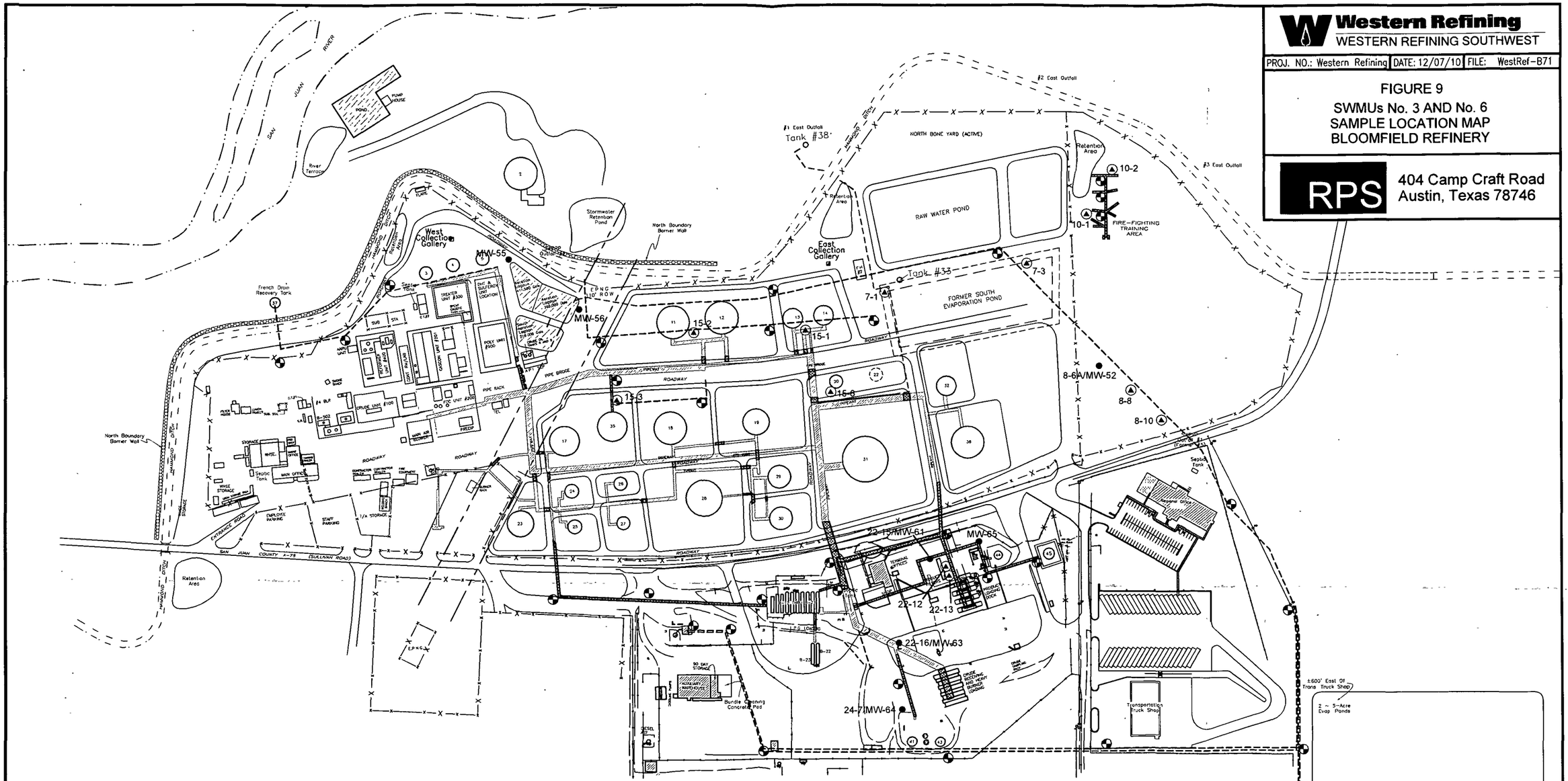
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Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 12/07/10	FILE: WestRef-B71

FIGURE 9
SWMUs No. 3 AND No. 6
SAMPLE LOCATION MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



LEGEND

MW-1 ●	MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 ▲	EXISTING SOIL BORING LOCATION AND IDENTIFICATION NUMBER
◔	PROPOSED SOIL BORING LOCATION
▨	ABOVE GROUND PIPE-WAY
▩	SLURRY BARRIER WALL
—x—x—	FENCE
- - - - - - -	SWMU No. 6 ABANDONED UNDERGROUND PIPING
▬	SWMU No. 3 UNDERGROUND PIPING CURRENTLY IN USE UNDERGROUND HYDROCARBON PIPING
- - - - - - -	UNDERGROUND WASTEWATER PIPING
A ——— A'	LINE OF CROSS SECTION
◌	FORMER TANK LOCATION

N

0 300
SCALE IN FEET

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us

DAVE MARTIN
Secretary

RAJ SOLOMON, P.E.
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

June 7, 2011

Mr. Randy Schmaltz
Environmental Manager
Western Refining, Southwest, Inc.
Bloomfield Refinery
P.O. Box 159
Bloomfield, New Mexico 87413

RE: APPROVAL WITH MODIFICATIONS
INVESTIGATION WORK PLAN GROUP 8
WESTERN REFINING SOUTHWEST INC., BLOOMFIELD REFINERY
EPA ID# NMD089416416
HWB-WRB-10-008

Dear Mr. Schmaltz:

The New Mexico Environment Department (NMED) has received the Western Refining Southwest, Inc., Bloomfield Refinery (Western) *Investigation Work Plan Group 8 (SWMU No. 3 Underground Piping Currently in Use and SWMU No. 6 Abandoned Underground Piping)* (Work Plan) dated December 2010. NMED hereby approves the Work Plan with the following modifications.

1. Section 5.2 (Soil Sampling), page 12:

Western's Statement: "[t]here is an area of potentially high soil moisture levels...near the Raw Water Pond. A PVC wastewater lines runs along the south side of the Raw Water Pond but would not be susceptible to corrosion from elevated moisture levels. A carbon steel line runs along the western side of the Raw Water Ponds from Tank #38 to northeast of Tank #31; however, this new steel line was just installed in August of 2010. A PVC line was present before the new line was installed and as part of the installation process the old pipeline was fully

excavated and removed. There were no indications of any historical releases along this pipeline. No new borings are proposed along this new steel pipeline."

NMED Comment:

a) Clarify why the wastewater line that runs along the south side of the Raw Water Pond would not be susceptible to degradation or damage.

b) Explain how it was determined there were no indications of historical releases along the pipeline that was removed (e.g., visual and olfactory examinations).

c) Submit replacement page(s) responding to items a and b above.

2. Section 5.2 (Soil Sampling), page 12, paragraph 2:

Western's Statement: "[b]orings located along the pipelines will be spaced off the pipeline to avoid hitting the pipeline while drilling but kept within a maximum of five feet of the pipelines, as possible considering necessary safety concerns."

NMED Comment: Borings to be installed near the inactive underground piping must be installed within three feet instead of five feet, if possible. This must be documented in the Investigation Report.

3. Figures:

NMED Comment:

a) NMED has added additional soil boring locations to Figure 9 (see attached Figure 9).

b) The legend in Figures 2 and 9 contain a dotted green line that states "Under Ground Wastewater Piping (SWMU No. 3)." As written this could indicate that SWMU 3 only consists of underground wastewater piping. SWMU No. 3 also includes underground piping associated with the transfer of product, the above ground storage tank farm, and the wastewater treatment system as described in the July 2007 Order. Revise the legends of Figures 2 and 9 to identify all aspects of SWMU 3.

c) Submit replacement figures with the required changes described in items a and b above.

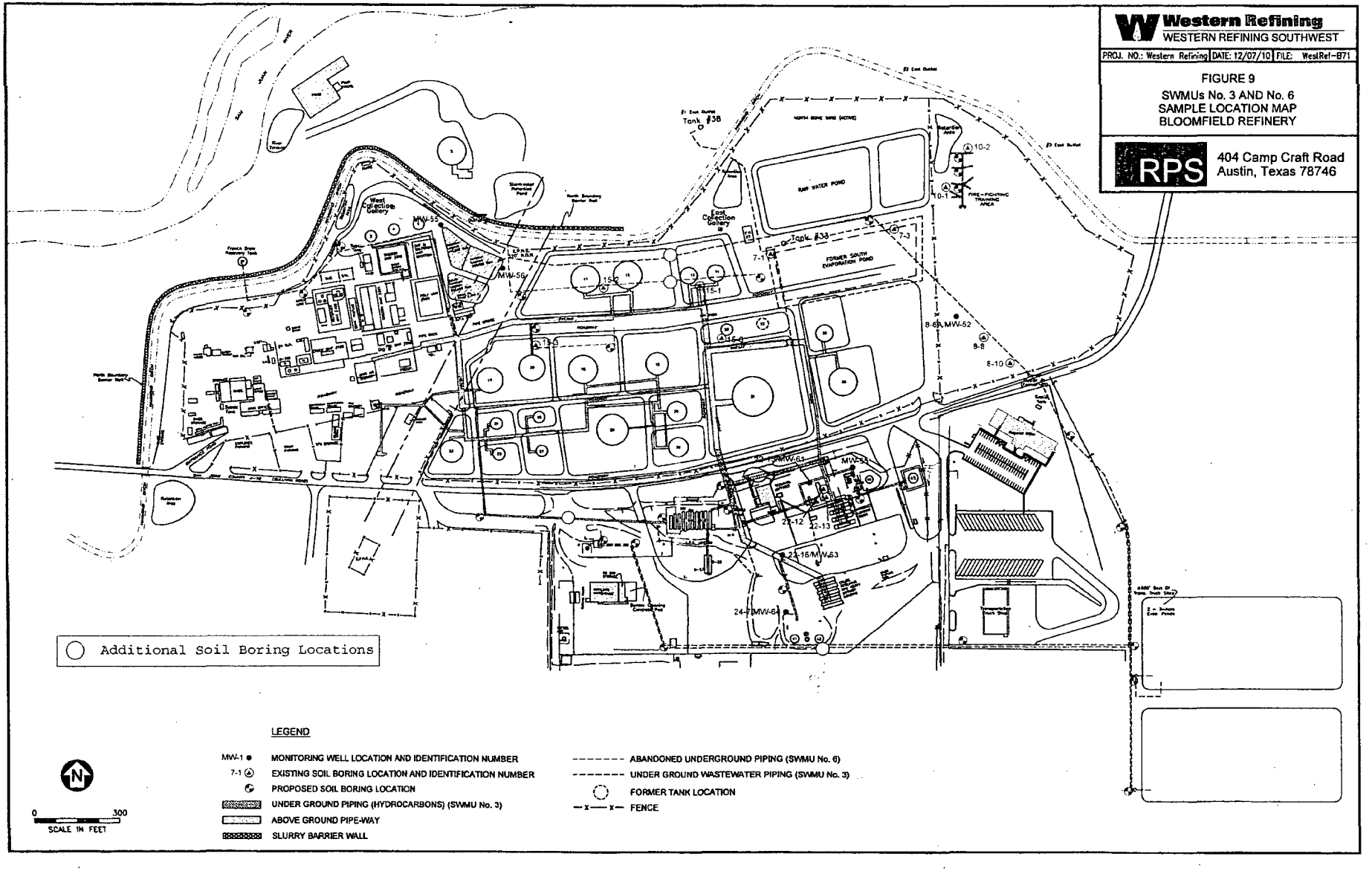
The replacement pages must be submitted on or before **August 30, 2011**. The Investigation Report must be submitted to NMED on or before **June 29, 2012**.

If you have any questions regarding this letter, please contact Hope Petrie of my staff at (505) 476-6045.

Sincerely,

John E. Kieling
Acting Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
H. Petrie, NMED HWB
C. Chavez, OCD
K. Robinson, Western
A. Hains, Western
File: HWB-WRB-10-008 and Reading 2011


Western Refining
WESTERN REFINING SOUTHWEST
PROJ. NO.: Western Refining | DATE: 12/07/10 | FILE: WestRef-871
FIGURE 9
SWMUs No. 3 AND No. 6
SAMPLE LOCATION MAP
BLOOMFIELD REFINERY
RPS
404 Camp Craft Road
Austin, Texas 78746
Tank #38
Tank #33
FORMER SOUTH EVAPORATION POND
RAW WATER POND
West Collection Gallery
East Collection Gallery
MW-55
MW-56
MW-52
MW-53
MW-54
MW-63
MW-64
10-2
10-1
7-1
7-3
8-8A
8-8
8-10
15-1
15-2
22-12
22-13
22-15
24-7
Additional Soil Boring Locations
LEGEND
MW-1 MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
7-1 EXISTING SOIL BORING LOCATION AND IDENTIFICATION NUMBER
PROPOSED SOIL BORING LOCATION
UNDER GROUND PIPING (HYDROCARBONS) (SWMU No. 3)
ABOVE GROUND PIPE-WAY
SLURRY BARRIER WALL
ABANDONED UNDERGROUND PIPING (SWMU No. 6)
UNDER GROUND WASTEWATER PIPING (SWMU No. 3)
FORMER TANK LOCATION
FENCE
0
300
SCALE IN FEET

Western Refining

WNR LISTED NYSE

COPY

December 20, 2010

James Bearzi, Bureau Chief
New Mexico Environmental Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Re: Giant Refining Company, Bloomfield Refinery (currently know as Western Refinery Southwest, Inc. – Bloomfield Refinery) Order No. HWB 07-34 (CO) Investigation Work Plan Group No. 8

Dear Mr. Bearzi:

Western Refining Southwest Inc. - Bloomfield Refinery submits the referenced Investigation Work Plan pursuant to Section IV.B.4 of the July 2007 HWB Order. The Investigation Work Plan covers Group No. 8, which includes SWMU No. 3 Underground Piping Currently in Use, and SWMU No. 6 Abandoned Underground Piping. The Investigation Work Plan was developed and formatted to meet the requirements of Section X.B of the July 2007 HWB Order.

If you have any questions or would like to discuss the Investigation Work Plan, please contact me at (505) 632-4171.

Sincerely,

James R. Schmaltz
Environmental Manager
Western Refining Southwest, Inc.
Bloomfield Refinery

cc: Hope Monzeglio – NMED HWB
Carl Chavez – NMOCD (w/attachment)
Dave Cobrain – NMED HWB
Laurie King – EPA Region 6 (w/attachment)
Vic McDaniel – Bloomfield Refinery
Allen Hains – Western Refining El Paso

RPS

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INVESTIGATION WORK PLAN
Group 8 (SWMU No. 3 Underground Piping Currently in Use and SWMU No. 6 Abandoned Underground Piping)

Bloomfield Refinery
Western Refining Southwest, Inc.
#50 Rd 4990
Bloomfield, New Mexico 87413

December 2010

James R. Schmaltz
Environmental Manager

Western Refining Southwest, Inc.
Bloomfield Refinery

Scott T. Crouch, P.G.
Senior Consultant

RPS
404 Camp Craft Rd.
Austin, Texas 78746

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Executive Summary

The Bloomfield Refinery, which is located in the Four Corners Area of New Mexico, has been in operation since the late 1950s. Past inspections by State and federal environmental inspectors have identified locations where releases to the environment may have occurred. These locations are generally referred to as Solid Waste Management Units (SWMUs) or Areas of Concern (AOCs).

Pursuant to the terms and conditions of an Order issued on July 27, 2007 by the New Mexico Environment Department (NMED) to San Juan Refining Company, as owner, and Giant Industries Arizona, Inc., as operator, for the Bloomfield Refinery, this Investigation Work Plan has been prepared for the SWMUs designated as Group 8. A Class I modification to the facility's RCRA permit was approved on June 10, 2008 to reflect the name change of the operator of the refinery to Western Refining Southwest, Inc. The operator is now Western Refining Southwest, Inc. – Bloomfield Refinery. The name of the owner of the refinery remained the same – San Juan Refining Company.

The planned investigation activities include collection of soil samples, which will be analyzed for potential site-related constituents. The Investigation Work Plan includes specific sampling locations, sample collection procedures, and analytical methods. The scope of the proposed investigation is based, in part, on the availability of recent site investigation data from other SWMUs that overlap with SWMUs No. 3 and No. 6.

SWMU Group 8 includes SWMU No. 3 (Underground Piping Currently in Use) and SWMU No. 6 (Abandoned Underground Piping). The Order requires that San Juan Refining Company and Giant Industries Arizona, Inc. ("Western") determine and evaluate the presence, nature, and extent of historical releases of contaminants at the aforementioned SWMUs. This Investigation Work Plan has been developed to collect the necessary data to meet the requirements of the Order.

Section 1
Introduction

The Bloomfield Refinery is located immediately south of Bloomfield, New Mexico in San Juan County (Figure 1). The physical address is #50 Road 4990, Bloomfield, New Mexico 87413. The Bloomfield Refinery is located on approximately 263 acres. Bordering the facility is a combination of federal and private properties. Public property managed by the Bureau of Land Management lies to the south. The majority of undeveloped land in the vicinity of the facility is used extensively for oil and gas production and, in some instances, grazing. U.S. Highway 44 is located approximately one-half mile west of the facility. The topography of the main portion of the site is generally flat with steep bluffs to the north where the San Juan River intersects Tertiary terrace deposits.

The Bloomfield Refinery is a crude oil refinery currently owned by San Juan Refining Company, and it is operated by Western Refining Southwest, Inc. – Bloomfield Refinery. The Bloomfield Refinery has an approximate refining capacity of 18,000 barrels per day; however, the refinery suspended petroleum refining operations in November 2009 but continues to operate as a petroleum storage terminal. Various process units operated at the facility, including crude distillation, reforming, fluidized catalytic cracking, sulfur recovery, merox treater, catalytic polymerization, and diesel hydrotreating. Products produced at the refinery included gasoline, diesel fuels, jet fuels, kerosene, propane, butane, naphtha, residual fuel, fuel oils, and LPG.

On July 27, 2007, the New Mexico Environment Department (NMED) issued an Order to San Juan Refining Company and Giant Industries Arizona, Inc. ("Western") requiring investigation and corrective action at the Bloomfield Refinery. This Investigation Work Plan has been prepared for the Solid Waste Management Units (SWMUs) designated as Group 8 in the Order, which includes SWMU No. 3 (Underground Piping Currently in Use) and SWMU No. 6 (Abandoned Underground Piping). There are some additional limited runs of underground piping in and near the Process Units (SWMU No. 13) and the Wastewater Collection System (SWMU No. 27). These pipelines will be investigated under Group 9. The location of SWMUs No. 3 and No. 6 is shown on Figure 2. Photographs are included for these two SWMUs in Appendix A. As the SWMUs No. 3 and No. 6 consist of underground piping, there is limited opportunity for photographs.

The purpose of the site investigation is to determine and evaluate the presence, nature, and extent of releases of contaminants in accordance with 20.4.1.500 New Mexico Administrative

Code (NMAC) incorporating 40 Code of Federal Regulations (CFR) Section 264.101. The investigation activities will be conducted in accordance with Section IV of the Order.

Section 2
Background

This section presents background information for the SWMUs, including a review of historical waste management and product storage/handling activities to identity the following:

- Type and characteristics of all waste and all potential contaminants handled in the subject SWMUs;
- Known and possible sources of contamination;
- History of releases; and
- Known extent of contamination.

SWMU No. 3 Underground Piping Currently in Use

The majority of the underground piping at the refinery is considered to still be in use even though petroleum refining operations have recently been suspended and the property is currently used as a petroleum terminal. The terminal operations still include most of the same or similar transfer and storage operations of refined products and crude oil that took place during active refining operations. Crude oil is delivered to the refinery at the truck unloading rack and crosses beneath County Road 4990 to storage tanks within the Refinery Tank Farm. Crude oil now leaves the facility via pipeline. Refined product is currently delivered to the facility via a pipeline operated by a third party and trucks, and is transferred to on-site storage tanks through aboveground lines. Product is moved from the storage tanks to the product loading rack via mostly aboveground pipelines with the exception of lines that run beneath County Road 4990 in open culverts and beneath the actual loading rack.

Figure 2 shows the underground lines that are included in SWMUs No. 3 and No. 6. A list of the underground pipelines that are considered to be SWMU No. 3 (i.e., underground piping currently in use) is included in Table 1. It should be noted that in Figure 2 there are very short segments of pipelines shown as underground pipelines in the Tank Farm but in actuality, these or only very short portions of the above ground lines that cross through tank dike walls. All of the active underground lines are subject to a routine inspection program to test for potential leaks and as indicated in the Table 1, all of the lines with inspection dates back to November 2007 have passed the integrity tests. There are no documented historical releases from the active underground pipelines. The type of materials (e.g., product type, crude oil, wastewater, etc.)

transported through a particular pipeline are identified in Table 1. The broad spectrum chemical analyses (e.g., SW-846 methods 8260, 8270, and 8015), as specified in Section 5.8 to be performed on all soil samples, are capable of detecting the presence of any of the petroleum hydrocarbons handled at the refinery and thus the identification of a particular material in any specific pipeline is not critical to the investigation.

SWMU No. 6 Abandoned Underground Piping

The abandoned underground piping is shown on Figure 2 and is limited to two pipelines. One line ran from the discharge at the aeration lagoons to the former South Evaporation Pond. This line carried wastewater to the evaporation pond. The second line ran a short distance along the north side of Tanks 35 and 18 and was used to move product within the Tank Farm. There are no documented historical releases from these pipelines.

Previous Investigations in the Area of SWMUs No. 3 and No. 6

Previous investigations have identified and delineated impacts to groundwater from historical site operations. Figure 3 shows the distribution of separate phase hydrocarbon (SPH) in the subsurface based on the apparent thickness of SPH measured in monitoring wells. Most of the areas with underground piping are not present over locations with measureable SPH. There is a thin accumulation of SPH in MW-25, which is near the isomerate/naphtha pipeline that runs from near bullet tank B-12 to Tank 25. Dissolved-phase impacts are depicted on Figure 4.

Recent investigations conducted under the Order for SWMU Groups 2, 3, 4, and 5 have included both soil borings and monitoring wells along the SWMU No. 3 underground lines as shown on Figure 2. The analytical results from analyses of these samples are presented in Tables 2 and 3 and will be used to supplement analyses conduct pursuant to this Work Plan during preparation of the Investigation Report. These existing sample locations include the following:

- Tank Farm - two soil borings (SWMU 15-3 and 15-6) near active underground hydrocarbon lines;
- Product Loading Rack – soil borings SWMU 22-12 and 22-13, monitoring well SWMU 22-15/MW-61, and MW-65;
- Crude Unloading Rack Area – borings/monitoring wells SMWU 22-16/MW-63 and SWMU 24-7/MW-64;
- Fire Training Area – soil borings SWMU 10-1 and 10-2;
- Aeration Basins – monitoring wells MW-55 and MW-56;

- Former South Evaporation Pond – soil borings SWMU 7-1 and 7-3; and
- Inactive Landfill – soil borings SWMU 8-6, 8-8, and 8-10, and monitoring well SWMU 8-6A/MW-52.

Soil and groundwater samples have also recently been collected pursuant to the Order along the SWMU No. 6 underground lines, with the sample locations shown on Figure 2. The analytical results from analyses of these samples are presented in Tables 2 and 3, and will be used to supplement analyses conduct pursuant to this Work Plan. These existing sample locations include soil borings SWMU 15-1, 15-2, and 15-3, which are located in the Tank Farm.

Section 3
Site Conditions

The surface and subsurface conditions that could affect the fate and transport of any contaminants are discussed below. This information is based on recent visual observations and historical subsurface investigations.

3.1 Surface Conditions

Regionally, the surface topography slopes toward the floodplain of the San Juan River, which runs along the northern boundary of the refinery complex. To the south of the refinery, the drainage is to the northwest. North of the refinery, across the San Juan River, surface water flows in a southeasterly direction toward the San Juan River. The portion of the refinery property, where the majority of the underground piping is located, is generally of low relief with an overall northwest gradient of approximately 0.02 ft/ft. The refinery sits on an alluvial floodplain terrace deposit and there is a steep bluff (approx. drop of 90 feet) at the northern boundary of the refinery where the San Juan River intersects the floodplain terrace, which marks the southern boundary of the floodplain.

There are two locally significant arroyos, one immediately east and another immediately west of the refinery. No underground piping crosses either of these arroyos. These arroyos collect most of the surface water flows in the area, thus significantly reducing surface water flows across the refinery. A minor drainage feature is located on the eastern portion of the refinery, where the former Landfill Pond (SWMU No. 9) was located and there are several steep arroyos along the northern refinery boundary that capture local surface water flows and minor groundwater discharges.

The refinery complex is bisected by County Rd #4990 (Sulivan Road), which runs east-west. The process units and wastewater treatment systems are located north of the county road. The crude oil and product loading racks, LPG storage tanks and loading racks, maintenance buildings/90-day storage area, pipeline offices, transportation truck shop, and the Class I injection well are located south of the county road. The underground piping is present across the refinery with the majority of the pipelines (i.e., wastewater lines) running near the perimeter of the property. There is very little vegetation throughout these areas with most surfaces composed of concrete, asphalt, or gravel. The land surface near the underground piping

(SWMU No. 3 and No. 6) is primarily bare soil with gravel or asphalt roads. The area between the refinery and the San Juan River does have limited vegetation on steep slopes that do not support dense vegetation.

3.2 Subsurface Conditions

Numerous soil borings and monitoring wells have been completed across the refinery property during previous site investigations and installation of the slurry wall, which runs along the northern and western refinery boundary. Based on the available site-specific and regional subsurface information, the site is underlain by the Quaternary Jackson Lake terrace deposits, which unconformably overlie the Tertiary Nacimiento Formation. The Jackson Lake deposits consist of fine grained sand, silt and clay that grades to coarse sand, gravel and cobble size material closer to the contact with the Nacimiento Formation. The Jackson Lake Formation is over 40 feet thick near the southeast portion of the site and generally thins to the northwest toward the San Juan River. The Nacimiento Formation is primarily composed of fine grained materials (e.g., carbonaceous mudstone/claystone with interbedded sandstones) with a reported local thickness of approximately 570 feet (Groundwater Technology Inc., 1994).

Figures 5, 6 and 7 present cross-sections of the shallow subsurface based on borings logs from on-site monitoring well completions. The uppermost aquifer is under water table conditions and occurs within the sand and gravel deposits of the Jackson Lake Formation. The Nacimiento Formation functions as an aquitard at the site that prevents contaminants from migrating to deeper aquifers. The potentiometric surface as measured in August 2009 is presented as Figure 8 and shows the groundwater flowing to the northwest across the area of SWMUs No. 3 and 6. The depth to groundwater varies from approximately 30 feet in the southern portion of the site near the wastewater line, which runs to the evaporation ponds and injection well, to less than 15 feet in the northern portion of the site where the wastewater discharge line runs along the northern boundary of the tank farm.

One particular characteristic of the subsurface that may affect the potential for releases from underground piping is the corrosivity of the soils. The corrosion of metals (e.g., buried steel piping) in the subsurface environment is caused by moisture, pH, redox potential, microbes in soils, and soil type (Ekine and Emujakporue, 2010). A review of this list of attributes and subsurface conditions within the subject area of investigation does not reveal any potential obvious areas with soils likely to be more corrosive in any particular location, with the possible exception of locations with higher moisture content. All of the underground piping lies within the

Jackson Lake Formation deposits, which is predominated by quartzose sand and silt deposits. The soils developed from the Jackson Lake Formation parent material in the area of investigation are all within the same soils map unit (i.e., the Doak-Avalon association) and thus the identifiable soil properties (e.g., pH) based on available government soil surveys are anticipated to be similar throughout the area of investigation (see soil survey in Appendix B). The underground pipelines are anticipated to be well above the depth of saturation; however, there may be locations with higher soil moisture (e.g., near the Raw Water Pond) that could be more corrosive. As discussed in Section 5.2, soil sampling will target these areas of potentially more corrosive soils.

Section 4
Scope of Services

4.1 Anticipated Activities

Pursuant to Section IV of the Order, a scope of services has been developed to determine and evaluate the presence, nature, extent, fate, and transport of contaminants. To accomplish this objective soil samples will be collected at the areas represented by SWMUs No. 3 and No. 6. There are 13 soil borings proposed along the SWMU No. 3 wastewater pipelines and 12 soil borings proposed along the active hydrocarbon pipelines. Three soil borings are proposed along the SWMU No. 6 abandoned pipelines. All of these soil borings will be drilled to a minimum depth of six feet below the adjacent pipeline. Soil borings will be installed and samples collected as discussed in Section 5.2.

4.2 Background Information Research

Documents containing the results of previous investigations and subsequent routine groundwater monitoring data from monitoring wells were reviewed to facilitate development of this work plan. The previously collected data provide detailed information on the overall subsurface conditions, including hydrogeology and contaminant distribution within groundwater on a site-wide basis. The data collected under this scope of services will supplement the existing soil and groundwater information and provide SWMU-specific information regarding contaminant occurrence and distribution within soils.

4.3 Collection and Management of Investigation Derived Waste

Drill cuttings, excess sample material and decontamination fluids, and all other investigation derived waste (IDW) associated with soil borings will be contained and characterized using methods based on the boring location, boring depth, drilling method, and type of contaminants suspected or encountered. All decontamination water will be disposed in the refinery wastewater treatment system upstream of the API Separator. An IDW management plan is included as Appendix C.

4.4 Surveys

The horizontal coordinates and elevation of each surface sampling location; the surface coordinates and elevation of each boring or test pit; the top of each monitoring well casing, if any,

and the ground surface at each monitoring well location; and the locations of all other pertinent structures will be determined by a registered New Mexico professional land surveyor in accordance with the State Plane Coordinate System (NMSA 1978 47-1-49-56 (Repl. Pamp. 1993)). The surveys will be conducted 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. Horizontal positions will be measured to the nearest 0.1-ft and vertical elevations will be measured to the nearest 0.01-ft.

Section 5
Investigation Methods

The purpose of the site investigation is to determine and evaluate the presence, nature, and extent of releases of contaminants. Guidance on selecting and developing sampling plans as provided in *Guidance for Choosing a Sampling Design for Environmental Data Collection* (EPA, 2000) was utilized to select the appropriate sampling strategy.

5.1 Drilling Activities

Soil borings will be drilled using either hollow-stem auger or if necessary, air rotary methods including ODEX. The preferred method will be hollow-stem auger to increase the ability to recover undisturbed samples and potential contaminants. The drilling equipment will be properly decontaminated before drilling each boring.

The NMED will be notified as early as practicable if conditions arise or are encountered that do not allow the advancement of borings to the specified depths or at planned sampling locations. Appropriate actions (e.g., installation of protective surface casing or relocation of borings to a less threatening location) will be taken to minimize any negative impacts from investigative borings. Soil samples will be collected continuously and logged by a qualified geologist or engineer.

The drilling and sampling will be accomplished under the direction of a qualified engineer or geologist who will maintain a detailed log of the materials and conditions encountered in each boring. Both sample information and visual observations of the cuttings and core samples will be recorded on the boring log. Known site features and/or site survey grid markers will be used as references to locate each boring prior to surveying the location as described in Section 4.4. The boring locations will be measured to the nearest foot, and locations will be recorded on a scaled site map upon completion of each boring.

5.2 Soil Sampling

Since there is the potential for constituents to have been released to soils at "known" locations (i.e., along pipeline right-of-ways at SWMUs No. 3 and 6) a judgmental sampling design is appropriate. The locations most likely to have releases from underground piping include pipe connections (e.g., fittings and valves) and areas most likely to result in corrosion of steel lines (e.g., locations with corrosive soils). Another method to identify potential areas for investigation

along pipelines is pipeline integrity testing. Western routinely tests underground pipelines for leaks and as noted in Table 1, all recent tests have passed and thus no potential target investigation locations have been determined from integrity test results.

The proposed soil boring locations are concentrated at pipeline connections (Figure 9). There is an area of potentially high soil moisture levels is near the Raw Water Pond. A PVC wastewater lines runs along the south side of the Raw Water Pond but would not be susceptible to corrosion from elevated moisture levels. A carbon steel line runs along the western side of the Raw Water Ponds from Tank #38 to northeast of Tank #31; however, this new steel line was just installed in August of 2010. A PVC line was present before the new line was installed and as part of the installation process the old pipeline was fully excavated and removed. There were no indications of any historical releases along this pipeline. No new borings are proposed along this new steel pipeline.

There are 13 soil borings proposed along the SWMU No. 3 wastewater pipelines and 12 soil borings proposed along the active hydrocarbon pipelines. Three soil borings are proposed along the SWMU No. 6 abandoned pipelines (Figure 9). Borings located along the pipelines will be spaced off the pipeline to avoid hitting the pipeline while drilling but kept within a maximum of five feet of the pipelines, as possible considering necessary safety concerns. All soil borings will be extended to a minimum depth of six feet below the depth of the adjacent pipeline. Most of the hydrocarbons pipelines are anticipated to be from two to four feet below the land surface, while wastewater lines may be up to eight feet in depth. If there is screening evidence of impacted soils (e.g., petroleum odor, staining, or elevated photo-ionization detector or a combustible gas indicator readings) at six feet below the pipeline, then the boring will be extended deeper until either there is no evidence of impacts or groundwater is encountered, whichever occurs first.

The decision to use a hand auger vs. a drilling rig will be based on accessibility, although most locations are anticipated to be completed using a drilling rig. A decontaminated split-barrel sampler or continuous five-foot core barrel will be used to obtain samples during the drilling of each boring. Soil samples may be collected using decontaminated, a hand-held stainless steel sampling device, shelby tube, or thin-wall sampler, or a pre-cleaned disposable sampling device. A portion of the samples will be placed in pre-cleaned, laboratory-prepared sample containers for laboratory chemical analysis. The use of an Encore® Sampler or other similar device will be used during collection of soil samples for VOC analysis. The remaining portions of the sample will be

used for logging and field screening as discussed in Section 5.2.1. Sample handling and chain-of-custody procedures will be in accordance with the procedures presented below in Section 5.4.

Discrete soil samples will be collected for laboratory analyses from within the following intervals:

- 1-2' below the bottom depth of the adjacent pipeline (all soil borings);
- 5-6' below the bottom depth of the adjacent pipeline or the lowermost one foot interval on soil borings penetrating deeper than six feet below the pipeline (all soil borings);
- from the interval in each soil boring with the greatest apparent degree of contamination based on field screening (only soil borings with observed potential impacts);
- From the 6" interval at the top of saturation (applicable only to borings that reach saturation); and
- Any additional intervals as determined based on field screening results.

Quality Assurance/Quality Control (QA/QC) samples will be collected to monitor the validity of the soil sample collection procedures as follows:

- Four field duplicates will be collected.

5.2.1 Soil Sample Field Screening and Logging

Samples obtained from the borings will be screened in the field on 2.5 foot intervals for evidence of contaminants. Field screening results will be recorded on the exploratory boring logs and will be used to aid in the selection of soil samples for laboratory analysis. The primary screening methods include: (1) visual examination, (2) olfactory examination, and (3) headspace vapor screening for volatile organic compounds. Additional screening for site- or release-specific characteristics such as pH or for specific compounds using field test kits may be conducted where appropriate.

Visual screening includes examination of soil samples for evidence of staining caused by petroleum-related compounds or other substances that may cause staining of natural soils such as elemental sulfur or cyanide compounds. Headspace vapor screening targets volatile organic compounds and involves placing a soil sample in a plastic sample bag or a foil sealed container allowing space for ambient air. The container will be sealed and then shaken gently to expose the soil to the air trapped in the container. The sealed container will be allowed to rest for a minimum of 5 minutes while vapors equilibrate. Vapors present within the sample bag's headspace will

then be measured by inserting the probe of the instrument in a small opening in the bag or through the foil. The maximum value and the ambient air temperature will be recorded on the field boring log for each sample.

The monitoring instruments will be calibrated each day to the manufacturer's standard for instrument operation. A photo-ionization detector (PID) equipped with a 10.6 or higher electron volt (eV) lamp or a combustible gas indicator will be used for VOC field screening. Field screening results may be site- and boring-specific and the results may vary with instrument type, the media screened, weather conditions, moisture content, soil type, and type of contaminant. Conditions capable of influencing the results of field screening will be recorded on the field logs.

The physical characteristics of the samples (such as mineralogy, ASTM soil classification, moisture content, texture, color, presence of stains or odors, and/or field screening results), depth where each sample was obtained, method of sample collection, and other observations will be recorded in the field log by a qualified geologist or engineer. Detailed logs of each boring will be completed in the field by a qualified engineer or geologist. Additional information, such as the presence of water-bearing zones and any unusual or noticeable conditions encountered during drilling, will be recorded on the logs.

5.3 Groundwater Water Monitoring

Groundwater has been sampled at monitoring wells located at the refinery from as early as 1984. Based on the fact that there are numerous wells that provide information on water quality across much of the subject investigation area, no groundwater samples are proposed under this Scope of Work.

5.4 Sample Handling

At a minimum, the following procedures will be used at all times when collecting samples during investigation, corrective action, and monitoring activities:

1. Neoprene, nitrile, or other protective gloves will be worn when collecting samples. New disposable gloves will be used to collect each sample;

2. All samples collected of each medium for chemical analysis will be transferred into clean sample containers supplied by the project analytical laboratory with the exception of soil, rock, and sediment samples obtained in Encore® samplers. 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; and

3. Sample labels and documentation will be completed for each sample following procedures discussed below. 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 below, will be followed for all samples collected. All samples will be submitted to the laboratory soon enough to allow the laboratory to conduct the analyses within the method holding times. At a minimum, all samples will be submitted to the laboratory within 48 hours after their collection.

Chain-of-custody and shipment procedures will include the following:

1. Chain-of-custody forms will be completed at the end of each sampling day, prior to the transfer of samples off site.

2. 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.

3. Each cooler or other container will be delivered directly to the analytical laboratory.

4. Glass bottles will be separated in the shipping container by cushioning material to prevent breakage.

5. Plastic containers will be protected from possible puncture during shipping using cushioning material.

6. The chain-of-custody form and sample request form will be shipped inside the sealed storage container to be delivered to the laboratory.

7. Chain-of-custody seals will be used to seal the sample-shipping container in conformance with EPA protocol.

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

9. 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 and copies will be returned to the relinquishing party.

10. Copies of all chain-of-custody forms generated as part of sampling activities will be maintained on-site.

5.5 Decontamination Procedures

The objective of the decontamination procedures is to minimize the potential for cross-contamination. A designated decontamination area will be established for decontamination of

drilling equipment and reusable sampling equipment. The drilling rig will be decontaminated prior to entering the site or unit. Drilling equipment or other exploration equipment that may come in contact with the borehole will be decontaminated by high pressure washing prior to drilling each new boring.

Sampling or measurement equipment, including but not limited to stainless steel sampling tools and split-barrel or core samplers, will be decontaminated in accordance with the following procedures or other methods approved by the Department before each sampling attempt or measurement:

1. Brush equipment with a wire or other suitable brush, if necessary or practicable, to remove large particulate matter;
2. Rinse with potable tap water;
3. Wash with nonphosphate detergent or other detergent approved by the Department (examples include Fantastik™, Liqui-Nox®);
4. Rinse with potable tap water; and
5. Double rinse with deionized water.

All decontamination solutions will be collected and stored temporarily as described in Section 4.3. Decontamination procedures and the cleaning agents used will be documented in the daily field log.

5.6 Field Equipment Calibration Procedures

Field equipment requiring calibration will be calibrated to known standards, in accordance with the manufacturers' recommended schedules and procedures. At a minimum, calibration checks will be conducted daily, or at other intervals approved by the Department, 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. In the interim, a properly calibrated replacement instrument will be used.

5.7 Documentation of Field Activities

Daily field activities, including observations and field procedures, will be recorded in a field log book. The original field forms will be maintained at the facility. Copies of the completed forms will be maintained in a bound and sequentially numbered field file for reference during field activities.

Indelible ink will be used to record all field activities. Photographic documentation of field activities will be performed, as appropriate. The daily record of field activities will include the following:

1. Site or unit designation;
2. Date;
3. Time of arrival and departure;
4. Field investigation team members including subcontractors and visitors;
5. Weather conditions;
6. Daily activities and times conducted;
7. Observations;
8. Record of samples collected with sample designations and locations specified;
9. Photographic log, as appropriate;
10. Field monitoring data, including health and safety monitoring;
11. Equipment used and calibration records, if appropriate;
12. List of additional data sheets and maps completed;
13. An inventory of the waste generated and the method of storage or disposal; and
14. Signature of personnel completing the field record.

5.8 Chemical Analyses

All samples collected for laboratory analysis will be submitted to an accredited laboratory. The laboratory will use the most recent standard EPA and industry-accepted analytical methods for target analytes as the testing methods for each medium sampled. Chemical analyses will be performed in accordance with the most recent EPA standard analytical methodologies and extraction methods.

All soil samples will be analyzed by the following methods:

- SW-846 Method 8260 volatile organic compounds;
- SW-846 Method 8270 semi-volatile organic compounds; and
- SW-846 Method 8015B gasoline range (C5-C10), diesel range (>C10-C28), and motor oil range (>C28-C36) organics.

Soil samples will also be analyzed for the following metals and cyanide using the indicated analytical methods.

Analyte	Analytical Method
Antimony	SW-846 method 6010/6020
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Beryllium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Cobalt	SW-846 method 6010/6020
Cyanide	SW-846 method 335.4/335.2 mod
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Nickel	SW-846 method 6010/6020
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020
Vanadium	SW-846 method 6010/6020
Zinc	SW-846 method 6010/6020

5.9 Data Quality Objectives

The Data Quality Objectives (DQOs) were developed to ensure that newly collected data are of sufficient quality and quantity to address the projects goals, including Quality Assurance/Quality Control (QA/QC) issues (EPA, 2006). The project goals are established in the Order and are to determine and evaluate the presence, nature, and extent of releases of contaminants at specified SWMUs. The type of data required to meet the project goals includes chemical analyses of soil to determine if there has been a release of contaminants at the individual SWMUs.

The quantity of data is SWMU specific and based on the historical operations at individual locations. The quality of data required is consistent across locations and is specified in Section VIII.D.7.c of the Order. In general, method detection limits should be 20% or less of the applicable background levels, cleanup standards and screening levels.

Additional DQOs include precision, accuracy, representativeness, completeness, and comparability. Precision is a measurement of the reproducibility of measurements under a given set of circumstances and is commonly stated in terms of standard deviation or coefficient of variation (EPA, 1987). Precision is also specific to sampling activities and analytical performance. Sampling precision will be evaluated through the analyses of duplicate field samples and laboratory replicates will be utilized to assess laboratory precision.

Accuracy is a measurement in the bias of a measurement system and may include many sources of potential error, including the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques (EPA, 1987). An evaluation of the accuracy will be performed by reviewing the results of field/trip blanks, matrix spikes, and laboratory QC samples.

Representativeness is an expression of the degree to which the data accurately and precisely represent the true environmental conditions. Sample locations and the number of samples have been selected to ensure the data is representative of actual environmental conditions. Based on SWMU specific conditions, this may include either biased (i.e., judgmental) locations/depths or unbiased (systematic grid samples) locations, as discussed in Section 5.2 for soils.

Completeness is defined as the percentage of measurements taken that are actually valid measurements, considering field QA and laboratory QC problems. EPA Contract Laboratory Program (CLP) data has been found to be 80-85% complete on a nationwide basis and this has been extrapolated to indicate that Level III, IV, and V analytical techniques will generate data that are approximately 80% complete (EPA, 1987). As an overall project goal, the completeness goal is 85%; however, some samples may be critical base on location or field screening results and thus a sample–by-sample evaluation will be performed to determine if the completeness goals have been obtained.

Comparability is a qualitative parameter, which expresses the confidence with which one data set can be compared to another. Industry standard sample collection techniques and routine EPA analytical methods will be utilized to help ensure data are comparable to historical and future data. Analytical results will be reported in appropriate units for comparison to historical data and cleanup levels.

Section 6
Schedule

This investigation Work Plan will be implemented in accordance with the schedule as specified by NMED in the Work Plan approval letter.

Section 7
References

Ekine, A.S., and Emujakporue, G.O., 2010, Investigation of Corrosion of Buried Oil Pipeline by the Electrical Geophysical Methods; Journal of Applied Sciences and Environmental Management, Volume 14(1), pp 63-65.

EPA, 1987, Data Quality Objectives for Remedial Response Activities; United States Environmental Protection Agency, Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, OSWER Directive 9355.0-7B, 85p

EPA, 2000, Guidance on Choosing a Sampling Design for Environmental Data Collection, EPA/240/R-02/005, EPA QA/G-5S, 168 p.

EPA, 2006, Guidance on Systematic Planning Using the Data Quality Objectives Process, United States Environmental Protection Agency, Office of Environmental Information; EPA/240/B-06/001, p. 111.

Groundwater Technology Inc., 1994, RCRA Facility Investigation/Corrective Measures Study Report Bloomfield Refining Company #50 County Road 4990 Bloomfield, New Mexico, p.51.

NMED, 2007, State of New Mexico Environment Department v. San Juan Refining Company and Giant Industries, Inc.; Order July 27, 2007, p. 133.

Tables

Table 1
Description and Inspection Schedule of Underground Pipelines
SWMU Group 8 Investigation Work Plan

Western Refining Southwest - Bloomfield Refinery

Line Number	Description (Service)	Line Size (inch)	Line Length (feet)	Starting Location	End Location	Drawing Reference	Construction Material	Inspection Scheduled	Inspection Date	Inspection Results Pass/Fail	Test/ Inspection Method	Repairs/Maint Needed	Repairs-Maint Completion date
1	Effluent Wtr. Transfer Line	6	3000	Effilent Pond Outlet Pump P-616	North Evaporation Pond	D-500-800-031	PVC	2010	Jul-10	Pass	Hydrtest	None	N/A
2	Effluent Wtr. Trans. Pump	6	908	North Evaporation Pond Outlet	Effilent Transfer Pump P-671	D-500-800-031	PVC	2012					
3	Effluent Wtr. Transfer Line	6	2,797	Effilent Trans. Pump Disch.	Injection Well Building	D-500-800-031	PVC	2012	Oct-09	Pass	Hydrostatic	None	N/A
4	Injection Well Recir. Line	6	910	Injection Well Building	North Evaporation Pond	D-500-800-031	PVC	2012					
5	River Terrace Transfer Line	2	911	River Terrace Processing Skid	River Pump Building Water Basin	D-500-800-043	PVC	2012					
6	Crude Transfer Line	12	912	Pipe Rack East Of LPG Stg Tks.	Pipe Rack Southwest of Tk. # 31	N/A	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
7	Steam Header at Terminals	6	913	Pipe Rack Southwest of Tk. # 31	Pipe Rack East Of LPG Stg. Tks.	N/A	Carbon steel	2011					
8	Condensate Return Header	4	914	Pipe Rack East Of LPG Stg Tks.	Pipe Rack Southwest of Tk. # 31	N/A	Carbon steel	2011					
9	C-4 To Blend	4	218	Pipe Rack East Of LPG Bullets	Pipe Rack Southwest of Tk. # 31	N/A	Carbon steel	*Temporarily Out of Service					
10	ULSD Sales Line	12	916	Pipe Rack Southwest of Tk. # 31	Filter Pad Area North Of Loading Pad	N/A	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
11	Unleaded Gasoline Sales	12	917	Pipe Rack Southwest of Tk. # 31	Filter Pad Area North Of Loading Pad	N/A	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
12	Naphtha Sales from Tk #35	12	980	Pipe Rack Southwest of Tk. # 31	Filter Pad Area North Of Loading Pad	N/A	Carbon steel	out of service					
13	Lite Straight Run Product	4	218	Pipe Rack Southwest of Tk. # 31	Rack Area North Of B-23	N/A	Carbon steel	2011					
14	Poly Material To Storage	3	275	Pipe Rack Southwest of Tk. # 31	Area Northeast of B-21	N/A	Carbon steel	*Temporarily Out of Service					
15	Poly Unit Feed Line	3	275	Area Northeast of B-21	Pipe Rack Southwest of Tk. # 31	N/A	Carbon steel	*Temporarily Out of Service					
16	LPG Rerun Line	2	275	Area Northeast of B-21	Pipe Rack Southwest of Tk. # 31	N/A	Carbon steel	*Temporarily Out of Service					
17	Saturate To Storage	2	275	Pipe Rack Southwest of Tk. # 31	Area Northeast of B-21	N/A	Carbon steel	*Temporarily Out of Service					
18	C-4 To Storage	2	275	Pipe Rack Southwest of Tk. # 31	Area Northeast of B-21	N/A	Carbon steel	*Temporarily Out of Service					
19	C-3 To Storage	2	275	Pipe Rack Southwest of Tk. # 31	Area Northeast of B-21	N/A	Carbon steel	*Temporarily Out of Service					
20	JP-8 Sales Line	8	388	Pipe Rack Southwest of Tk. # 31	Out Of Service	N/A	Carbon steel	out of service					
21	Off Road Diesel Sales From Tk.18	6	389	Pipe Rack Southwest of Tk. # 31	Filter Pad Area North Of Loading Pad	N/A	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
22	Slop Line ToTk. # 22	4	390	Area Northeast of B-21	Out of Service	N/A	Carbon steel	out of service					
23	Isomerate/Naptha Line	6	699	Low Rack West Of Tk.# 25	Area West of B-12	D-000-900-023	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
24	Sub Grade Gasoine (Tk #32)	8	392	Pipe Rack West Of Tk.# 36	Filter Pad Area North Of Loading Pad	N/A	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A

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Western Refining Southwest - Bloomfield Refinery

Line Number	Description (Service)	Line Size (inch)	Line Length (feet)	Starting Location	End Location	Drawing Reference	Construction Material	Inspection Scheduled	Inspection Date	Inspection Results Pass/Fail	Test/ Inspection Method	Repairs/Maint Needed	Repairs-Maint Completion date
25	Premium Sales from Tk.s # 3 & 4	6	393	Pipe Rack West Of Tk.# 36	Filter Pad Area North Of Loading Pad	N/A	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
26	Naptha to VRU	4	313	Crude Line East of B-21	Manifold @ VRU Unit	NewTech 595-M-601	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
27	Naphta Feed To VRU Unit	4	223	Transfer Pump @ Tk. # 44	Manifold @ VRU Unit	NewTech 595-M-601	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
28	Naptha Fill/Rerun To Tk. #44	4	223	Manifold @ VRU Unit	Naptha Fill Line To Tk. # 44	NewTech 595-M-601	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
29	Off-Road Diesel To Bays #1 & 2	8	397	From F-706 Filter Piping	To Meter Spools @ Bays # 1&2	D-700-500-118	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
30	(Old Kerosene) To Bay # 3	6	398	From F-706 Filter Piping	To Meter Spools @ Bays # 3	D-700-500-118	Carbon steel	2011					
31	Premiun Sales Line	10	399	From F-705 Filter Piping	To Meter Spools @ Bays # 1,2 & 3	D-700-500-118	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
32	Unleaded GasolineSales Line	10	400	From F-704 Filter Piping	To Meter Spools @ Bays # 1,2 & 3	D-700-500-118	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
33	ULSD To Bay # 4	8	401	From F-703 Filter Piping	To Meter Spool @ Bay # 4	D-700-500-123	Carbon steel	2007	Nov-07	Pass	Praxair	None	N/A
34	Ethanol Pump Suction Line	8	330	From Tk. # 45 Outlet Nozzel	To P-707 & P-707A Pump Suction	D-700-500-140	Carbon steel	2011					
35	Ethanol Unloading Line	4	330	From P-706 Pump Discharge	To Tk. # 45 Inlet Nozzel	D-700-500-140	Carbon steel	2011					
36	Naphtha Unloading Line	6	420	Suction Manifold @ P-607A	Unloading line @ Tk. #18 and 19	B-600-500-296	Carbon steel	2007	Sep-07	Pass		None	N/A
37	Naptha Rundown To Tk.# 35	3	99	Line From North Pipe Rack Area	To Tk. # 35 Fill Nozzle	B-600-500-232	Carbon steel	*Temporarily Out of Service					
38	Naptha Feed Line to Unit	4	99	From P-607A Pump Discharge	To North Pipe Rack Feed To Units	B-600-500-236	Carbon steel	*Temporarily Out of Service					
81	Crude Transfer Line	12	99	Pipe Rack East Of LPG Stg Tks.	Pipe Rack South of Crude Unloading Bays	D-000-900-023	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
82	Crude Transfer Line	12	194	Pipe Rack South of Crude Unloading Bays	Berm South of Tank #43	D-000-900-023	Carbon steel	2008	May-08	Pass	Praxair	None	N/A
83	Groundwater Recovery Transfer Line	4	822	Discharge at Tk #37	Valve box at corner Northeast of DHT	AMEC 6/7	Carbon Steel/PVC	2010	Jul-10	Pass	Hydrtest	None	N/A
84	Premium Sales Line from Tk #3 & 4	8	300	Area West of API Separator	DHT Option City		Carbon Steel	2007	Nov-07	Pass	Praxair	None	N/A
85	Diesel Reciepts	6	25	Roadway SW of Tk #17	Piperack btwn Tk #34 and Tk #25	D-800-600-104	Carbon Steel	2010	Jun-10	Pass	Hydrotest	None	N/A
86	Premium/Uneaded Reciepts	6	25	Roadway SW of Tk #17	Piperack btwn Tk #34 and Tk #25	D-800-600-099 D-600-800-113	Carbon Steel	2010	Jun-10	Pass	Hydrotest	None	N/A
87	Groundwater Recovery Transfer Line	3	970	Tk #38	Slop Line NE of Tk #31	D-600-800-121	Carbon Steel	2010	Aug-10	Pass	Hydrotest	None	N/A

*All lines that are temporarily out of service due to suspension of refining operations were steamed out and are hydrocarbon free

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Non-Residential Screening Levels (0-2' bgs)	Non-Residential Screening Levels (2-10' bgs)	Non-Residential Screening Levels (>10' bgs)	Source	Units	AOC 22-12 (0-0.5')	AOC 22-12 (0-0.5') DUP	AOC 22-12 (1.5-2.0')	AOC 22-12 (32-35')	AOC 22-12 (36-37.75')	AOC 22-13 (0-0.5')	AOC 22-13 (1.5-2.0')	AOC 22-13 (18-20')	AOC 22-13 (32-34.5')	AOC 22-13 (37-39')	AOC 22-15 (1.0-1.5')	AOC 22-15 (1.5-2.0')	AOC 22-15 (1.5-2.0') DUP	AOC 22-15 (30-32')	AOC 22-15 (34-36')	AOC 22-16 (0-0.5')	AOC 22-16 (1.5-2.0')	AOC 22-16 (36-38') [1]	AOC 24-7 (0-0.5')	AOC 24-7 (1.5-2.0')	AOC 24-7 (39-42')	AOC 26-8 (0-1.0')	AOC 26-8 (0-1.0') DUP	AOC 26-8 (1.5-2.0')	AOC 26-8 (32-36')
Sample Date						4/13/2009	4/13/2009	4/13/2009	4/13/2009	4/13/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/13/2009	4/13/2009	4/14/2009	4/7/2009	4/7/2009	4/7/2009	4/16/2009	4/16/2009	4/16/2009	4/16/2009
Metals (mg/kg)																														
Antimony	6.61E-01	6.61E-01	6.61E-01	(1)	mg/Kg	<13	<2.5	<12	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	--	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<13	<13	<2.5	<13	<12	<2.5	<2.5
Arsenic	1.31E-02	1.31E-02	1.31E-02	(1)	mg/Kg	<13	<13	<12	<2.5	<2.5	<2.5	<13	<2.5	<2.5	--	<13	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<13	<13	<2.5	<13	<12	<2.5	<2.5
Barium	3.01E+02	3.01E+02	3.01E+02	(1)	mg/Kg	230	220	180	130	110	180	180	37	130	--	160	160	180	190	230	230	130	220	210	150	**530**	**380**	240	280	230
Beryllium	5.77E+01	5.77E+01	5.77E+01	(1)	mg/Kg	<0.75	0.38	<0.75	<0.15	<0.15	0.33	<0.75	<0.15	<0.15	--	0.26	0.39	0.37	0.18	<0.15	0.35	0.32	<0.15	<0.75	<0.75	<0.15	<0.75	<0.75	0.29	<0.15
Cadmium	1.37E+00	1.37E+00	1.37E+00	(1)	mg/Kg	<0.50	<0.10	<0.50	<0.10	<0.10	0.17	<0.50	<0.10	<0.10	--	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.50	<0.50	<0.10	<0.50	<0.50	<0.10	<0.10
Chromium	4.47E+05	4.47E+05	9.86E+07	(2)	mg/Kg	6.7	6	10	4	20	5.8	6.4	1.7	8.5	--	4.4	4.8	4.9	4.7	2.2	16	82	2.7	38	54	4	2.4	2.1	4.2	2.5
Cobalt	4.90E-01	4.90E-01	4.90E-01	(3)	mg/Kg	**5**	**3.5**	**4.9**	**2.8**	**1.8**	**3.3**	**4.6**	**1.3**	**2**	--	**3.5**	**3.8**	**3.7**	**2.9**	**2.2**	**3.2**	**2.8**	**2**	**4.9**	**4.4**	**2.4**	**3.1**	**3.1**	**3.5**	**2.3**
Cyanide	7.44E+00	7.44E+00	7.44E+00	(1)	mg/Kg	<0.5	<0.5	<0.5	<0.5	--*	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Lead	8.00E+02	8.00E+02	--	(5)	mg/Kg	6.5	5.5	7.8	2.7	1.7	6.7	7.2	5.8	6.2	--	5.3	4.3	4.4	3.9	2.1	4.4	3.6	1.8	7.2	5.1	0.84	2.8	2.8	3.2	3.1
Mercury	2.93E-02	2.93E-02	2.93E-02	(1)	mg/Kg	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	--	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	**0.042**	<0.033	<0.033	<0.033	<0.032	<0.033	<0.033	<0.033	<0.033
Nickel	4.77E+01	4.77E+01	4.77E+01	(1)	mg/Kg	6.9	5.5	7.7	2.5	2	4.9	7.2	2	2.2	--	5	5.7	5.6	3.8	1.7	5.1	5.2	1.7	6.8	5.8	1.6	3	2.8	4.8	1.8
Selenium	9.65E-01	9.65E-01	9.65E-01	(1)	mg/Kg	<13	<13	<12	<12	<2.5	<13	<13	<2.5	<2.5	--	<13	<13	<13	<2.5	<2.5	<13	<13	<2.5	<13	<13	<2.5	<13	<12	<12	<12
Silver	1.57E+00	1.57E+00	1.57E+00	(1)	mg/Kg	<1.3	<0.25	<1.2	<0.25	<0.25	<0.25	<1.3	<0.25	<0.25	--	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3	<1.3	<0.25	<1.3	<1.2	<0.25	<0.25
Vanadium	1.83E+02	1.83E+02	1.83E+02	(1)	mg/Kg	16	14	19	14	10	14	18	5.5	9.8	--	12	15	14	15	11	14	13	12	17	15	11	<13	<12	13	10
Zinc	6.82E+02	6.82E+02	6.82E+02	(1)	mg/Kg	32	26	36	13	10	28	32	9.1	14	--	18	24	23	21	12	34	75	12	52	48	15	22	20	24	14
Volatile Organic Compounds - (EPA Method 8260B) mg/kg																														
1,1,1,2-Tetrachloroethane	1.73E-03	1.73E-03	1.73E-03	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	2.98E+00	2.98E+00	2.98E+00	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	2.25E-04	2.25E-04	2.25E-04	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	6.74E-04	6.74E-04	6.74E-04	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	6.09E-03	6.09E-03	6.09E-03	(1)	mg/Kg	--	--	--	--	--	--	<2.0	<1.0	<0.10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	1.19E-01	1.19E-01	1.19E-01	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloropropene	--	--	--		mg/Kg	--	--	--	--	--	--	<2.0	<1.0	<0.10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	--	--	--		mg/Kg	--	--	--	--	--	--	<2.0	<1.0	<0.10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	3.56E-05	3.56E-05	3.56E-05	(1)	mg/Kg	--	--	--	--	--	--	<2.0	<1.0	<0.10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	1.02E-02	1.02E-02	1.02E-02	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	2.40E-02	2.40E-02	2.40E-02	(3)	mg/Kg	--	--	--	--	--	**28**	**200**	**73**	**13**	**400**	--	--	--	--	**0.69**	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane	2.97E-06	2.97E-06	2.97E-06	(1)	mg/Kg	--	--	--	--	--	--	<2.0	<1.0	<0.10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	1.58E-05	1.58E-05	1.58E-05	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	3.13E-01	3.13E-01	3.13E-01	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	3.65E-04	3.65E-04	3.65E-04	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	1.11E-03	1.11E-03	1.11E-03	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	2.00E-02	2.00E-02	2.00E-02	(3)	mg/Kg	--	--	--	--	--	**11**	**77**	**21**	**4.4**	**140**	--	--	--	--	**0.26**	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	--	--	--		mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropane	2.70E-01	2.70E-01	2.70E-01	(3)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	3.57E-03	3.57E-03	3.57E-03	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnaphthalene	1.50E-01	1.50E-01	1.50E-01	(4)	mg/Kg	--	--	--	--	--	**1.7**	**31**	**9.1**	**1.9**	**45**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	--	--	--		mg/Kg	--	--	--	--	--	--	<2.0	<1.0	<0.10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	1.27E+00	1.27E+00	1.27E+00	(1)	mg/Kg	--	--	--	--	--	--	<10	<5.0	<0.50	<50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	6.24E-01	6.24E-01	6.24E-01	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	--	--	--		mg/Kg	--	--	--	--	--	--	<10	<5.0	<0.50	<50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	9.00E-01	9.00E-01	9.00E-01	(3)	mg/Kg	--	--	--	--	--	**3**	**47**	**17**	**3.4**	**72**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	2.80E+00	2.80E+00	2.80E+00	(3)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Isopropyltoluene	--	--	--		mg/Kg	--	--	--	--	--	0.83	4.9	1.7	0.46	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	--	--	--		mg/Kg	--	--	--	--	--	--	<10	<5.0	<0.50	<50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	3.84E+00	3.84E+00	3.84E+00	(1)	mg/Kg	--	--	--	--	--	--	<15	<7.5	<0.75	<75	--	--	--	--	--	--	--	<0.75	--	--	--	--	--	--	--
Benzene	1.85E-03	1.85E-03	1.85E-03	(1)	mg/Kg	--	--	--	--	--	--	**3.1**	**0.81**	**0.066**	**7.7**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	1.50E-02	1.50E-02	1.50E-02	(3)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	2.76E-04	2.76E-04	2.76E-04	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromoform	2.30E-02	2.30E-02	2.30E-02	(4)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	1.94E-03	1.94E-03	1.94E-03	(1)	mg/Kg	--	--	--	--	--	--	<2.0	<1.0	<0.10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	2.52E-01	2.52E-01	2.52E-01	(1)	mg/Kg	--	--	--	--	--	--	<10	<5.0	<0.50	<50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	7.39E-04	7.39E-04	7.39E-04	(1)	mg/Kg	--	--	--	--	--	--	<2.0	<1.0	<0.10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	5.38E-02	5.38E-02	5.38E-02	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	--	--	--		mg/Kg	--	--	--	--	--	--	<2.0	<1.0	<0.10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	4.68E-04	4.68E-04	4.68E-04	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	4.18E-03	4.18E-03	4.18E-03	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-DCE	9.43E-02	9.43E-02	9.43E-02	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	1.35E-03	1.35E-03	1.35E-03	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	3.38E-04	3.38E-04	3.38E-04	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Non-Residential Screening Levels (0-2' bgs)	Non-Residential Screening Levels (2-10' bgs)	Non-Residential Screening Levels (>10' bgs)	Source	Units	AOC 22-12 (0-0.5')	AOC 22-12 (0-0.5') DUP	AOC 22-12 (1.5-2.0')	AOC 22-12 (32-35')	AOC 22-12 (36-37.75')	AOC 22-13 (0-0.5')	AOC 22-13 (1.5-2.0')	AOC 22-13 (18-20')	AOC 22-13 (32-34.5')	AOC 22-13 (37-39')	AOC 22-15 (1.0-1.5')	AOC 22-15 (1.5-2.0')	AOC 22-15 (1.5-2.0') DUP	AOC 22-15 (30-32')	AOC 22-15 (34-36')	AOC 22-16 (0-0.5')	AOC 22-16 (1.5-2.0')	AOC 22-16 (36-38') [1]	AOC 24-7 (0-0.5')	AOC 24-7 (1.5-2.0')	AOC 24-7 (39-42')	AOC 26-8 (0-1.0')	AOC 26-8 (0-1.0') DUP	AOC 26-8 (1.5-2.0')	AOC 26-8 (32-36')
Sample Date						4/13/2009	4/13/2009	4/13/2009	4/13/2009	4/13/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/13/2009	4/13/2009	4/14/2009	4/7/2009	4/7/2009	4/7/2009	4/16/2009	4/16/2009	4/16/2009	4/16/2009
Dibromomethane	9.10E-02	9.10E-02	9.10E-02	(3)	mg/Kg	--	--	--	--	--	--	<2.0	<1.0	<0.10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	7.23E-01	7.23E-01	7.23E-01	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	1.46E-02	1.46E-02	1.46E-02	(1)	mg/Kg	--	--	--	--	--	**0.28**	**16**	**22**	**2.2**	**120**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	2.20E+02	2.20E+02	1.90E-02	(4)	mg/Kg	--	--	--	--	--	--	<2.0	<1.0	<0.10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isopropylbenzene	9.86E-01	9.86E-01	9.86E-01	(1)	mg/Kg	--	--	--	--	--	--	**2.5**	**3.7**	0.55	**12**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	2.29E-02	2.29E-02	2.29E-02	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	1.07E-02	1.07E-02	1.07E-02	(1)	mg/Kg	--	--	--	--	--	--	<3.0	<1.5	<0.15	<15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	4.19E-03	4.19E-03	4.19E-03	(1)	mg/Kg	--	--	--	--	--	**2.6**	**32**	**12**	**2.5**	**49**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	--	--	--		mg/Kg	--	--	--	--	--	2.8	4.4	7.9	2.3	36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
n-Propylbenzene	--	--	--		mg/Kg	--	--	--	--	--	--	8.5	9.9	1.6	57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	--	--	--		mg/Kg	--	--	--	--	--	0.094	3	2.7	0.67	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	1.56E+00	1.56E+00	1.56E+00	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	--	--	--		mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	4.49E-04	4.49E-04	4.49E-04	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	1.38E+00	1.38E+00	1.38E+00	(1)	mg/Kg	--	--	--	--	--	0.78	**47**	**28**	**1.6**	**68**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-DCE	3.01E-02	3.01E-02	3.01E-02	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	1.35E-03	1.35E-03	1.35E-03	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5.30E-03	5.30E-03	5.30E-03	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	9.01E-01	9.01E-01	9.01E-01	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2.88E-04	2.88E-04	2.88E-04	(1)	mg/Kg	--	--	--	--	--	--	<1.0	<0.50	<0.050	<5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	1.76E-01	1.76E-01	1.76E-01	(1)	mg/Kg	--	--	--	--	--	**25**	**250**	**130**	**14**	**760**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Volatile Organic Compounds - (EPA Method 8260B) µg/Kg-dry																														
1,1,1,2-Tetrachloroethane	1.73E+00	1.73E+00	1.73E+00	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,1,1-Trichloroethane	2.98E+03	2.98E+03	2.98E+03	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,1,2,2-Tetrachloroethane	2.25E-01	2.25E-01	2.25E-01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,1,2-Trichloroethane	6.74E-01	6.74E-01	6.74E-01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,1-Dichloroethane	6.09E+00	6.09E+00	6.09E+00	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,1-Dichloroethene	1.19E+02	1.19E+02	1.19E+02	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,1-Dichloropropene	--	--	--		µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,2,3-Trichlorobenzene	--	--	--		µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,2,3-Trichloropropane	3.56E-02	3.56E-02	3.56E-02	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,2,4-Trichlorobenzene	1.02E+01	1.02E+01	1.02E+01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,2,4-Trimethylbenzene	2.40E+01	2.40E+01	2.40E+01	(3)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	16.1	--	--	--	--	--	<0.924	<1.00	<0.918	<0.976	--	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	4.33	1.6	<1.09	3.2
1,2-Dibromo-3-chloropropane	2.97E-03	2.97E-03	2.97E-03	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,2-Dibromoethane (EDB)	1.58E-02	1.58E-02	1.58E-02	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,2-Dichlorobenzene	3.13E+02	3.13E+02	3.13E+02	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,2-Dichloroethane (EDC)	3.65E-01	3.65E-01	3.65E-01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,2-Dichloropropane	1.11E+00	1.11E+00	1.11E+00	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,3,5-Trimethylbenzene	2.00E+01	2.00E+01	2.00E+01	(3)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	5.42	--	--	--	--	--	<0.924	<1.00	<0.918	<0.976	--	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,3-Dichlorobenzene	--	--	--		µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,3-Dichloropropane	2.70E+02	2.70E+02	2.70E+02	(3)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
1,4-Dichlorobenzene	3.57E+00	3.57E+00	3.57E+00	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
2,2-Dichloropropane	--	--	--		µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
2-Butanone	1.27E+03	1.27E+03	1.27E+03	(1)	µg/Kg-dry	<4.45	<4.04	<4.10	4.66	4.96	<4.42	--	--	--	--	<3.70	<4.01	<3.67	<3.90	<4.03	<4.03	<4.94	<3.86	<4.16	<4.06	<4.29	<3.71	<3.97	<4.36	9.58
2-Chlorotoluene	6.24E+02	6.24E+02	6.24E+02	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
2-Hexanone	--	--	--		µg/Kg-dry	<4.45	<4.04	<4.10	<3.88	<3.76	<4.42	--	--	--	--	<3.70	<4.01	<3.67	<3.90	<4.03	<4.03	<4.94	<3.86	<4.16	<4.06	<4.29	<3.71	<3.97	<4.36	<3.65
4-Chlorotoluene	2.80E+03	2.80E+03	2.80E+03	(3)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
4-Isopropyltoluene	--	--	--		µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	--	--	--	--	--	<0.924	<1.00	<0.918	<0.976	--	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
4-Methyl-2-pentanone	--	--	--		µg/Kg-dry	<4.45	<4.04	<4.10	<3.88	<3.76	<4.42	--	--	--	--	<3.70	<4.01	<3.67	<3.90	<4.03	<4.03	<4.94	<3.86	<4.16	<4.06	<4.29	<3.71	<3.97	<4.36	<3.65
Acetone	3.84E+03	3.84E+03	3.84E+03	(1)	µg/Kg-dry	<4.45	<4.04	<4.10	30.1	21	<4.42	--	--	--	--	9.84	6.14	4.35	15	205	<4.03	<4.94	--	<4.16	<4.06	7.8	<3.71	<3.97	<4.36	42.4
Benzene	1.85E+00	1.85E+00	1.85E+00	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	**6.43**	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	0.966
Bromobenzene	1.50E+01	1.50E+01	1.50E+01	(3)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Bromodichloromethane	2.76E-01	2.76E-01	2.76E-01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Bromoform	2.30E+01	2.30E+01	2.30E+01	(4)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Bromomethane	1.94E+00	1.94E+00	1.94E+00	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Carbon disulfide	2.52E+02	2.52E+02	2.52E+02	(1)	µg/Kg-dry	<4.45	<4.04	<4.10	<3.88	<3.76	<4.42	--	--	--	--	<3.70	<4.01	<3.67	<3.90	<4.03	<4.03	<4.94	<3.86	<4.16	<4.06	<4.29	<3.71	<3.97	<4.36	<3.65
Carbon tetrachloride	7.39E-01	7.39E-01	7.39E-01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Chlorobenzene	5.38E+01	5.38E+01	5.38E+01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Chloroethane	--	--	--		µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Chloroform	4.68E-01	4.68E-01	4.68E-01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Chloromethane	4.18E+00	4.18E+00	4.18E+00	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Non-Residential Screening Levels (0-2' bgs)	Non-Residential Screening Levels (2-10' bgs)	Non-Residential Screening Levels (>10' bgs)	Source	Units	AOC 22-12 (0-0.5')	AOC 22-12 (0-0.5') DUP	AOC 22-12 (1.5-2.0')	AOC 22-12 (32-35')	AOC 22-12 (36-37.75')	AOC 22-13 (0-0.5')	AOC 22-13 (1.5-2.0')	AOC 22-13 (18-20')	AOC 22-13 (32-34.5')	AOC 22-13 (37-39')	AOC 22-15 (1.0-1.5')	AOC 22-15 (1.5-2.0')	AOC 22-15 (1.5-2.0') DUP	AOC 22-15 (30-32')	AOC 22-15 (34-36')	AOC 22-16 (0-0.5')	AOC 22-16 (1.5-2.0')	AOC 22-16 (36-38') [1]	AOC 24-7 (0-0.5')	AOC 24-7 (1.5-2.0')	AOC 24-7 (39-42')	AOC 26-8 (0-1.0')	AOC 26-8 (0-1.0') DUP	AOC 26-8 (1.5-2.0')	AOC 26-8 (32-36')
Sample Date						4/13/2009	4/13/2009	4/13/2009	4/13/2009	4/13/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/13/2009	4/13/2009	4/14/2009	4/7/2009	4/7/2009	4/7/2009	4/16/2009	4/16/2009	4/16/2009	4/16/2009
cis-1,2-DCE	9.43E+01	9.43E+01	9.43E+01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
cis-1,3-Dichloropropene	1.35E+00	1.35E+00	1.35E+00	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Dibromochloromethane	3.38E-01	3.38E-01	3.38E-01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Dibromomethane	9.10E+01	9.10E+01	9.10E+01	(3)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Dichlorodifluoromethane	7.23E+02	7.23E+02	7.23E+02	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Ethylbenzene	1.46E+01	1.46E+01	1.46E+01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	1.28	--	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<0.05	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Hexachlorobutadiene	2.20E+05	2.20E+05	1.90E+01	(4)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Isopropylbenzene	9.86E+02	9.86E+02	9.86E+02	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	8.15	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<0.05	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Methyl tert-butyl ether (MTBE)	2.29E+01	2.29E+01	2.29E+01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	0.981	2.2	3.71	--	--	--	--	<0.924	<1.00	<0.918	**28.1**	7.07	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Methylene chloride	1.07E+01	1.07E+01	1.07E+01	(1)	µg/Kg-dry	6.76	5.77	7.36	7.43	8.3	**14**	--	--	--	--	**16.3**	**11**	9.09	**12.1**	**15.6**	8.85	7.26	**13.2**	2.37	2.39	2.71	8.24	10.5	9.76	8.38
Naphthalene	4.19E+00	4.19E+00	4.19E+00	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	1.4	**6.22**	--	--	--	--	--	<0.924	<1.00	<0.918	<0.976	0.1	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	1.82	<0.991	<1.09	2.34
n-Butylbenzene	--	--	--		µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	6.37	--	--	--	--	--	<0.924	<1.00	<0.918	<0.976	0.15	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
n-Propylbenzene	--	--	--		µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	1.88	11.9	--	--	--	--	<0.924	<1.00	<0.918	<0.976	0.084	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
sec-Butylbenzene	--	--	--		µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	1	--	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<0.05	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Styrene	1560	1560	1.56E+03	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
tert-Butylbenzene	--	--	--		µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	8.23	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Tetrachloroethene (PCE)	4.49E-01	4.49E-01	4.49E-01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Toluene	1.38E+03	1.38E+03	1.38E+03	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	--	--	--	--	--	<0.924	<1.00	<0.918	<0.976	1.59	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	3.92	3.55	<1.09	<0.912
trans-1,2-DCE	3.01E+01	3.01E+01	3.01E+01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
trans-1,3-Dichloropropene	1.35E+00	1.35E+00	1.35E+00	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Trichloroethene (TCE)	5.30E+00	5.30E+00	5.30E+00	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Trichlorofluoromethane	9.01E+02	9.01E+02	9.01E+02	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Vinyl chloride	2.88E-01	2.88E-01	2.88E-01	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	<0.939	<1.10	--	--	--	--	<0.924	<1.00	<0.918	<0.976	<1.01	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	<0.912
Xylenes, Total	1.76E+02	1.76E+02	1.76E+02	(1)	µg/Kg-dry	<1.11	<1.01	<1.03	<0.971	7.62	--	--	--	--	--	<0.924	<1.00	<0.918	<0.976	0.22	<1.01	<1.24	<0.965	<1.04	<1.01	<1.07	<0.928	<0.991	<1.09	2.54
Semi Volatile Organics - (EPA Method 8270) mg/kg																														
1,2,4-Trichlorobenzene	1.02E-02	1.02E-02	1.02E-02	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	3.13E-01	3.13E-01	3.13E-01	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,3-Dichlorobenzene	--	--	--		mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,4-Dichlorobenzene	3.57E-03	3.57E-03	3.57E-03	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	7.13E+00	7.13E+00	7.13E+00	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4,6-Trichlorophenol	7.13E-02	7.13E-02	7.13E-02	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4-Dichlorophenol	1.37E-01	1.37E-01	1.37E-01	(1)	mg/Kg	<0.40	<0.40	<0.40	<0.40	<0.40	<2.0	<4.0	<0.40	<0.40	--	<2.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<2.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
2,4-Dimethylphenol	9.12E-01	9.12E-01	9.12E-01	(1)	mg/Kg	<0.30	<0.30	<0.30	<0.30	<0.30	<1.5	<3.0	<0.30	<0.30	--	<1.5	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<1.5	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2,4-Dinitrophenol	5.25E-02	5.25E-02	5.25E-02	(1)	mg/Kg	<0.40	<0.40	<0.40	<0.40	<0.40	<2.0	<4.0	<0.40	<0.40	--	<2.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<2.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
2,4-Dinitrotoluene	1.56E-03	1.56E-03	1.56E-03	(1)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,6-Dinitrotoluene	2.67E-02	2.67E-02	2.67E-02	(1)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2-Chloronaphthalene	1.35E+01	1.35E+01	1.35E+01	(1)	mg/Kg	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3	<2.5	<0.25	<0.25	--	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Chlorophenol	1.53E-01	1.53E-01	1.53E-01	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Methylnaphthalene	9.00E-01	9.00E-01	9.00E-01	(3)	mg/Kg	<0.25	<0.25	<0.25	<0.25	<0.25	**9.5**	**32**	**11**	**3.8**	--	<1.3	<0.25	<0.25	<0.25	0.63	<0.25	<0.25	<0.25	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2-Methylphenol	2.00E+00	2.00E+00	2.00E+00	(3)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2-Nitroaniline	3.30E-02	3.30E-02	3.30E-02	(3)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Nitrophenol	--	--	--		mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3,3´-Dichlorobenzidine	1.70E-02	1.70E-02	1.70E-02	(1)	mg/Kg	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3	<2.5	<0.25	<0.25	--	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
3+4-Methylphenol	1.90E-01	1.90E-01	1.90E-01	(3)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3-Nitroaniline	--	--	--		mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4,6-Dinitro-2-methylphenol	--	--	--		mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Bromophenyl phenyl ether	--	--	--		mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4-Chloro-3-methylphenol	--	--	--		mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chloroaniline	1.20E-03	1.20E-03	1.20E-03	(4)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-Chlorophenyl phenyl ether	--	--	--		mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
4-Nitroaniline	1.00E-02	1.00E-02	1.00E-02	(4)	mg/Kg	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3	<2.5	<0.25	<0.25	--	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-Nitrophenol	--	--	--		mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthene	2.05E+01	2.05E+01	2.05E+01	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthylene	--	--	--		mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Aniline	3.40E-02	3.40E-02	3.40E-02	(4)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Anthracene	3.37E+02	3.37E+02	3.37E+02	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Azobenzene	5.10E-03	5.10E-03	5.10E-03	(4)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benz(a)anthracene	3.20E-01	3.20E-01	3.20E-01	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	1.09E-01	1.09E-01	1.09E-01	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(b)fluoranthene	1.11E+00	1.11E+00	1.11E+00	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	--	--	--		mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Table 2
Existing Soil Analytical Results
Bloomfield Refinery, Bloomfield, New Mexico

Analytes	Non-Residential Screening Levels (0-2' bgs)	Non-Residential Screening Levels (2-10' bgs)	Non-Residential Screening Levels (>10' bgs)	Source	Units	AOC 22-12 (0-0.5')	AOC 22-12 (0-0.5') DUP	AOC 22-12 (1.5-2.0')	AOC 22-12 (32-35')	AOC 22-12 (36-37.75')	AOC 22-13 (0-0.5')	AOC 22-13 (1.5-2.0')	AOC 22-13 (18-20')	AOC 22-13 (32-34.5')	AOC 22-13 (37-39')	AOC 22-15 (1.0-1.5')	AOC 22-15 (1.5-2.0')	AOC 22-15 (1.5-2.0') DUP	AOC 22-15 (30-32')	AOC 22-15 (34-36')	AOC 22-16 (0-0.5')	AOC 22-16 (1.5-2.0')	AOC 22-16 (36-38') [1]	AOC 24-7 (0-0.5')	AOC 24-7 (1.5-2.0')	AOC 24-7 (39-42')	AOC 26-8 (0-1.0')	AOC 26-8 (0-1.0') DUP	AOC 26-8 (1.5-2.0')	AOC 26-8 (32-36')
Sample Date						4/13/2009	4/13/2009	4/13/2009	4/13/2009	4/13/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/15/2009	4/13/2009	4/13/2009	4/14/2009	4/7/2009	4/7/2009	4/7/2009	4/16/2009	4/16/2009	4/16/2009	4/16/2009
Benzo(k)fluoranthene	1.09E+01	1.09E+01	1.09E+01	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzoic acid	3.30E+01	3.30E+01	3.30E+01	(3)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzyl alcohol	4.20E+00	4.20E+00	4.20E+00	(3)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethoxy)methane	2.30E-02	2.30E-02	2.30E-02	(3)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroethyl)ether	2.33E-05	2.33E-05	2.33E-05	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-chloroisopropyl)ether	2.56E-03	2.56E-03	2.56E-03	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bis(2-ethylhexyl)phthalate	1.19E+01	1.19E+01	1.19E+01	(1)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Butyl benzyl phthalate	6.70E+00	6.70E+00	6.70E+00	(4)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Carbazole	--	--	--		mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chrysene	3.26E+01	3.26E+01	3.26E+01	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	3.62E-01	3.62E-01	3.62E-01	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenzofuran	--	--	--		mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Diethyl phthalate	1.06E+01	1.06E+01	1.06E+01	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dimethyl phthalate	8.36E+01	8.36E+01	8.36E+01	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Di-n-butyl phthalate	8.63E+00	8.63E+00	8.63E+00	(1)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Di-n-octyl phthalate	--	--	--		mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Fluoranthene	1.55E+02	1.55E+02	1.55E+02	(1)	mg/Kg	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3	<2.5	<0.25	<0.25	--	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Fluorene	2.50E+01	2.50E+01	2.50E+01	(1)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene	2.21E-03	2.21E-03	2.21E-03	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorobutadiene	1.90E-02	1.90E-02	1.90E-02	(4)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachlorocyclopentadiene	6.13E-01	6.13E-01	6.13E-01	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Hexachloroethane	1.93E-02	1.93E-02	1.93E-02	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Indeno(1,2,3-cd)pyrene	3.70E+00	3.70E+00	3.70E+00	(1)	mg/Kg	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3	<2.5	<0.25	<0.25	--	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<1.3	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Isophorone	1.85E-01	1.85E-01	1.85E-01	(1)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	4.19E-03	4.19E-03	4.19E-03	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	**3.5**	**17**	**5.3**	**1.8**	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Nitrobenzene	6.86E-03	6.86E-03	6.86E-03	(1)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
N-Nitrosodi-n-propylamine	1.10E-04	1.10E-04	1.10E-04	(4)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
N-Nitrosodiphenylamine	1.29E+00	1.29E+00	1.29E+00	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pentachlorophenol	2.94E-02	2.94E-02	2.94E-02	(1)	mg/Kg	<0.40	<0.40	<0.40	<0.40	<0.40	<2.0	<4.0	<0.40	<0.40	--	<2.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<2.0	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Phenanthrene	8.34E+01	8.34E+01	8.34E+01	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	1.5	3.1	0.67	0.41	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Phenol	6.30E+00	6.30E+00	6.30E+00	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pyrene	1.12E+02	1.12E+02	1.12E+02	(1)	mg/Kg	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<2.0	<0.20	<0.20	--	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pyridine	9.70E-03	9.70E-03	9.70E-03	(3)	mg/Kg	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<5.0	<0.50	<0.50	--	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg																														
Diesel Range Organics (DRO)	1120	1120	1120	(6)	mg/Kg	56	63	74	10	46	**4400**	**8600**	**1400**	**1300**	**7800**	19	<10	<10	<10	100	24	1000	18	120	34	<10	11	<10	<10	<10
Gasoline Range Organics (GRO)	1120	1120	1120	(6)	mg/Kg	<5.0	<5.0	<5.0	<5.0	<5.0	180	**1900**	**1300**	<250	**5500**	<5.0	<5.0	<5.0	<5.0	15	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Motor Oil Range Organics (MRO)	5000	5000	5000	(7)	mg/Kg	62	67	87	<50	<50	1000	540	<500	<500	<1000	71	<50	<50	<50	<50	67	1200	59	280	140	<50	160	79	64	<50
Ethanol	--	--	--		mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	<1.0	<1.0	<1.0	<1.0

--* Laboratory inadvertently did not analyze for Cyanide for AOC (22-12 (36-37.75')

-- No screening level or analytical result available
NMED - Technical Background Document for Development of Soil Screening Levels - Revision 5.0 (August 2009)

EPA - Regional Screening Levels (April 2009)

(1) NMED DAF=1 SoilGW (All depths)

(2) NMED ConstWork (0-10'), NMED Soil-to-ground water DAF=1 (>10')

(3) EPA Protection of Ground Water Risk-based SSL (All depths)

(4) EPA - Regional Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic & EPA screening level based on 10-6 risk-based SSL

(5) NMED ConsWork Soil (0-10')

(6) NMED Oct. 2006 TPH Screening Guidelines - diesel fuel for industrial exposure via direct contact

(7) NMED Oct. 2006 TPH Screening Guidelines - waste oil for industrial exposure via direct contact

Table 2
Existing Soil Analytical Results
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level (0-2 ft)	Source	Residential Soil Screening Level (2-10 ft)	Source	Residential Soil Screening Level (>10 ft)	Source	Units	SWMU 8-6 (0-0.5')	SWMU 8-6 (1.5-2.0')	SWMU 8-6a (33-34)	SWMU 8-8 (0-0.5')	SWMU 8-8 (1.5-2.0')	SWMU 8-10 (0-0.5')	SWMU 8-10 (1.5-2.0')
Metals (mg/kg)														
Antimony	3.13E+01	(1)	7.44E+00	(4)	7.44E+00	(4)	mg/Kg	<2.6	<2.7	<2.9	<2.6	<2.6	<2.6	<2.6
Arsenic	3.59E+00	(1)	1.48E-01	(4)	1.48E-01	(4)	mg/Kg	<2.6	3	<2.9	<2.6	<2.6	3	<2.6
Barium	1.56E+04	(1)	3.39E+03	(4)	3.39E+03	(4)	mg/Kg	210	200	130	190	180	440	350
Beryllium	1.56E+02	(1)	1.56E+02	(1)	6.49E+02	(4)	mg/Kg	0.43	0.44	<0.18	0.42	0.43	0.5	0.47
Cadmium	7.79E+01	(1)	1.55E+01	(4)	1.55E+01	(4)	mg/Kg	<0.11	<0.11	<0.12	<0.11	<0.11	<0.11	<0.10
Chromium	1.13E+05	(1)	1.13E+05	(1)	1.11E+09	(4)	mg/Kg	85	100	7.7	83	100	6.1	6.4
Cobalt	2.30E+01	(2)	5.51E+00	(5)	5.51E+00	(5)	mg/Kg	4.2	4.5	2.2	4.1	4	4.8	5.4
Cyanide	1.56E+03	(1)	8.37E+01	(4)	8.37E+01	(4)	mg/Kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Lead	4.00E+02	(1)	--		--		mg/Kg	6.1	5.6	3.8	5.8	5.7	5.1	4.8
Mercury	7.71E+00	(1)	3.30E-01	(4)	3.30E-01	(4)	mg/Kg	0.046	0.045	<0.039	0.044	0.053	<0.035	<0.035
Nickel	1.56E+03	(1)	5.36E+02	(4)	5.36E+02	(4)	mg/Kg	8.5	7.8	2.2	7.4	7	7.2	7.1
Selenium	3.91E+02	(1)	1.09E+01	(4)	1.09E+01	(4)	mg/Kg	<26	<27	<2.9	<26	<26	<26	<26
Silver	3.91E+02	(1)	1.76E+01	(4)	1.76E+01	(4)	mg/Kg	<0.26	<0.27	<0.29	<0.26	<0.26	<0.26	<0.26
Vanadium	3.91E+02	(1)	3.91E+02	(1)	2.05E+03	(4)	mg/Kg	18	18	12	17	16	20	22
Zinc	2.35E+04	(1)	7.67E+03	(4)	7.67E+03	(4)	mg/Kg	89	88	14	84	84	32	32
Volatile Organic Compounds - (EPA Method 8260B) mg/kg														
1,1,1,2-Tetrachloroethane	2.92E+01	(1)	1.94E-02	(4)	1.94E-02	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,1,1-Trichloroethane	2.18E+04	(1)	3.35E+01	(4)	3.35E+01	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,1,2,2-Tetrachloroethane	7.97E+00	(1)	2.53E-03	(4)	2.53E-03	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,1,2-Trichloroethane	1.72E+01	(1)	7.58E-03	(4)	7.58E-03	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,1-Dichloroethane	6.29E+01	(1)	6.85E-02	(4)	6.85E-02	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,1-Dichloroethene	6.18E+02	(1)	1.34E+00	(4)	1.34E+00	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,1-Dichloropropene	--		--		--		mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,2,3-Trichlorobenzene	--		--		--		mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,2,3-Trichloropropane	9.15E-01	(1)	4.01E-04	(4)	4.01E-04	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,2,4-Trichlorobenzene	1.43E+02	(1)	1.15E-01	(4)	1.15E-01	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,2,4-Trimethylbenzene	6.70E+01	(2)	2.70E-01	(5)	2.70E-01	(5)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,2-Dibromo-3-chloropropane	1.94E-01	(1)	3.35E-05	(4)	3.35E-05	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,2-Dibromoethane (EDB)	5.74E-01	(1)	1.78E-04	(4)	1.78E-04	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,2-Dichlorobenzene	3.01E+03	(1)	3.53E+00	(4)	3.53E+00	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,2-Dichloroethane (EDC)	7.74E+00	(1)	4.11E-03	(4)	4.11E-03	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,2-Dichloropropane	1.47E+01	(1)	1.25E-02	(4)	1.25E-02	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,3,5-Trimethylbenzene	4.70E+01	(2)	2.25E-01	(5)	2.25E-01	(5)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,3-Dichlorobenzene	--		--		--		mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,3-Dichloropropane	1.60E+03	(2)	3.04E+00	(5)	3.04E+00	(5)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
1,4-Dichlorobenzene	3.21E+01	(1)	4.02E-02	(4)	4.02E-02	(4)	mg/Kg	NR	NR	<0.20	NR	NR	NR	NR
1-Methylnaphthalene	2.20E+02	(3)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
2,2-Dichloropropane	--		--		--		mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
2-Butanone (MEK)	3.96E+04	(1)	1.43E+01	(4)	1.43E+01	(4)	mg/Kg	<0.00467	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446
2-Chlorotoluene	1.56E+03	(1)	7.02E+00	(4)	7.02E+00	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
2-Hexanone	--		--		--		mg/Kg	<0.00467	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446
2-Methylnaphthalene	3.10E+02	(2)	1.01E+01	(5)	1.01E+01	(5)	mg/Kg	NR	NR	<0.20	NR	NR	NR	NR

Table 2
Existing Soil Analytical Results
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level (0-2 ft)	Source	Residential Soil Screening Level (2-10 ft)	Source	Residential Soil Screening Level (>10 ft)	Source	Units	SWMU 8-6 (0-0.5')	SWMU 8-6 (1.5-2.0')	SWMU 8-6a (33-34)	SWMU 8-8 (0-0.5')	SWMU 8-8 (1.5-2.0')	SWMU 8-10 (0-0.5')	SWMU 8-10 (1.5-2.0')
4-Chlorotoluene	5.50E+03	(2)	3.15E+01	(5)	3.15E+01	(5)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
4-Isopropyltoluene	--		--		--		mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
4-Methyl-2-pentanone	--		--		--		mg/Kg	<0.00467	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446
Acetone	6.75E+04	(1)	4.32E+01	(4)	4.32E+01	(4)	mg/Kg	0.0669	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446
Benzene	1.55E+01	(1)	2.08E-02	(4)	2.08E-02	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Bromobenzene	9.40E+01	(2)	1.69E-01	(5)	1.69E-01	(5)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Bromodichloromethane	5.25E+00	(1)	3.11E-03	(4)	3.11E-03	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Bromoform	6.10E+02	(3)	2.59E-02	(5)	2.59E-02	(5)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Bromomethane	2.23E+01	(1)	2.18E-02	(4)	2.18E-02	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Carbon disulfide	1.94E+03	(1)	2.84E+00	(4)	2.84E+00	(4)	mg/Kg	<0.00467	<0.0045	<0.00497	<0.00449	<0.00465	<0.00475	<0.00446
Carbon tetrachloride	4.38E+00	(1)	8.32E-03	(4)	8.32E-03	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Chlorobenzene	5.08E+02	(1)	6.06E-01	(4)	6.06E-01	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Chloroethane	--		--		--		mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Chloroform	5.72E+00	(1)	5.27E-03	(4)	5.27E-03	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Chloromethane	3.56E+01	(1)	4.70E-02	(4)	4.70E-02	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
cis-1,2-DCE	7.82E+02	(1)	1.06E+00	(4)	1.06E+00	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
cis-1,3-Dichloropropene	2.35E+01	(1)	1.52E-02	(4)	1.52E-02	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Dibromochloromethane	1.13E+01	(1)	3.80E-03	(4)	3.80E-03	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Dibromomethane	7.80E+02	(2)	1.02E+00	(5)	1.02E+00	(5)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Dichlorodifluoromethane	4.81E+02	(1)	8.14E+00	(4)	8.14E+00	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Ethylbenzene	6.96E+01	(1)	1.64E-01	(4)	1.64E-01	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Hexachlorobutadiene	6.20E+01	(3)	2.14E-02	(5)	2.14E-02	(5)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Isopropylbenzene	3.21E+03	(1)	1.11E+01	(4)	1.11E+01	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Methyl tert-butyl ether (MTBE)	8.62E+02	(1)	2.58E-01	(4)	2.58E-01	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Methylene chloride	1.99E+02	(1)	1.21E-01	(4)	1.21E-01	(4)	mg/Kg	<0.00234	<0.00225	<0.00249	<0.00224	<0.00232	<0.00238	<0.00223
Naphthalene	4.50E+01	(1)	4.72E-02	(4)	4.72E-02	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
n-Butylbenzene	--		--		--		mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
n-Propylbenzene	--		--		--		mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
sec-Butylbenzene	--		--		--		mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Styrene	8.97E+03	(1)	1.76E+01	(4)	1.76E+01	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
tert-Butylbenzene	--		--		--		mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Tetrachloroethene (PCE)	6.99E+00	(1)	5.05E-03	(4)	5.05E-03	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Toluene	5.57E+03	(1)	1.56E+01	(4)	1.56E+01	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
trans-1,2-DCE	2.73E+02	(1)	3.39E-01	(4)	3.39E-01	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
trans-1,3-Dichloropropene	2.35E+01	(1)	1.52E-02	(4)	1.52E-02	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Trichloroethene (TCE)	4.57E+01	(1)	5.96E-02	(4)	5.96E-02	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Trichlorofluoromethane	2.01E+03	(1)	1.01E+01	(4)	1.01E+01	(4)	mg/Kg	0.00214	<0.00112	<0.00124	<0.00112	0.00417	<0.00119	<0.00112
Vinyl chloride	8.65E-01	(1)	3.24E-03	(4)	3.24E-03	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Xylenes, Total	1.09E+03	(1)	1.98E+00	(4)	1.98E+00	(4)	mg/Kg	<0.00117	<0.00112	<0.00124	<0.00112	<0.00116	<0.00119	<0.00112
Semi Volatile Organics - (EPA Method 8270) mg/kg														
1,2,4-Trichlorobenzene	1.43E+02	(1)	1.15E-01	(4)	1.15E-01	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
1,2-Dichlorobenzene	3.01E+03	(1)	3.53E+00	(4)	3.53E+00	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
1,3-Dichlorobenzene	--		--		--		mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
1,4-Dichlorobenzene	3.21E+01	(1)	4.02E-02	(4)	4.02E-02	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21

Table 2
Existing Soil Analytical Results
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level (0-2 ft)	Source	Residential Soil Screening Level (2-10 ft)	Source	Residential Soil Screening Level (>10 ft)	Source	Units	SWMU 8-6 (0-0.5')	SWMU 8-6 (1.5-2.0')	SWMU 8-6a (33-34)	SWMU 8-8 (0-0.5')	SWMU 8-8 (1.5-2.0')	SWMU 8-10 (0-0.5')	SWMU 8-10 (1.5-2.0')
2,4,5-Trichlorophenol	6.11E+03	(1)	8.02E+01	(4)	8.02E+01	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
2,4,6-Trichlorophenol	6.11E+01	(1)	8.02E-01	(4)	8.02E-01	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
2,4-Dichlorophenol	1.83E+02	(1)	1.54E+00	(4)	1.54E+00	(4)	mg/Kg	<2.1	<2.1	<0.47	<2.1	<2.1	<0.42	<0.42
2,4-Dimethylphenol	1.22E+03	(1)	1.03E+01	(4)	1.03E+01	(4)	mg/Kg	<1.6	<1.6	<0.35	<1.6	<1.6	<0.32	<0.31
2,4-Dinitrophenol	1.22E+02	(1)	5.91E-01	(4)	5.91E-01	(4)	mg/Kg	<2.1	<2.1	<0.47	<2.1	<2.1	<0.42	<0.42
2,4-Dinitrotoluene	1.26E+01	(1)	1.75E-02	(4)	1.75E-02	(4)	mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
2,6-Dinitrotoluene	6.12E+01	(1)	3.00E-01	(4)	3.00E-01	(4)	mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
2-Chloronaphthalene	6.26E+03	(1)	1.52E+02	(4)	1.52E+02	(4)	mg/Kg	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26
2-Chlorophenol	3.91E+02	(1)	1.72E+00	(4)	1.72E+00	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
2-Methylnaphthalene	3.10E+02	(2)	1.01E+01	(5)	1.01E+01	(5)	mg/Kg	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26
2-Methylphenol	3.10E+03	(2)	2.25E+01	(5)	2.25E+01	(5)	mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
2-Nitroaniline	1.80E+02	(2)	3.71E-01	(5)	3.71E-01	(5)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
2-Nitrophenol	--		--		--		mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
3,3´-Dichlorobenzidine	8.71E+00	(1)	1.92E-01	(4)	1.92E-01	(4)	mg/Kg	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26
3+4-Methylphenol	3.10E+02	(2)	2.14E+00	(5)	2.14E+00	(5)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
3-Nitroaniline	--		--		--		mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
4,6-Dinitro-2-methylphenol	--		--		--		mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
4-Bromophenyl phenyl ether	--		--		--		mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
4-Chloro-3-methylphenol	--		--		--		mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
4-Chloroaniline	2.40E+01	(3)	1.35E-03	(5)	1.35E-03	(5)	mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
4-Chlorophenyl phenyl ether	--		--		--		mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
4-Nitroaniline	2.40E+02	(3)	1.13E-02	(5)	1.13E-02	(5)	mg/Kg	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26
4-Nitrophenol	--		--		--		mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Acenaphthene	3.44E+03	(1)	2.31E+02	(4)	2.31E+02	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Acenaphthylene	--		--		--		mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Aniline	8.50E+02	(3)	3.83E-02	(5)	3.83E-02	(5)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Anthracene	1.72E+04	(1)	3.79E+03	(4)	3.79E+03	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Azobenzene	4.90E+01	(3)	5.74E-03	(5)	5.74E-03	(5)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Benz(a)anthracene	4.81E+00	(1)	3.59E+00	(4)	3.59E+00	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Benzo(a)pyrene	4.81E-01	(1)	4.81E-01	(1)	1.22E+00	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Benzo(b)fluoranthene	4.81E+00	(1)	4.81E+00	(1)	1.25E+01	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Benzo(g,h,i)perylene	--		--		--		mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
Benzo(k)fluoranthene	4.81E+01	(1)	4.81E+01	(1)	1.22E+02	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Benzoic acid	2.40E+05	(2)	3.71E+02	(5)	3.71E+02	(5)	mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
Benzyl alcohol	3.10E+04	(2)	4.73E+01	(5)	4.73E+01	(5)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Bis(2-chloroethoxy)methane	1.80E+02	(2)	2.59E-01	(5)	2.59E-01	(5)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Bis(2-chloroethyl)ether	2.56E+00	(1)	2.62E-04	(4)	2.62E-04	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Bis(2-chloroisopropyl)ether	9.15E+01	(1)	2.88E-02	(4)	2.88E-02	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Bis(2-ethylhexyl)phthalate	2.80E+02	(1)	1.34E+02	(4)	1.34E+02	(4)	mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
Butyl benzyl phthalate	2.60E+03	(3)	7.54E+00	(5)	7.54E+00	(5)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Carbazole	--		--		--		mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Chrysene	4.81E+02	(1)	3.67E+02	(4)	3.67E+02	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Dibenz(a,h)anthracene	4.81E-01	(1)	4.81E-01	(1)	4.07E+00	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Dibenzofuran	--		--		--		mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21

Table 2
Existing Soil Analytical Results
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Residential Soil Screening Level (0-2 ft)	Source	Residential Soil Screening Level (2-10 ft)	Source	Residential Soil Screening Level (>10 ft)	Source	Units	SWMU 8-6 (0-0.5')	SWMU 8-6 (1.5-2.0')	SWMU 8-6a (33-34)	SWMU 8-8 (0-0.5')	SWMU 8-8 (1.5-2.0')	SWMU 8-10 (0-0.5')	SWMU 8-10 (1.5-2.0')
Diethyl phthalate	4.89E+04	(1)	1.19E+02	(4)	1.19E+02	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Dimethyl phthalate	6.11E+05	(1)	9.40E+02	(4)	9.40E+02	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Di-n-butyl phthalate	6.11E+03	(1)	9.70E+01	(4)	9.70E+01	(4)	mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
Di-n-octyl phthalate	--		--		--		mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Fluoranthene	2.29E+03	(1)	1.75E+03	(4)	1.75E+03	(4)	mg/Kg	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26
Fluorene	2.29E+03	(1)	2.81E+02	(4)	2.81E+02	(4)	mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
Hexachlorobenzene	2.45E+00	(1)	2.48E-02	(4)	2.48E-02	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Hexachlorobutadiene	6.20E+01	(3)	2.14E-02	(5)	2.14E-02	(5)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Hexachlorocyclopentadiene	3.67E+02	(1)	6.90E+00	(4)	6.90E+00	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Hexachloroethane	6.11E+01	(1)	2.17E-01	(4)	2.17E-01	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Indeno(1,2,3-cd)pyrene	4.81E+00	(1)	4.81E+00	(1)	4.16E+01	(4)	mg/Kg	<1.3	<1.3	<0.29	<1.3	<1.3	<0.26	<0.26
Isophorone	4.13E+03	(1)	2.08E+00	(4)	2.08E+00	(4)	mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
Naphthalene	4.50E+01	(1)	4.72E-02	(4)	4.72E-02	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Nitrobenzene	4.94E+01	(1)	7.72E-02	(4)	7.72E-02	(4)	mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
N-Nitrosodi-n-propylamine	6.90E-01	(3)	1.24E-04	(5)	1.24E-04	(5)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
N-Nitrosodiphenylamine	8.00E+02	(1)	1.45E+01	(4)	1.45E+01	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Pentachlorophenol	2.07E+01	(1)	3.30E-01	(4)	3.30E-01	(4)	mg/Kg	<2.1	<2.1	<0.47	<2.1	<2.1	<0.42	<0.42
Phenanthrene	1.83E+03	(1)	9.39E+02	(4)	9.39E+02	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Phenol	1.83E+04	(1)	7.09E+01	(4)	7.09E+01	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Pyrene	1.72E+03	(1)	1.26E+03	(4)	1.26E+03	(4)	mg/Kg	<1.1	<1.1	<0.23	<1.1	<1.1	<0.21	<0.21
Pyridine	7.80E+01	(2)	1.09E-01	(5)	1.09E-01	(5)	mg/Kg	<2.6	<2.7	<0.59	<2.6	<2.6	<0.53	<0.52
Total Petroleum Hydrocarbons - (EPA Method 8015B) mg/kg														
Diesel Range Organics (DRO)	1.83E+03	(8)	1000	(7)	1000	(7)	mg/Kg	93	150	21	61	92	<11	<10
Gasoline Range Organics (GRO)	--		--		--		mg/Kg	<5.0	<5.0	<5.9	<5.0	<5.0	<5.0	<5.0
Motor Oil Range Organics (MRO)	1.83E+03	(8)	1000	(7)	1000	(7)	mg/Kg	300	500	<59	200	270	<53	<52

-- No screening level available
NR - No analytical result reported by the laboratory
NMED screening levels from - Technical Background Document for Development of Soil Screening Levels - Revision 5.0 (August 2009)
EPA screening levels from - Regional Screening Levels (April 2009)
(1) Residential Soil NMED
(2) Residential Soil EPA
(3) Residential Soil EPA - Regional Screening Levels (April 2009) multiplied by 10 pursuant to Provision VII.B. of the July 7, 2007 NMED Order because the constituent is listed as carcinogenic
(4) SoilGW NMED DAF = 11.25
(5) SoilGW Risk-based EPA DAF = 11.25
(6) SoilGW MCL-based EPA DAF=11.25
(7) NMED Oct. 2006 TPH Screening Guidelines(updated with Masschusetts Department of Environmental Protection 2009 tox data - uknown oil, residential, all pathways
(8) NMED Oct. 2006 TPH Screening Guidelines(updated with Masschusetts Department of Environmental Protection 2009 tox data - uknown oil, residential, direct contact pathways
4.2 -bolded value exeeds screening level

Table 3
Ground Water Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	AOC 22-12 (GW)	AOC 22-12/TW-01	AOC 22-13 (GW)	MW-55	MW-56	MW-59	MW-59	MW-61	MW-61	MW-63	MW-63	MW-63 (DUP)	MW-64	MW-64	MW-65	MW-65 (DUP)	MW-65	SWMU 15-2
Sample Date				4/14/2009	7/29/2009	4/9/2009	5/5/2009	5/5/2009	10/28/2008	1/8/2009	5/13/2009	7/16/2009	5/13/2009	7/15/2009	7/15/2009	5/13/2009	7/15/2009	5/12/2009	5/12/2009	7/16/2009	8/19/2010
Metals																					
Antimony	0.006	(2)	mg/L	<0.001	<0.005	<0.001			<0.001	<0.0010	0.002	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.005	<0.0050
Arsenic	0.01	(2)	mg/L	**0.013**	**0.031**	**0.017**	<0.020	<0.020	**0.043**	**0.075**	**0.041**	**0.024**	0.007	0.005	0.004	0.006	**0.017**	**0.021**	**0.015**	**0.024**	**0.45**
Barium	1	(3)	mg/L	0.88	0.44	0.73	0.6	**1.2**	**1.1**	**0.099**	0.29	0.28	0.15	0.027	0.026	0.18	0.036	0.15	0.13	0.074	**22**
Beryllium	0.004	(2)	mg/L	<0.0030	<0.0030	<0.0030	--	--	0.002	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	**0.039**
Cadmium	0.005	(2)	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.001	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.020
Calcium *	-		mg/L	--	210	--	36	130	**258**	**220**	--	120	--	420	410	--	480	--	--	240	--
Calcium, Dissolved	-		mg/L	140	150	180	35	130	--	--	110	120	390	410	420	470	500	230	230	260	--
Chromium	0.05	(3)	mg/L	<0.0060	<0.0060	0.013	<0.0060	<0.0060	0.03	<0.0060	<0.0060	<0.0060	0.0063	<0.0060	<0.0060	0.0075	<0.0060	<0.0060	<0.0060	<0.0060	**0.75**
Cobalt	0.05	(3)	mg/L	0.0083	0.0084	0.024	--	--	0.05	0.028	<0.0060	<0.0060	0.013	<0.0060	<0.0060	0.01	0.0067	<0.0060	<0.0060	<0.0060	**0.39**
Cyanide, Total	0.2	(3)	mg/L	<0.005	<0.005	<0.005	--	--	<0.005	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010
Iron, Dissolved	1	(3)	mg/L	**2.2**	**5.9**	**24**	0.88	0.26	**0.54**	**4.7**	0.14	**1.6**	0.35	0.028	0.044	0.051	0.1	0.98	**1.1**	**4**	<0.020
Iron, Total	-	(3)	mg/L	10	17	61	3.3	2.9	--	**41**	1.2	2.8	21	1.5	1.3	19	5.3	3.5	3.6	5.3	1500
Lead	0.015	(2)	mg/L	<0.0050	**0.018**	**0.038**	0.0098	<0.0050	**0.02**	<0.0050	**0.025**	**0.042**	0.0097	<0.0050	0.0051	0.014	0.011	<0.0050	0.006	<0.0050	**0.32**
Magnesium	-		mg/L	--	78	--	12	42	69	56	--	44	--	130	120	--	73	--	--	82	--
Magnesium, Dissolved	-		mg/L	61	70	81	11	36	--	--	37	45	110	120	120	75	73	79	79	84	--
Manganese	0.2	(3)	mg/L	--	**5.4**	--	1.6	3.6	**4.86**	**6.1**	3.2	4.3	--	**4.6**	**4.5**	--	**0.53**	**2.7**	**2.8**	**3.8**	--
Manganese, Dissolved	-	(3)	mg/L	3.4	3.7	3.9	--	--	--	--	--	4.4	3	4.4	4.5	0.13	0.032	--	--	3.9	--
Mercury	0.002	(3)	mg/L	<0.00020	<0.00020	0.00045	<0.00020	<0.00020	<0.001	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	**0.004**
Nickel	0.2	(3)	mg/L	0.011	0.013	0.034	--	--	0.12	0.074	<0.010	<0.010	0.021	0.012	0.012	0.02	0.012	<0.010	<0.010	<0.010	**0.59**
Potassium *	-		mg/L	--	3.6	--	6	3.5	**6**	**4.2**	--	1.9	--	4.6	4.6	--	5	--	--	3.4	--
Potassium, Dissolved	-		mg/L	3.8	5.1	3.7	6	3.1	--	--	1.7	2.1	4.7	4.1	4.3	5.5	5.7	3.8	3.7	3.9	--
Selenium	0.05	(3)	mg/L	<0.050	<0.005	<0.050	<0.050	<0.050	0.038	0.0095	<0.25	<0.001	<0.25	0.026	0.023	<0.25	0.024	<0.050	<0.050	<0.001	0.017
Silver	0.05	(3)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050
Sodium *	-		mg/L	--	410	--	220	420	--	--	--	110	--	540	530	--	850	--	--	520	--
Sodium, Dissolved	-		mg/L	380	400	360	220	430	**577**	**490**	130	110	510	510	520	820	850	480	480	520	--
Vanadium	0.26	(1)	mg/L	<0.050	<0.050	<0.050	--	--	<0.1	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	**2**
Zinc	10	(3)	mg/L	0.027	0.054	0.051	--	--	0.18	<0.020	<0.020	<0.020	0.074	<0.020	<0.020	0.085	0.035	<0.020	<0.020	<0.020	2.7
Volatile Organic Compounds - (EPA Method 8260W)																					
1,1,1,2-Tetrachloroethane	0.52	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
1,1,1-Trichloroethane	60	(3)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
1,1,2,2-Tetrachloroethane	10	(3)	µg/L	<100	<200	<200	<40	<10	<2.0	<2.0	<40	<20	<2.0	<2.0	<2.0	<2.0	<2.0	<40	<40	<20	<10
1,1,2-Trichloroethane	5	(2)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
1,1-Dichloroethane	25	(3)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
1,1-Dichloroethene	-	(3)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
1,1-Dichloropropene	-		µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
1,2,3-Trichlorobenzene	-		µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
1,2,3-Trichloropropane	0.0096	(1)	µg/L	<100	<200	<200	<40	<10	<2.0	<2.0	<40	<20	<2.0	<2.0	<2.0	<2.0	<2.0	<40	<40	<20	<10
1,2,4-Trichlorobenzene	70	(2)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	**960**
1,2,4-Trimethylbenzene	15	(1)	µg/L	**1500**	**1300**	**4800**	**510**	**340**	<1.0	<1.0	**2400**	**2900**	<1.0	<1.0	<1.0	<1.0	<1.0	**1400**	**1500**	**1300**	--
1,2-Dibromo-3-chloropropane	0.2	(2)	µg/L	<100	<200	<200	<40	<10	<2.0	<2.0	<40	<20	<2.0	<2.0	<2.0	<2.0	<2.0	<40	<40	<20	<10
1,2-Dibromoethane (EDB)	0.05	(2)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
1,2-Dichlorobenzene	600	(2)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
1,2-Dichloroethane (EDC)	5	(2)	µg/L	**61**	<100	**220**	<20	<5.0	<1.0	<1.0	<20	<10	1.9	1.4	1.6	<1.0	<1.0	**220**	**250**	**270**	--
1,2-Dichloropropane	5	(2)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
1,3,5-Trimethylbenzene	12	(1)	µg/L	**240**	<100	**1300**	**120**	**61**	<1.0	<1.0	**820**	**550**	<1.0	<1.0	<1.0	<1.0	<1.0	**500**	**510**	**490**	**190**
1,3-Dichlorobenzene	-		µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
1,3-Dichloropropane	730	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--

Table 3
Ground Water Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	AOC 22-12 (GW)	AOC 22-12/TW-01	AOC 22-13 (GW)	MW-55	MW-56	MW-59	MW-59	MW-61	MW-61	MW-63	MW-63	MW-63 (DUP)	MW-64	MW-64	MW-65	MW-65 (DUP)	MW-65	SWMU 15-2
1,4-Dichlorobenzene	75	(2)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
1-Methylnaphthalene	2.3	(1)	µg/L	<200	<400	<400	**100**	**210**	<4.0	<4.0	**270**	**150**	<4.0	<4.0	<4.0	<4.0	<4.0	**150**	**170**	**130**	--
2,2-Dichloropropane	-		µg/L	<100	<200	<200	<40	<10	<2.0	<2.0	<40	<20	<2.0	<2.0	<2.0	<2.0	<2.0	<40	<40	<20	--
2-Butanone	7100	(1)	µg/L	<500	<1000	<1000	<200	50	<10	<10	<200	<100	<10	<10	<10	<10	<10	<200	<200	<100	<50
2-Chlorotoluene	730	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
2-Hexanone	-		µg/L	<500	<1000	<1000	<200	<50	<10	<10	<200	<100	<10	<10	<10	<10	<10	<200	<200	<100	--
2-Methylnaphthalene	150	(1)	µg/L	<200	<400	**710**	120	**260**	<4.0	<4.0	**450**	**260**	<4.0	<4.0	<4.0	<4.0	<4.0	**220**	**230**	**210**	--
4-Chlorotoluene	2600	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
4-Isopropyltoluene	-		µg/L	<50	<100	<100	<20	8.2	<1.0	<1.0	22	13	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
4-Methyl-2-pentanone	-		µg/L	<500	<1000	<1000	<200	<50	<10	<10	<200	<100	<10	<10	<10	<10	<10	<200	<200	<100	--
Acetone	22000	(1)	µg/L	<500	<1000	<1000	<200	82	<10	<10	1100	3000	<10	<10	<10	<10	<10	<200	<200	110	<50
Benzene	5	(2)	µg/L	**8600**	**8200**	**13000**	**10000**	**2800**	<1.0	<1.0	**49**	**48**	<1.0	<1.0	<1.0	<1.0	<1.0	**6800**	**7100**	**5400**	**210**
Bromobenzene	20	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
Bromodichloromethane	0.12	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
Bromoform	8.5	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
Bromomethane	8.7	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
Carbon disulfide	1000	(1)	µg/L	<500	<1000	<1000	<200	<50	<10	<10	<200	<100	<10	<10	<10	<10	<10	<200	<200	<100	<50
Carbon Tetrachloride	5	(2)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
Chlorobenzene	100	(2)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
Chloroethane	-		µg/L	<100	<200	<200	<40	<10	<2.0	<2.0	<40	<20	<2.0	<2.0	<2.0	<2.0	<2.0	<40	<40	<20	--
Chloroform	100	(3)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
Chloromethane	190	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
cis-1,2-DCE	70	(2)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
cis-1,3-Dichloropropene	-		µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
Dibromochloromethane	0.15	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
Dibromomethane	370	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
Dichlorodifluoromethane	390	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
Ethylbenzene	700	(2)	µg/L	**2100**	**2200**	**4300**	**1300**	310	<1.0	<1.0	**1400**	**1500**	<1.0	<1.0	<1.0	<1.0	<1.0	**1800**	**2000**	**1400**	270
Hexachlorobutadiene	0.86	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
Isopropylbenzene (Cumene)	680	(1)	µg/L	69	190	240	55	42	<1.0	<1.0	100	70	<1.0	<1.0	<1.0	<1.0	<1.0	84	92	81	--
Methyl tert-butyl ether (MTBE)	12	(1)	µg/L	**20000**	**23000**	**14000**	**1900**	**2100**	<1.0	<1.0	**380**	**410**	**48**	**54**	**61**	<1.0	<1.0	**1700**	**1800**	**1700**	--
Methylene Chloride	5	(2)	µg/L	<150	<300	<300	<60	<15	<3.0	<3.0	<60	<30	<3.0	<3.0	<3.0	<3.0	<3.0	<60	<60	<30	<15
Naphthalene	0.14	(1)	µg/L	**380**	**480**	**800**	**330**	**360**	<2.0	<2.0	**690**	**500**	<2.0	<2.0	<2.0	<2.0	<2.0	**480**	**520**	**450**	**28**
n-Butylbenzene	-		µg/L	<50	<100	420	<20	16	<1.0	<1.0	110	97	<1.0	<1.0	<1.0	<1.0	<1.0	49	50	85	--
n-Propylbenzene	-		µg/L	200	180	700	98	71	<1.0	<1.0	310	240	<1.0	<1.0	<1.0	<1.0	<1.0	230	240	260	--
sec-Butylbenzene	-		µg/L	<50	<100	110	<20	11	<1.0	<1.0	<20	15	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	14	--
Styrene	100	(2)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
tert-Butylbenzene	-		µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
Tetrachloroethene (PCE)	5	(2)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
Toluene	750	(3)	µg/L	**870**	380	**16000**	**760**	5.5	<1.0	<1.0	<20	11	<1.0	<1.0	<1.0	<1.0	<1.0	**2500**	**2800**	150	390
trans-1,2-DCE	100	(2)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
trans-1,3-Dichloropropene	0.43	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	--
Trichloroethene (TCE)	5	(2)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
Trichlorofluoromethane	1300	(1)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
Vinyl chloride	1	(3)	µg/L	<50	<100	<100	<20	<5.0	<1.0	<1.0	<20	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<20	<10	<5.0
Xylenes, Total	620	(3)	µg/L	**6100**	**5000**	**23000**	**1500**	390	<1.5	<1.5	**7300**	**6800**	<1.5	<1.5	<1.5	<1.5	<1.5	**8500**	**9200**	**6400**	**800**
Semi Volatile Organics - (EPA Method 8270W)																					
1,2,4-Trichlorobenzene	70	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
1,2-Dichlorobenzene	600	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10

Table 3
Ground Water Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

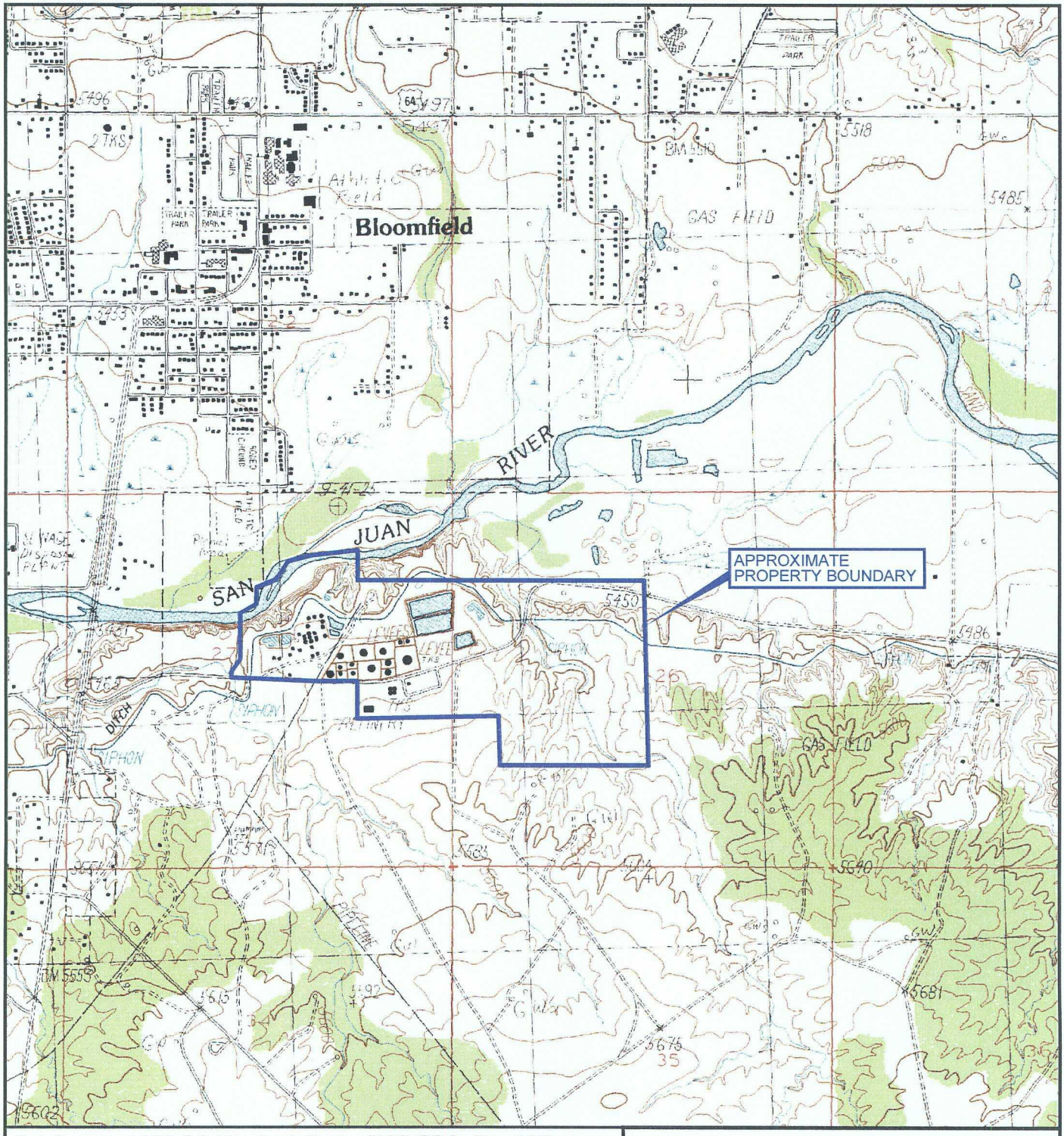
Analytes	Screening Levels	Source	Units	AOC 22-12 (GW)	AOC 22-12/TW-01	AOC 22-13 (GW)	MW-55	MW-56	MW-59	MW-59	MW-61	MW-61	MW-63	MW-63	MW-63 (DUP)	MW-64	MW-64	MW-65	MW-65 (DUP)	MW-65	SWMU 15-2
1,3-Dichlorobenzene	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
1,4-Dichlorobenzene	75	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
2,4,5-Trichlorophenol	3700	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
2,4,6-Trichlorophenol	6.1	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
2,4-Dichlorophenol	110	(1)	µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<20	<20	<20	<20	<100	<20
2,4-Dimethylphenol	730	(1)	µg/L	30	<50	<10	<10	<10	<10	<10	<50	130	<10	<10	<10	<10	<10	24	22	<50	<10
2,4-Dinitrophenol	73	(1)	µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<20	<20	<20	<20	<100	<20
2,4-Dinitrotoluene	0.22	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
2,6-Dinitrotoluene	37	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
2-Chloronaphthalene	2900	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
2-Chlorophenol	180	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
2-Methylnaphthalene	150	(1)	µg/L	81	71	100	53	85	<10	<10	**17000**	**1200**	<10	<10	<10	<10	<10	**160**	150	130	--
2-Methylphenol	1800	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
2-Nitroaniline	110	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
2-Nitrophenol	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
3,3'-Dichlorobenzidine	0.15	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
3+4-Methylphenol	180	(1)	µg/L	16	<50	10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
3-Nitroaniline	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
4,6-Dinitro-2-methylphenol	-		µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<20	<20	<20	<20	<100	--
4-Bromophenyl phenyl ether	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
4-Chloro-3-methylphenol	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
4-Chloroaniline	0.34	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
4-Chlorophenyl phenyl ether	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
4-Nitroaniline	3.4	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
4-Nitrophenol	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Acenaphthene	2200	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Acenaphthylene	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Aniline	12	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Anthracene	11000	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Azobenzene	0.12	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Benz(a)anthracene	0.029	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Benzo(a)pyrene	0.2	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Benzo(b)fluoranthene	0.029	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Benzo(g,h,i)perylene	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Benzo(k)fluoranthene	0.29	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Benzoic acid	150000	(1)	µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<20	<20	<20	<20	<100	--
Benzyl alcohol	18000	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Bis(2-chloroethoxy)methane	110	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Bis(2-chloroethyl)ether	0.012	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Bis(2-chloroisopropyl)ether	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Bis(2-ethylhexyl)phthalate	6	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	**140**	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Butyl benzyl phthalate	35	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Carbazole	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Chrysene	2.9	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Dibenz(a,h)anthracene	0.0029	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Dibenzofuran	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Diethyl phthalate	29000	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Dimethyl phthalate	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Di-n-butyl phthalate	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--

Table 3
Ground Water Analytical Results Summary
Bloomfield Refinery - Bloomfield, New Mexico

Analytes	Screening Levels	Source	Units	AOC 22-12 (GW)	AOC 22-12/TW-01	AOC 22-13 (GW)	MW-55	MW-56	MW-59	MW-59	MW-61	MW-61	MW-63	MW-63	MW-63 (DUP)	MW-64	MW-64	MW-65	MW-65 (DUP)	MW-65	SWMU 15-2
Di-n-octyl phthalate	-		µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Fluoranthene	1500	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Fluorene	1500	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	300	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Hexachlorobenzene	1	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Hexachlorobutadiene	0.86	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Hexachlorocyclopentadiene	50	(2)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Hexachloroethane	4.8	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Indeno(1,2,3-cd)pyrene	0.029	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Isophorone	71	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Naphthalene	0.14	(1)	µg/L	**250**	**220**	**110**	**200**	**120**	<10	<10	**7500**	**690**	<10	<10	<10	<10	<10	**370**	**350**	**290**	**13**
Nitrobenzene	0.12	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
N-Nitrosodimethylamine	0.00042	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
N-Nitrosodi-n-propylamine	0.0096	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
N-Nitrosodiphenylamine	14	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Pentachlorophenol	1	(2)	µg/L	<20	<100	<20	<20	<20	<20	<20	<100	<100	<20	<20	<20	<20	<20	<20	<20	<100	<20
Phenanthrene	-		µg/L	<10	<50	<10	<10	<10	<10	<10	1500	130	<10	<10	<10	<10	<10	<10	<10	<50	--
Phenol	5	(3)	µg/L	**30**	<50	**19**	**15**	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	**49**	**49**	<50	<10
Pyrene	1100	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	58	<50	<10	<10	<10	<10	<10	<10	<10	<50	<10
Pyridine	37	(1)	µg/L	<10	<50	<10	<10	<10	<10	<10	<50	<50	<10	<10	<10	<10	<10	<10	<10	<50	--
Alkalinity, Total (As CaCO3)	-		mg/L CaCO3	1100	1200	1200	570	1100	**260**	**500**	590	520	640	630	640	300	300	1000	1000	990	--
Bicarbonate	-		mg/L CaCO3	1100	1200	1200	570	1100	260	500	590	520	640	630	640	300	300	1000	1000	990	--
Bromide	-		mg/L	--			--	--	--	--											--
Carbonate	-		mg/L CaCO3	<5.0	<5.0	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	--
Chloride	250	(3)	mg/L	140	170	210	77	**270**	**450**	**580**	67	70	210	240	240	**1100**	**1100**	140	130	160	--
Fluoride	1.6	(3)	mg/L	--	0.28	--	0.56	0.56			0.38	0.39	0.19	0.17	0.14	0.21	0.19	0.21	0.22	0.24	--
Nitrate (As N)+Nitrite (As N)			mg/L	--	--	--	--	--	--	--	--	<1.0	72	--	--	44	--	<1.0	<1.0	<1.0	--
Nitrogen, Nitrate (As N)	10	(2)	mg/L	0.12	0.19	0.15	0.32	8.1	2.1	2.2	<1.0	--	--	**74**	**75**	--	**48**	--	--	--	--
Nitrogen, Nitrite (As N)	1	(2)	mg/L	<1.0	<2.0	<1.0	<0.10	<1.0	**2.2**	<5.0	<1.0	--	--	<2.0	--	--	<2.0	--	--	--	--
Sulfate	600	(3)	mg/L	56	39	110	4	19	**1000**	**760**	65	110	**1600**	**1500**	**1500**	**1800**	**1700**	**790**	**750**	**950**	--
Phosphorus, Orthophosphate (As P)	-		mg/L	--	<0.50	--	<0.50	<0.50	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	--
Total Dissolved Solids	1000	(3)	mg/L	**2500**	**1720**	**1700**	740	**1700**	--	--	820	872	**3500**	**3710**	**3700**	**4500**	**4580**	**2300**	**2400**	**2420**	--
Diesel Range Organics (DRO)	1.34	(4)	mg/L	**9.4**	**5.7**	**65**	**5.7**	**5.2**			**550**	**59**	<1.0	<1.0	<1.0	<1.0	<1.0	**14**	**14**	**11**	--
Gasoline Range Organics (GRO)	1.34	(4)	mg/L	**84**	**54**	**190**	**42**	**16**	<1.0	<1.0	**24**	**30**	0.055	0.077	0.073	<0.050	<0.050	**42**	**44**	**43**	--
Motor Oil Range Organics (MRO)	-		mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--
Ethanol	-		mg/L	--	--	--	--	--	<0.050	<0.050	--	--	--	--	--	--	--	<1.0	<1.0	<1.0	

-- *No screening level or analytical result available*
450 - bolded value exceeds screening level
(1) EPA - Regional Screening Levels (April 2009) - EPA Screening Levels.Tap Water
(2) EPA - Regional Screening Levels (April 2009) - MCL
(3) NMED WQCC standards - Title 20 Chapter 6, Part 2, - 20.6.2.3101 Standards for Ground Water of 10,000 mg/l TDS Concentration or less
(4) NMED TPH Screening Guidelines Oct. 2006 - #3 and #6 fuel oil
* = General Chemistry analytes not required by Work Plan.

Figures



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

N

0 2000

SCALE IN FEET



QUADRANGLE LOCATION

Western Refining

WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 12/08/10	FILE: WestRef-A42

FIGURE 1
SITE LOCATION MAP
BLOOMFIELD REFINERY

RPS

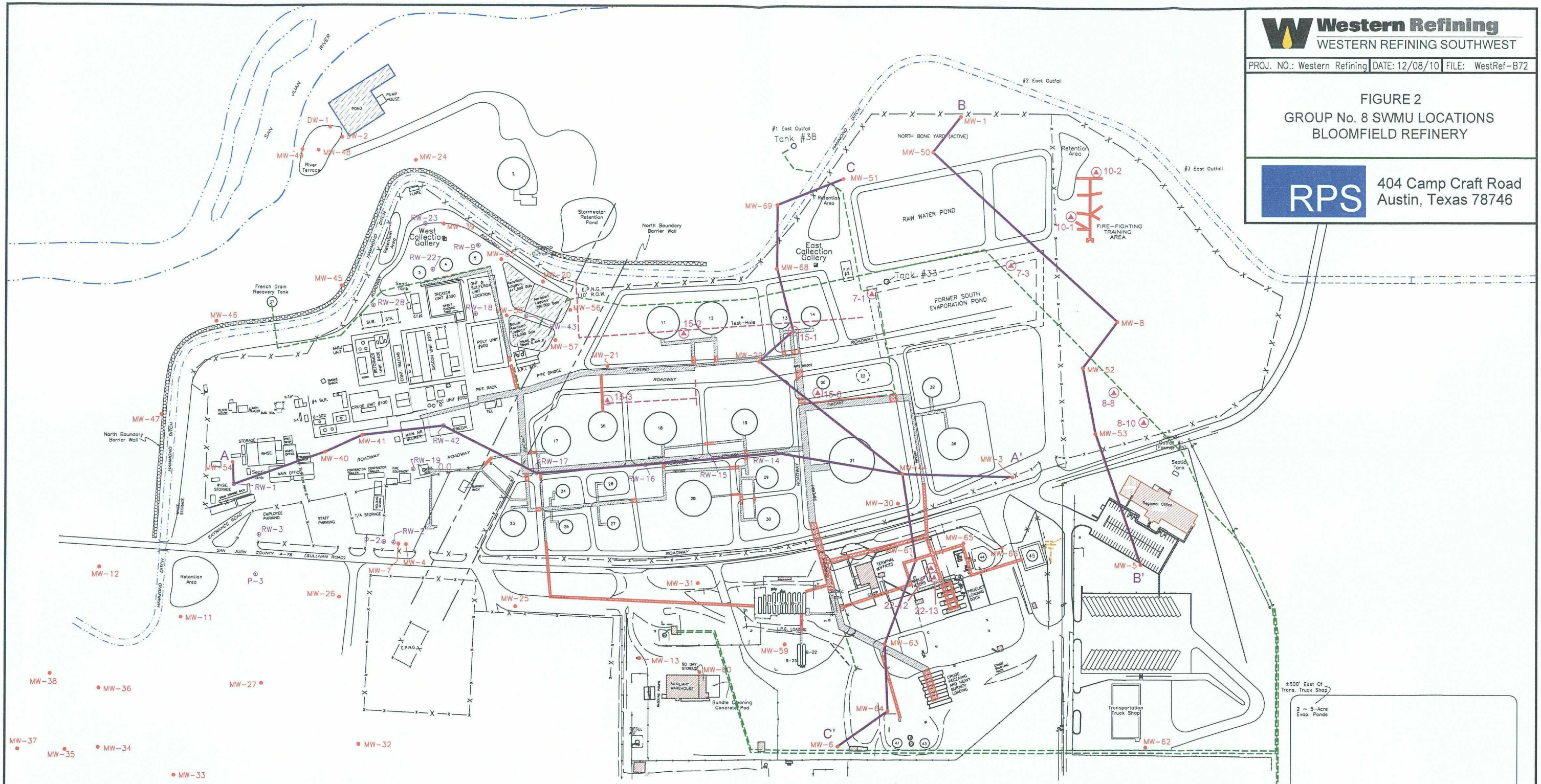
404 Camp Craft Road
Austin, Texas 78746

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 12/08/10	FILE: WestRef-B72

FIGURE 2
GROUP No. 8 SWMU LOCATIONS
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746


SAN JUAN RIVER
POND
PUMP HOUSE
DW-1
DW-2
MW-49
MW-48
River Terrace
MW-24
#2 East Outfall
#1 East Outfall
Tank #38
HAMMOND DITCH
NORTH BONE YARD (ACTIVE)
MW-1
MW-50
MW-51
MW-69
Retention Area
RAW WATER POND
#3 East Outfall
10-2
10-1
FIRE-FIGHTING TRAINING AREA
Stormwater Retention Pond
North Boundary Barrier Wall
West Collection Gallery
East Collection Gallery
MW-68
Tank #33
FORMER SOUTH EVAPORATION POND
7-3
7-1
MW-8
MW-52
8-8
8-10
MW-53
French Drain Recovery Tank
MW-45
MW-46
MW-47
MW-54
MW-41
MW-42
MW-40
RW-1
RW-2
RW-3
RW-4
RW-17
RW-16
RW-15
RW-14
RW-19
RW-23
RW-22
RW-9
RW-18
RW-28
MW-19
MW-20
MW-56
MW-43
MW-57
MW-21
MW-22
15-2
15-1
13-3
16-6
MW-3
MW-4
MW-30
MW-31
MW-65
MW-66
MW-61
MW-5
B'
A
A'
B
C
C'
Septic Tank
Regional Office
Retention Area
MW-12
MW-11
MW-26
MW-25
MW-7
P-2
P-3
MW-38
MW-36
MW-27
MW-37
MW-35
MW-34
MW-33
MW-32
MW-13
MW-60
MW-59
MW-63
MW-64
MW-6
MW-62
Transportation Truck Shop
±500' East Of Trans. Truck Shop
2 ~ 5-Acre Evap. Ponds
SAN JUAN COUNTY A-78 (SULLIVAN ROAD)
ENTRANCE ROAD
EMPLOYEE PARKING
STAFF PARKING
MAIN OFFICE
WHSE. STORAGE
T/A STORAGE
ROADWAY
PIPE RACK
PIPE BRIDGE
TREATER UNIT #300
DHT & SULFEROX UNIT LOCATION
POLY UNIT #900
CRUDE UNIT #100
FCC UNIT #200
GRACE UNIT #700
AMINE UNIT #400
SRU UNIT #600
SUB. STA.
MAIN AIR BLOWER
TERMINAL OFFICES
SHOP
LOADING RACKS
PRODUCT LOADING DOCK
P.G. LOADING
90 DAY STORAGE
AUXILIARY WAREHOUSE
Bundle Cleaning Concrete Pad
CRUDE SLOPPING AND HEAVY ENGINES LOADING
SNUBBING AREA
DIESEL
E.P.N.G. 10" R.O.W.
SAN JUAN RIVER
HAMMOND DITCH
#2 East Outfall
Septic Tank
Retention Area
Test-Hole
Tank #33
Tank #38
Retention Area
Retention Area
Retention Area

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 12/05/10	FILE: WestRef-B68

FIGURE 3
SEPARATE PHASE HYDROCARBON THICKNESS MAP
AUGUST 2010
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

LEGEND

- MW-1 ● MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- RW-1 ⊕ RECOVERY WELL LOCATION AND IDENTIFICATION NUMBER
- OW 1+50 ◐ OBSERVATION WELL LOCATION AND IDENTIFICATION NUMBER
- CW 1+50 ◍ COLLECTION WELL LOCATION AND IDENTIFICATION NUMBER
- SW1-0206 ▲ SUMP WELL LOCATION AND IDENTIFICATION NUMBER
- P-2 PIEZOMETER IDENTIFICATION
- 0 LNAPL THICKNESS CONTOUR (FT MSL)
- 0.15 APPARENT LNAPL THICKNESS IN WELL (FT)
- NM NOT MEASURED
- UNDER GROUND PIPE-WAY
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- FORMER TANK LOCATION
- — x — x — FENCE

0 300
SCALE IN FEET

±600' East Of Trans. Truck Shop
2 ~ 5-Acre Evap. Ponds

Map Source: Western Refining Southwest, Inc. 2010, Fig 17.

0 360
APPROXIMATE SCALE IN FEET

Legend

- Monitoring Well
- Observation Well
- Recovery Well
- Collection Well
- Outfall
- Site
- Approximate Property Line

MW-38	-Well ID
< 0.001	-Benzene
< 0.001	-Toluene
< 0.001	-Ethylbenzene
< 0.0015	-Xylenes, Total
0.001	-MTBE

Notes:

All concentrations in milligrams per liter (mg/L)

NS[1] = Well is Dry or Not Enough Water to Sample- No sample

NS[2] = Not sampled due to approved Facility-wide Monitoring Plan.

NS[3] = Sample Inadvertently not Collected this Sampling Event.

NR[1] = No Sample Required - Well Contains Separate Phase Hydrocarbon

NR[2] = No Sample Required per OCD and NMED Conditions

Western Refining
WESTERN REFINING SOUTHWEST

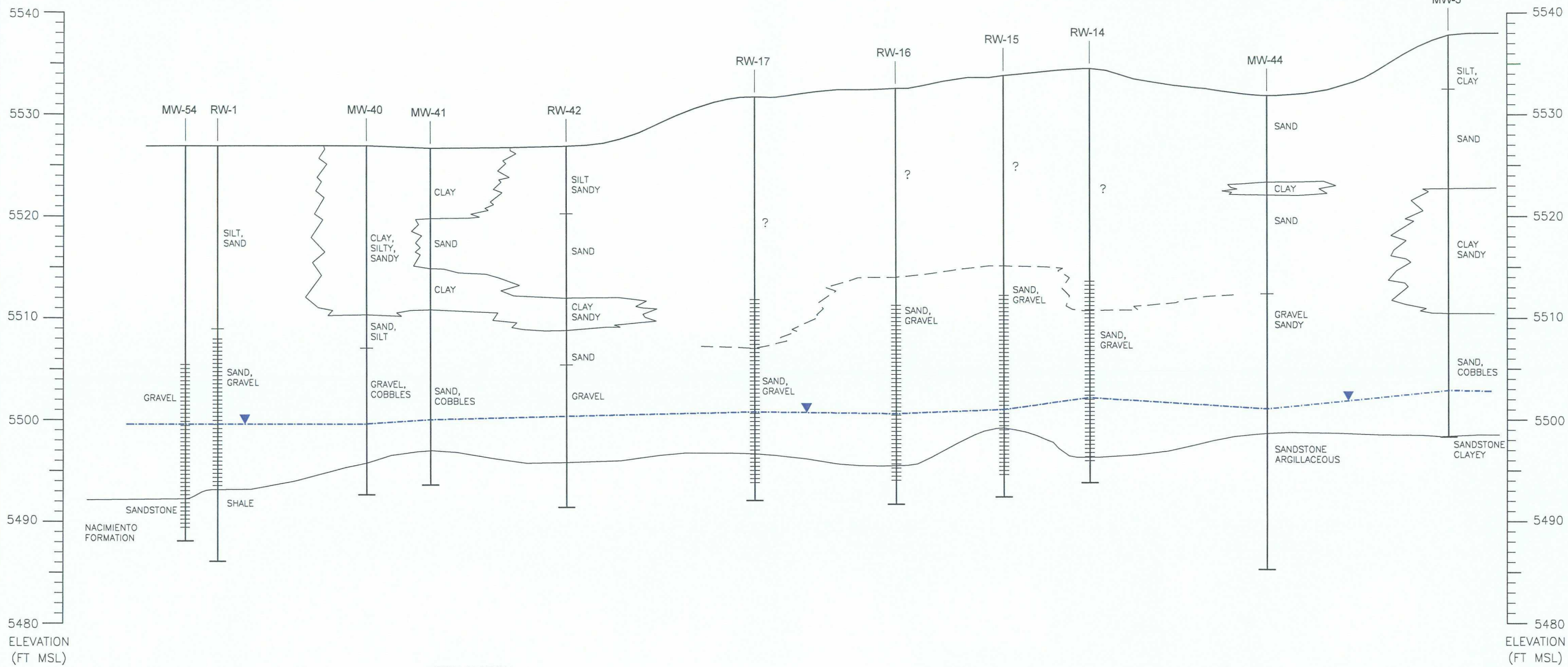
PROJ. NO.: Western Refining | DATE: 12/05/10 | FILE: WestRef-B69

FIGURE 4
DISSOLVED-PHASE GROUNDWATER DATA
AUGUST 2009
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

WEST
A

EAST
A'



EXPLANATION

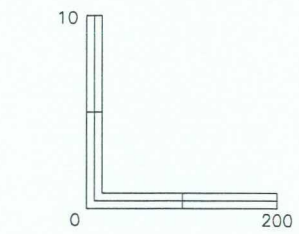
MW-54 ← WELL IDENTIFICATION

WELL

SCREEN INTERVAL

LITHOLOGIC CONTACTS

– POTENTIOMETRIC SURFACE MEASURED APRIL 12, 2010 (RECOVERY PUMPS OFF)



SCALE IN FEET
VERTICAL EXAGGERATION = 20X

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 12/08/10	FILE: WestRef-B73

FIGURE 5
CROSS SECTION A-A'
WEST TO EAST
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

NORTH
B

SOUTH
B'

ELEVATION (FT MSL)

5550
5540
5530
5520
5510
5500
5490

MW-1
MW-50
MW-8
MW-52
MW-53
MW-3
MW-5

SAND
CLAYEY

CLAYEY
SILT

SAND,
PEBBLES,
COBBLES

SAND,
GRAVEL

SANDSTONE
CLAYEY,
CLAYSTONE
SANDY

NACIMIENTO
FORMATION

CLAY
SANDY

SILT

COBBLES,
PEBBLES

CLAYEY
SILT

SAND,
GRAVEL

CLAY,
SANDSTONE

SILT

SILT,
CLAY

SILT
SANDY

SILT
CLAYEY

SILT
SANDY

SAND,
GRAVEL

SAND

CLAY
SANDY

SAND,
COBBLES

SANDSTONE
CLAYEY

CLAY
SILTY

SAND

COBBLES

DRY

?

COBBLES
WITH CLAY

CLAY,
PEBBLES

EXPLANATION

MW-8 ← WELL IDENTIFICATION

WELL

SCREEN INTERVAL

LITHOLOGIC CONTACTS

– POTENTIOMETRIC SURFACE MEASURED APRIL 12, 2010 (RECOVERY PUMPS OFF)

10
0
200

SCALE IN FEET
VERTICAL EXAGGERATION = 20X

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining	DATE: 12/08/10	FILE: WestRef-B74

FIGURE 6
CROSS SECTION B-B'
NORTH TO SOUTH
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746

NORTH
C

SOUTH
C'

ELEVATION (FT MSL)

5550
5540
5530
5520
5510
5500
5490

MW-51
MW-68
MW-69
15-1/TW
MW-29
MW-44
MW-61
MW-63
MW-64
MW-6

SILT
SAND, GRAVELLY
SAND, SILTY
SAND, SILTY, CLAYEY
SAND
CLAY
SILT
SAND
SILT
SAND
SILT
SAND, CLAYEY, SILTY
SILT
SAND
SAND
SAND
GRAVEL
GRAVEL
GRAVEL & COBBLES
GRAVELLY
GRAVELLY
GRAVELLY
GRAVELLY
COBBLES & PEBBLES
DRY
SANDSTONE
SANDSTONE, WEATHERED
LIMESTONE, WEATHERED
SANDSTONE, WEATHERED
CLAY
SANDSTONE
CLAY
SANDSTONE, CLAYSTONE
SANDSTONE, WEATHERED

NACIMIENTO FORMATION

EXPLANATION

MW-6 ← WELL IDENTIFICATION

WELL

SCREEN INTERVAL

LITHOLOGIC CONTACTS

POTENTIOMETRIC SURFACE MEASURED APRIL 12, 2010, EXCEPT MW-68, MW-69 & 15-1/TW MEASURED SEPT. 7, 2010

DEPTH TO SATURATION ENCOUNTERED WHILE DRILLING

10
0
200

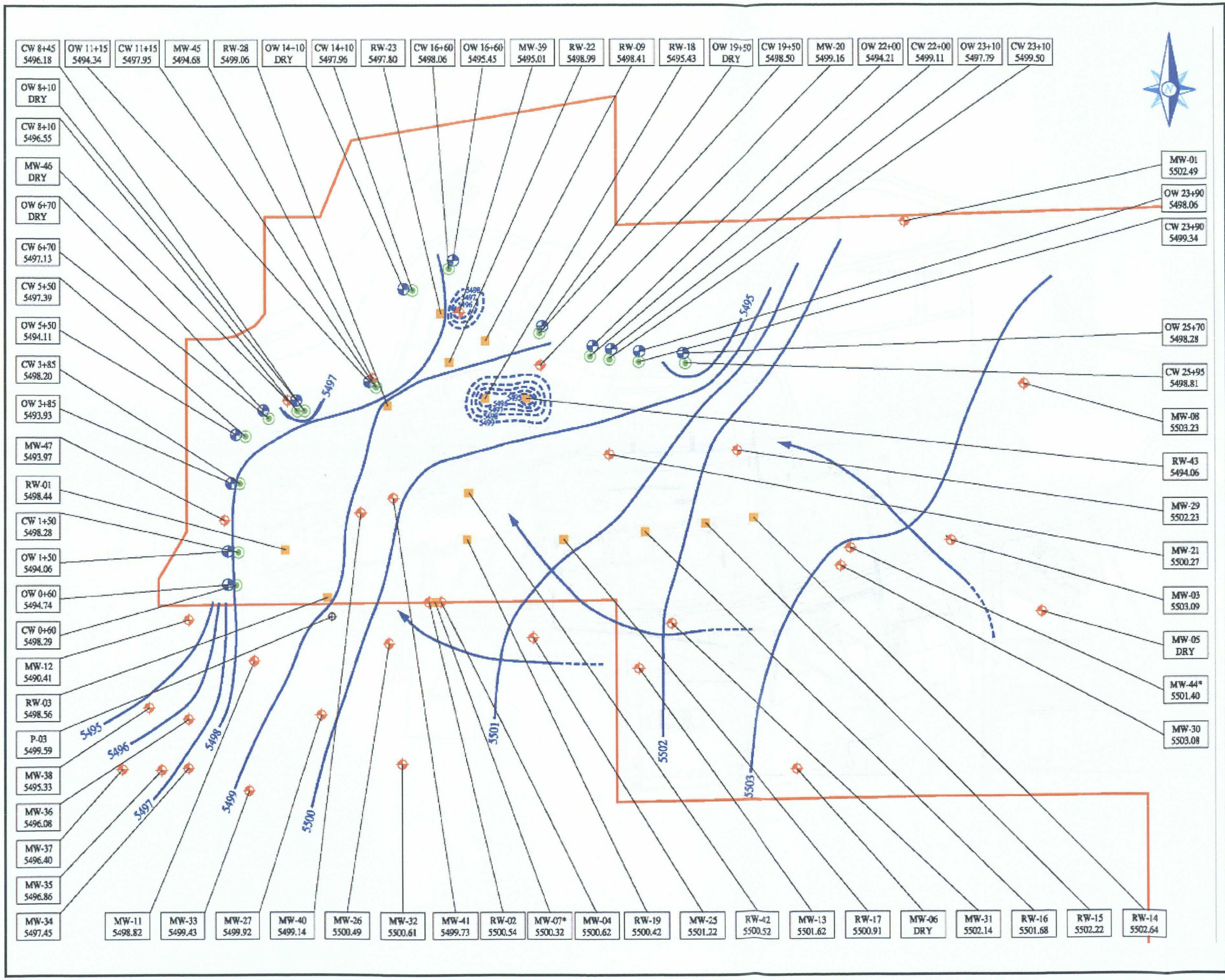
SCALE IN FEET
VERTICAL EXAGGERATION = 20X

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 12/08/10 | FILE: WestRef-B75

FIGURE 7
CROSS SECTION C-C'
NORTH TO SOUTH
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



Map Source: Western Refining Southwest, Inc. 2010, Fig 17.

0 360
APPROXIMATE SCALE IN FEET

Legend

- Monitoring Well
- Observation Well
- Recovery Well
- Collection Well
- Piezometer
- Seep
- Site
- Approximate Property Line
- Groundwater Elevation Contours
- Inferred Groundwater Elevation
- Groundwater Flow Direction - Dashed where inferred

MW-47 5493.97 -Well ID -Groundwater Elevation (ft amsl)

Notes:
* Deeper Well; data not used to contour.

3rd Quarter
August 17th

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 12/08/10 | FILE: WestRef-B76

FIGURE 8

POTENTIOMETRIC SURFACE MAP
AUGUST 2009
BLOOMFIELD REFINERY

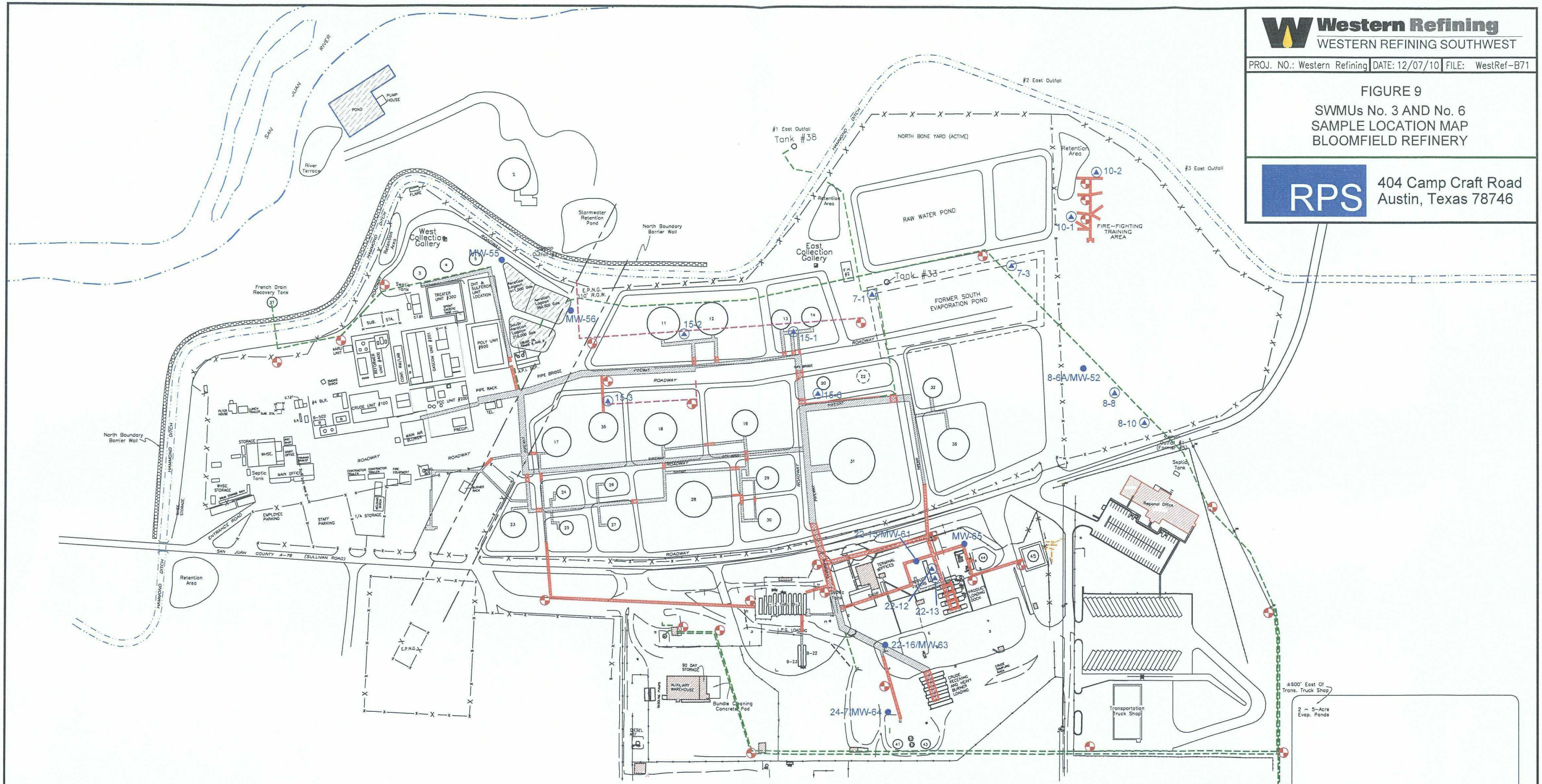
RPS
404 Camp Craft Road
Austin, Texas 78746

Western Refining
WESTERN REFINING SOUTHWEST

PROJ. NO.: Western Refining | DATE: 12/07/10 | FILE: WestRef-B71

FIGURE 9
SWMUs No. 3 AND No. 6
SAMPLE LOCATION MAP
BLOOMFIELD REFINERY

RPS
404 Camp Craft Road
Austin, Texas 78746



LEGEND

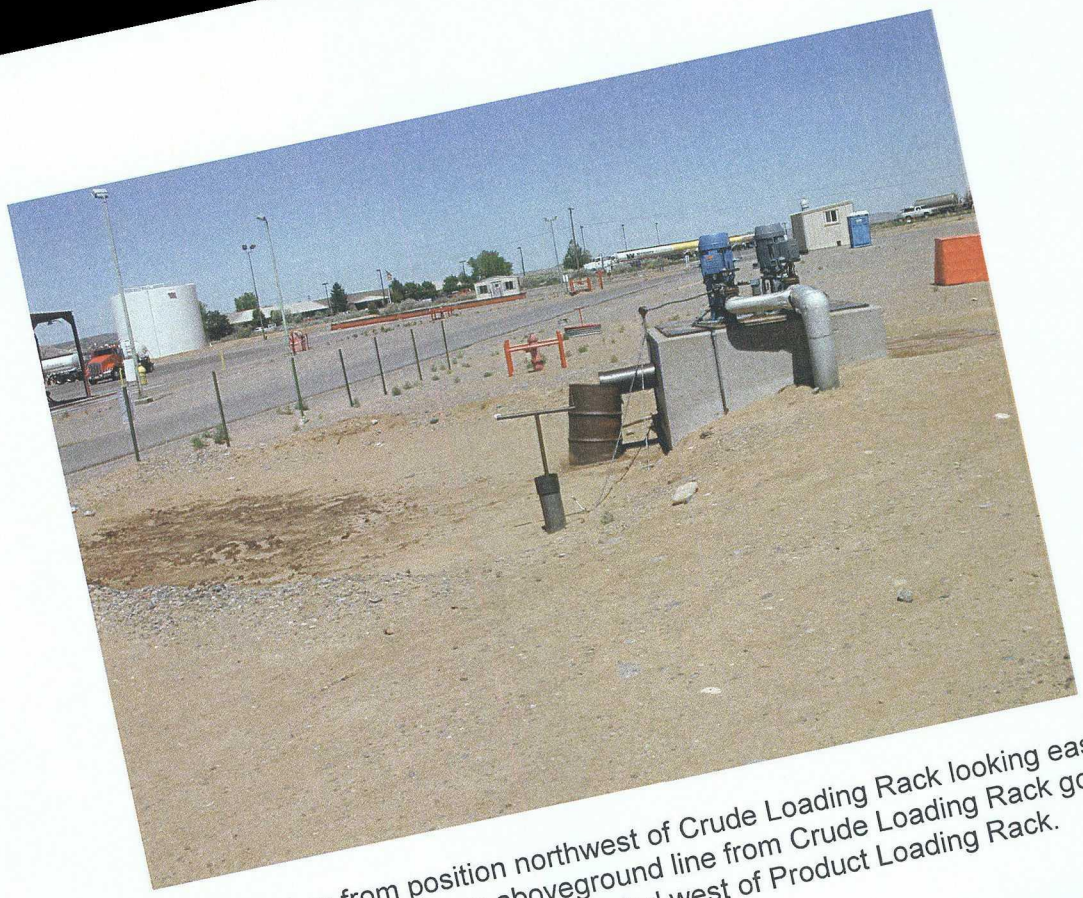
- MW-1 ● MONITORING WELL LOCATION AND IDENTIFICATION NUMBER
- 7-1 ▲ EXISTING SOIL BORING LOCATION AND IDENTIFICATION NUMBER
- PROPOSED SOIL BORING LOCATION
- UNDER GROUND PIPING (HYDROCARBONS) (SWMU No. 3)
- ABOVE GROUND PIPE-WAY
- SLURRY BARRIER WALL
- ABANDONED UNDERGROUND PIPING (SWMU No. 6)
- UNDER GROUND WASTEWATER PIPING (SWMU No. 3)
- FORMER TANK LOCATION
- FENCE

N

0 300
SCALE IN FEET

Appendix A

Photographs



Photograph taken from position northwest of Crude Loading Rack looking east. Transition point shown where aboveground line from Crude Loading Rack goes underground beneath asphalt road located west of Product Loading Rack.



Photograph of Product Loading Rack. Underground pipelines supply product to each truck loading station.



Photo shows location of underground piping running from Tank 45 in background to Tank 44 in foreground



Photo shows example of aboveground piping running beneath roadway in open cuvert.

Appendix B

Soil Survey

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Juan County, New Mexico, Eastern Part

Bloomfield Refinery Soils Report



March 30, 2010

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

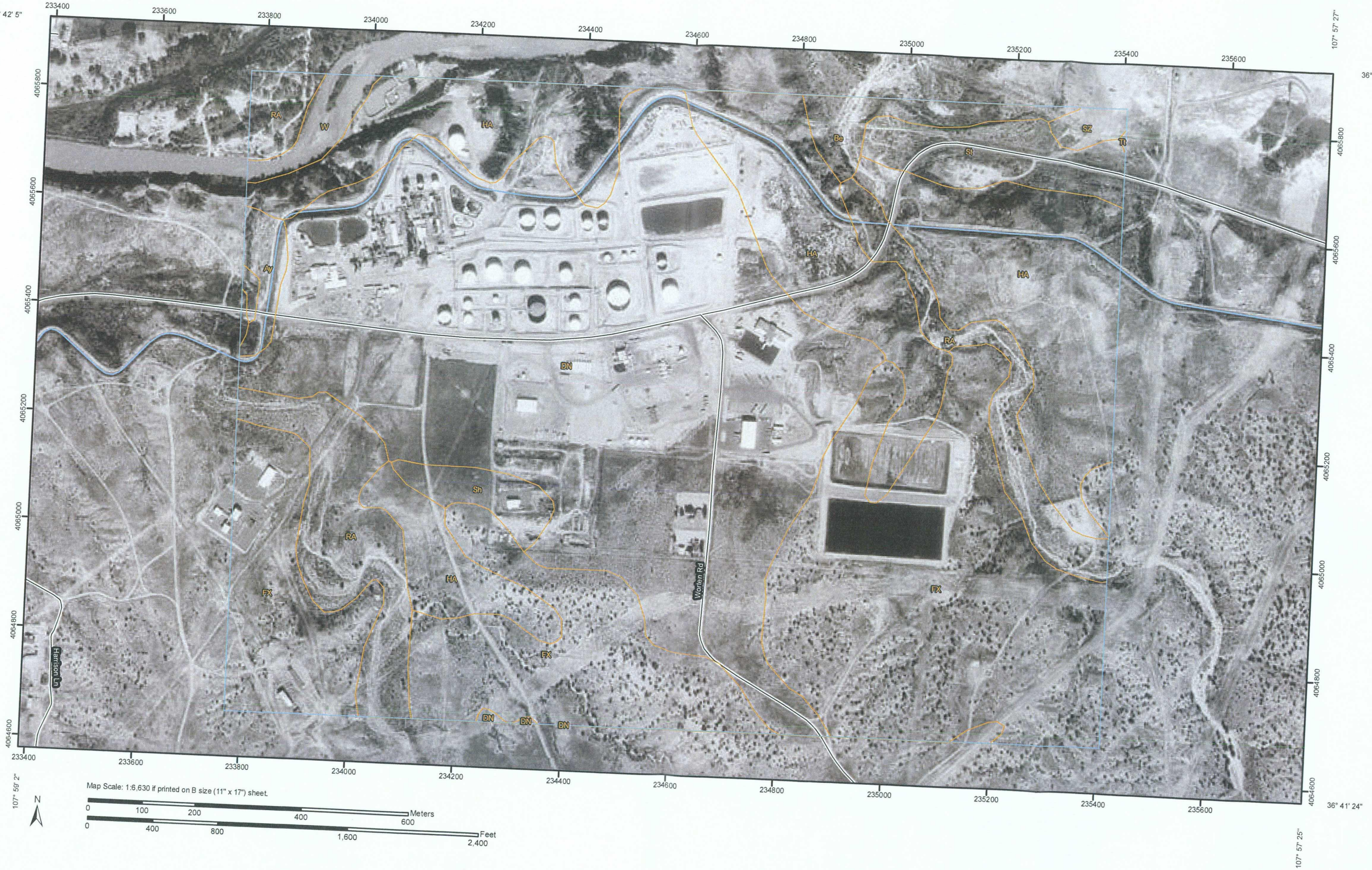
While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


107° 59' 3"
36° 42' 5"
107° 57' 27"
36° 42' 8"
233400
233600
233800
234000
234200
234400
234600
234800
235000
235200
235400
235600
4065800
4065600
4065400
4065200
4065000
4064800
4064600
RA
W
HA
Be
St
SZ
Tr
Av
DN
Sh
FX
Harrison Ln
Worlen Rd
36° 41' 22"
107° 59' 2"
36° 41' 24"
107° 57' 25"
Map Scale: 1:6,630 if printed on B size (11" x 17") sheet.
N
0 100 200 400 600 Meters
0 400 800 1,600 2,400 Feet

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:6,630 if printed on B size (11" × 17") sheet.

The soil surveys that comprise your AOI were mapped at 1:63,360.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 13N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Juan County, New Mexico, Eastern Part
Survey Area Data: Version 10, Sep 23, 2009

Date(s) aerial images were photographed: 10/9/1997

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Soil Map - San Juan County, NM, Eastern Part)

San Juan County, New Mexico, Eastern Part (NM618)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ay	Avalon loam, 0 to 3 percent slopes	3.8	0.8%
Be	Beebe loamy sand	6.7	1.4%
DN	Doak-Avalon association, gently sloping	168.8	35.4%
FX	Fruitland-Persayo-Sheppard complex, hilly	134.6	28.2%
HA	Haplargids-Blackston-Torriorthents complex, very steep	100.7	21.1%
RA	Riverwash	37.8	7.9%
Sh	Shiprock loamy fine sand, 0 to 2 percent slopes	5.5	1.1%
St	Stumble loamy sand, 0 to 3 percent slopes	12.4	2.6%
SZ	Stumble-Slickspots complex, gently sloping	2.1	0.4%
Tt	Turley clay loam, wet, 0 to 2 percent slopes	0.1	0.0%
W	Lakes, rivers, reservoirs	4.4	0.9%
Totals for Area of Interest		**477.0**	**100.0%**

Map Unit Descriptions (Soil Map - San Juan County, NM, Eastern Part)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used.

Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Juan County, New Mexico, Eastern Part

Ay—Avalon loam, 0 to 3 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Avalon and similar soils: 90 percent

Description of Avalon

Setting

Landform: Mesas
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits over slope alluvium derived from sandstone and shale

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (2.0 to 8.0 mmhos/cm)
Available water capacity: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability (nonirrigated): 7e
Ecological site: Limy (R035XB003NM)

Typical profile

0 to 18 inches: Loam
18 to 60 inches: Sandy clay loam
60 to 64 inches: Gravelly sandy loam

Be—Beebe loamy sand

Map Unit Setting

Elevation: 4,800 to 6,000 feet

Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition
Beebe and similar soils: 90 percent

Description of Beebe

Setting
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stream alluvium derived from igneous and sedimentary rock

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (2.0 to 4.0 mmhos/cm)
Available water capacity: Low (about 3.6 inches)

Interpretive groups
Land capability classification (irrigated): 4e
Land capability (nonirrigated): 7e
Ecological site: Sandy (R035XB002NM)

Typical profile
0 to 6 inches: Loamy sand
6 to 81 inches: Sand

DN—Doak-Avalon association, gently sloping

Map Unit Setting
Elevation: 5,600 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition
Doak and similar soils: 50 percent
Avalon and similar soils: 35 percent

Description of Doak

Setting

Landform: Fan remnants, mesas, stream terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Alluvium derived from sandstone and shale

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability (nonirrigated): 7e
Ecological site: Loamy (R035XB001NM)

Typical profile

0 to 5 inches: Loam
5 to 43 inches: Clay loam
43 to 60 inches: Clay loam

Description of Avalon

Setting

Landform: Fan remnants, mesas, stream terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Eolian deposits over alluvium derived from sandstone and shale

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0

Available water capacity: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability (nonirrigated): 7e
Ecological site: Limy (R035XB003NM)

Typical profile

0 to 14 inches: Loam
14 to 60 inches: Loam
60 to 64 inches: Gravelly loam

FX—Fruitland-Persayo-Sheppard complex, hilly

Map Unit Setting

Elevation: 4,800 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Fruitland and similar soils: 40 percent
Persayo and similar soils: 30 percent
Sheppard and similar soils: 25 percent

Description of Fruitland

Setting

Landform: Alluvial fans, stream terraces
Landform position (three-dimensional): Riser, rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from sandstone and shale

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 7e

Ecological site: Sandy (R035XB002NM)

Typical profile

0 to 4 inches: Sandy loam
4 to 60 inches: Fine sandy loam

Description of Persayo

Setting

Landform: Breaks, hills, ridges
Landform position (two-dimensional): Backslope, footslope, shoulder, toeslope
Landform position (three-dimensional): Side slope, nose slope, head slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from shale

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: 5 to 20 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Very low (about 2.9 inches)

Interpretive groups

Land capability (nonirrigated): 7e
Ecological site: Shale Hills (R035XA130NM)

Typical profile

0 to 18 inches: Clay loam
18 to 20 inches: Bedrock

Description of Sheppard

Setting

Landform: Dunes
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits over mixed alluvium

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Available water capacity: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 7e
Ecological site: Deep Sand (R035XB007NM)

Typical profile

0 to 4 inches: Loamy fine sand
4 to 60 inches: Loamy fine sand

HA—Haplargids-Blackston-Torriorthents complex, very steep

Map Unit Setting

Elevation: 4,800 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Haplargids and similar soils: 45 percent
Blackston and similar soils: 30 percent
Torriorthents and similar soils: 20 percent

Description of Haplargids

Setting

Landform: Escarpments
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Properties and qualities

Slope: 8 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Moderate (about 7.3 inches)

Interpretive groups

Land capability (nonirrigated): 7e
Ecological site: Loamy (R035XB001NM)

Typical profile

0 to 7 inches: Cobbly sandy loam
7 to 26 inches: Cobbly sandy clay loam
26 to 60 inches: Cobbly sandy clay loam

Description of Blackston

Setting

Landform: Escarpments
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Properties and qualities

Slope: 8 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Very slightly saline to slightly saline (4.0 to 8.0 mmhos/cm)
Available water capacity: Low (about 4.5 inches)

Interpretive groups

Land capability (nonirrigated): 7e
Ecological site: Limy (R035XB003NM)

Typical profile

0 to 11 inches: Gravelly loam
11 to 26 inches: Very gravelly loam
26 to 60 inches: Very gravelly sand

Description of Torriorthents

Setting

Landform: Escarpments
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Properties and qualities

Slope: 8 to 50 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)

Sodium adsorption ratio, maximum: 2.0
Available water capacity: Very low (about 2.2 inches)

Interpretive groups
Land capability (nonirrigated): 7e
Ecological site: Hills (R042XB027NM)

Typical profile
0 to 3 inches: Cobbly loam
3 to 15 inches: Cobbly clay loam
15 to 60 inches: Bedrock

RA—Riverwash

Map Unit Setting
Elevation: 4,800 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition
Riverwash, clayey: 35 percent
Riverwash, sandy: 35 percent
Riverwash, gravelly: 30 percent

Description of Riverwash, Sandy

Setting
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stream alluvium derived from igneous and sedimentary rock

Properties and qualities
Slope: 0 to 3 percent
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: Frequent
Available water capacity: Very low (about 2.9 inches)

Interpretive groups
Land capability (nonirrigated): 8w

Typical profile
0 to 6 inches: Sand
6 to 60 inches: Stratified coarse sand to sandy loam

Description of Riverwash, Clayey

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stream alluvium derived from igneous and sedimentary rock

Properties and qualities

Slope: 0 to 1 percent
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Available water capacity: Low (about 6.0 inches)

Interpretive groups

Land capability (nonirrigated): 8w

Typical profile

0 to 6 inches: Clay
6 to 60 inches: Clay

Description of Riverwash, Gravelly

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stream alluvium derived from igneous and sedimentary rock

Properties and qualities

Slope: 0 to 3 percent
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: Frequent
Available water capacity: Very low (about 1.9 inches)

Interpretive groups

Land capability (nonirrigated): 8w

Typical profile

0 to 6 inches: Gravelly sand
6 to 60 inches: Stratified extremely gravelly coarse sand to gravelly sand

Sh—Shiprock loamy fine sand, 0 to 2 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Shiprock and similar soils: 85 percent

Description of Shiprock

Setting

Landform: Mesas
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits over alluvium derived from sandstone and shale

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability (nonirrigated): 7e
Ecological site: Deep Sand (R035XB007NM)

Typical profile

0 to 10 inches: Loamy fine sand
10 to 60 inches: Fine sandy loam

St—Stumble loamy sand, 0 to 3 percent slopes

Map Unit Setting

Elevation: 4,800 to 6,400 feet

Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Stumble and similar soils: 90 percent
Fruitland and similar soils: 10 percent

Description of Stumble

Setting

Landform: Dunes
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits derived from sandstone

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 7e
Ecological site: Sandy (R035XB002NM)

Typical profile

0 to 5 inches: Loamy sand
5 to 29 inches: Loamy sand
29 to 49 inches: Gravelly loamy sand
49 to 81 inches: Loamy sand

Description of Fruitland

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fan alluvium derived from sandstone and shale

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability (nonirrigated): 7e
Ecological site: Loamy (R035XB001NM)

Typical profile

0 to 8 inches: Loam
8 to 60 inches: Fine sandy loam

SZ—Stumble-Slickspots complex, gently sloping

Map Unit Setting

Elevation: 4,800 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Stumble and similar soils: 70 percent
Slickspots: 20 percent

Description of Stumble

Setting

Landform: Dunes
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits derived from sandstone

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability (nonirrigated): 7e
Ecological site: Sandy (R035XB002NM)

Typical profile
0 to 4 inches: Loamy sand
4 to 60 inches: Loamy sand

Description of Slickspots

Setting
Landform: Alluvial fans
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits derived from sandstone

Properties and qualities
Slope: 0 to 5 percent
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Maximum salinity: Slightly saline to moderately saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0

Interpretive groups
Land capability (nonirrigated): 8w

Typical profile
0 to 2 inches: Clay
2 to 60 inches: Clay

Tt—Turley clay loam, wet, 0 to 2 percent slopes

Map Unit Setting
Elevation: 4,800 to 6,000 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition
Turley variant and similar soils: 90 percent

Description of Turley Variant

Setting
Landform: Alluvial fans
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fan alluvium derived from sandstone and shale

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 24 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability (nonirrigated): 6w
Ecological site: Clayey (R035XB004NM)

Typical profile

0 to 9 inches: Clay loam
9 to 60 inches: Clay loam

W—Lakes, rivers, reservoirs

Map Unit Setting

Elevation: 4,800 to 6,400 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 51 to 55 degrees F
Frost-free period: 140 to 160 days

Map Unit Composition

Water: 95 percent

Description of Water

Setting

Landform: Channels
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Chemical Properties

This folder contains a collection of tabular reports that present soil chemical properties. The reports (tables) include all selected map units and components for each map unit. Soil chemical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil chemical properties include pH, cation exchange capacity, calcium carbonate, gypsum, and electrical conductivity.

Chemical Soil Properties (Soil Map - San Juan County, NM, Eastern Part)

This table shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced saturated hydraulic conductivity and aeration, and a general degradation of soil structure.

Chemical Soil Properties– San Juan County, New Mexico, Eastern Part								
Map symbol and soil name	**Depth**	**Cation-exchange capacity**	**Effective cation-exchange capacity**	**Soil reaction**	**Calcium carbonate**	**Gypsum**	**Salinity**	**Sodium adsorption ratio**
	In	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
Ay—Avalon loam, 0 to 3 percent slopes								
Avalon	0-18	9.8-15	—	7.9-8.4	1-5	0-2	2.0-8.0	0
	18-60	11-23	—	7.9-8.4	10-20	0-2	2.0-8.0	0
	60-64	4.0-11	—	7.9-8.4	15-20	0-2	2.0-8.0	0
Be—Beebe loamy sand								
Beebe	0-6	3.1-7.4	—	7.4-8.4	0-1	0	2.0-4.0	0
	6-81	0.8-7.4	—	7.4-8.4	0-1	0	2.0-4.0	0
DN—Doak-Avalon association, gently sloping								
Doak	0-5	11-19	—	7.4-8.4	0-5	0	0.0-2.0	0
	5-43	15-23	—	7.4-9.0	1-10	0	2.0-4.0	0
	43-60	15-23	—	7.9-9.0	5-10	0-2	2.0-4.0	0-2
Avalon	0-14	11-15	—	7.9-8.4	0-5	0	2.0-8.0	0
	14-60	11-23	—	7.9-8.4	10-20	0-2	2.0-8.0	0
	60-64	4.0-11	—	7.9-8.4	15-20	0-2	2.0-8.0	0-2
FX—Fruitland-Persayo-Sheppard complex, hilly								
Fruitland	0-4	4.1-7.6	—	7.4-8.4	5-10	0-1	0.0-4.0	0-2
	4-60	3.1-12	—	7.4-8.4	5-10	0-1	0.0-4.0	0-2
Persayo	0-18	18-23	—	7.9-9.0	0-2	0-2	0.0-8.0	0-2
	18-20	—	—	—	—	—	—	—
Sheppard	0-4	2.5-5.4	—	7.9-8.4	0	0	0.0-2.0	0
	4-60	2.5-5.4	—	7.9-8.4	0	0	0.0-2.0	0

Chemical Soil Properties– San Juan County, New Mexico, Eastern Part								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
HA—Haplargids-Blackston-Torriorthents complex, very steep								
Haplargids	0-7	7.0-14	—	7.4-8.4	0	0	0.0-4.0	0
	7-26	13-23	—	7.4-8.4	0-5	0	0.0-4.0	0
	26-60	13-18	—	7.4-8.4	1-10	0	0.0-4.0	0
Blackston	0-11	11-18	—	7.9-8.4	0-2	0	0.0-2.0	0
	11-26	9.8-17	—	7.9-8.4	10-20	0	4.0-8.0	0
	26-60	0.0-4.6	—	7.9-8.4	15-30	0	4.0-8.0	0
Torriorthents	0-3	11-17	—	7.4-8.4	0-2	0-2	0.0-4.0	0
	3-15	5.7-19	—	7.4-8.4	0-2	0-2	0.0-4.0	0-2
	15-60	—	—	—	—	—	—	—
RA—Riverwash								
Riverwash, clayey	0-6	—	—	—	—	—	—	—
	6-60	—	—	—	—	—	—	—
Riverwash, sandy	0-6	—	—	—	—	—	—	—
	6-60	—	—	—	—	—	—	—
Riverwash, gravelly	0-6	—	—	—	—	—	—	—
	6-60	—	—	—	—	—	—	—
Sh—Shiprock loamy fine sand, 0 to 2 percent slopes								
Shiprock	0-10	8.1-11	—	7.4-8.4	0-2	0	0.0-2.0	0
	10-60	7.0-13	—	7.4-9.0	0-2	0	0.0-4.0	0

Chemical Soil Properties– San Juan County, New Mexico, Eastern Part								
Map symbol and soil name	**Depth**	**Cation-exchange capacity**	**Effective cation-exchange capacity**	**Soil reaction**	**Calcium carbonate**	**Gypsum**	**Salinity**	**Sodium adsorption ratio**
	In	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
St—Stumble loamy sand, 0 to 3 percent slopes								
Stumble	0-5	0.0-7.4	—	7.9-8.4	0-2	0	0.0-2.0	0
	5-29	0.0-7.4	—	7.9-9.0	0-2	0	0.0-2.0	0
	29-49	0.0-3.1	—	7.9-9.0	0-2	0	0.0-2.0	0
	49-81	0.0-5.7	—	7.9-9.0	0-2	0	0.0-2.0	0
Fruitland	0-8	5.7-16	—	7.4-8.4	5-10	0	0.0-4.0	0
	8-60	3.1-12	—	7.4-8.4	5-10	0	0.0-4.0	0
SZ—Stumble-Slickspots complex, gently sloping								
Stumble	0-4	0.0-7.4	—	7.9-8.4	0-1	0	0.0-2.0	0
	4-60	0.0-7.4	—	7.9-9.0	0-1	0	0.0-2.0	0
Slickspots	0-2	—	—	7.9-9.6	0	0	0.0-8.0	2-6
	2-60	—	—	7.9-9.6	0	0	8.0-16.0	4-12
Tt—Turley clay loam, wet, 0 to 2 percent slopes								
Turley variant	0-9	14-22	—	7.4-8.4	1-5	0-2	2.0-4.0	0-2
	9-60	14-22	—	7.4-8.4	1-5	0-2	2.0-4.0	0-2
W—Lakes, rivers, reservoirs								
Water	—	—	—	—	—	—	—	—

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Physical Soil Properties (Soil Map - San Juan County, NM, Eastern Part)

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The

moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Physical Soil Properties– San Juan County, New Mexico, Eastern Part														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Ay—Avalon loam, 0 to 3 percent slopes														
Avalon	0-18	-43-	-40-	15-18- 20	1.40-1.50	4.23-14.11	0.16-0.18	0.0-2.9	0.0-1.0	.43	.43	3	4L	86
	18-60	-56-	-18-	18-27- 35	1.40-1.50	4.23-14.11	0.15-0.17	3.0-5.9	0.0-0.5	.43	.43			
	60-64	-67-	-23-	5-10- 15	1.50-1.65	14.11-42.34	0.10-0.12	0.0-2.9	0.0-0.5	.32	.37			
Be—Beebe loamy sand														
Beebe	0-6	-84-	- 9-	5- 8- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.20	.20	5	2	134
	6-81	-93-	- 2-	1- 6- 10	1.45-1.55	141.14	0.03-0.08	0.0-2.9	0.0-0.5	.17	.17			
DN—Doak-Avalon association, gently sloping														
Doak	0-5	-42-	-37-	15-21- 27	1.20-1.30	4.23-14.11	0.15-0.17	0.0-2.9	0.5-0.6	.37	.37	5	5	56
	5-43	-34-	-37-	25-30- 35	1.45-1.55	1.41-4.23	0.15-0.18	3.0-5.9	0.0-0.5	.37	.37			
	43-60	-34-	-37-	25-30- 35	1.40-1.50	1.41-4.23	0.15-0.18	3.0-5.9	0.0-0.5	.37	.37			
Avalon	0-14	-43-	-40-	15-18- 20	1.40-1.50	4.23-14.11	0.16-0.18	0.0-2.9	0.5-1.0	.43	.43	3	4L	86
	14-60	-38-	-36-	18-27- 35	1.40-1.50	4.23-14.11	0.15-0.17	3.0-5.9	0.0-0.5	.43	.43			
	60-64	-46-	-44-	5-10- 15	1.50-1.65	14.11-42.34	0.10-0.12	0.0-2.9	0.0-0.5	.32	.37			

Physical Soil Properties– San Juan County, New Mexico, Eastern Part															
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
FX—Fruitland-Persayo-Sheppard complex, hilly														
Fruitland	0-4	-69-	-24-	5- 8- 10	1.45-1.55	14.11-42.34	0.11-0.13	0.0-2.9	0.6-0.8	.28	.28	5	3	86
	4-60	-68-	-21-	5-12- 18	1.45-1.55	14.11-42.34	0.11-0.13	0.0-2.9	0.0-0.5	.28	.28			
Persayo	0-18	-35-	-34-	27-31-35	1.35-1.45	1.41-4.23	0.15-0.17	3.0-5.9	0.5-1.0	.37	.37	1	8	0
	18-20	—	—	—	—	0.00-1.41	—	—	—					
Sheppard	0-4	-79-	-16-	4- 5- 7	1.45-1.60	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.15	.15	5	2	134
	4-60	-79-	-16-	4- 5- 7	1.45-1.60	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.15	.15			
HA—Haplargids-Blackston-Torriorthents complex, very steep														
Haplargids	0-7	-66-	-19-	10-15- 20	1.45-1.55	14.11-42.34	0.08-0.10	0.0-2.9	0.0-0.5	.15	.28	4	4	86
	7-26	-55-	-17-	20-28- 35	1.35-1.45	4.23-14.11	0.11-0.13	0.0-2.9	0.0-0.5	.15	.28			
	26-60	-59-	-18-	20-24- 27	1.35-1.45	4.23-14.11	0.12-0.14	0.0-2.9	0.0-0.5	.20	.37			
Blackston	0-11	-42-	-38-	15-20-25	1.45-1.55	4.23-14.11	0.11-0.14	0.0-2.9	0.5-1.0	.10	.17	3	8	0
	11-26	-42-	-38-	15-20-25	1.35-1.45	4.23-14.11	0.07-0.10	0.0-2.9	0.0-0.5	.10	.28			
	26-60	-96-	-2-	0-3-5	1.35-1.45	42.34-141.14	0.03-0.06	0.0-2.9	0.0-0.5	.10	.28			
Torriorthents	0-3	-42-	-38-	15-20- 25	1.40-1.50	4.23-14.11	0.12-0.14	0.0-2.9	0.6-0.8	.20	.37	1	6	48
	3-15	-34-	-37-	10-30- 30	1.40-1.50	1.41-42.34	0.10-0.20	0.0-2.9	0.0-0.5	.20	.32			
	15-60	—	—	—	—	0.00-1.40	—	—	—					

Physical Soil Properties– San Juan County, New Mexico, Eastern Part														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
RA—Riverwash														
Riverwash, clayey	0-6	-12-	-28-	40-60- 80	1.65-1.75	0.00-1.41	0.09-0.11	6.0-8.9	0.0-0.1	.20	.20	5	4	86
	6-60	-12-	-28-	40-60- 80	1.65-1.75	0.00-1.41	0.09-0.11	6.0-8.9	0.0-0.1	.28	.32			
Riverwash, sandy	0-6	-98-	-2-	0- 1- 1	1.65-1.75	42.34-141.14	0.03-0.04	0.0-2.9	0.0-0.1	.10	.10	5	4	86
	6-60	-68-	-30-	0- 3- 5	1.65-1.75	42.34-141.14	0.04-0.06	0.0-2.9	0.0-0.1	.10	.10			
Riverwash, gravelly	0-6	-98-	- 2-	0- 1- 1	1.65-1.75	42.34-141.14	0.03-0.04	0.0-2.9	0.0-0.1	.05	.10	5	4	86
	6-60	-93-	- 7-	0- 1- 1	1.65-1.75	42.34-141.14	0.02-0.03	0.0-2.9	0.0-0.1	.05	.10			
Sh—Shiprock loamy fine sand, 0 to 2 percent slopes														
Shiprock	0-10	-83-	- 5-	10-13- 15	1.40-1.50	42.34-141.14	0.06-0.09	0.0-2.9	0.5-0.6	.20	.20	5	2	134
	10-60	-70-	-16-	10-14- 18	1.45-1.55	14.11-42.34	0.09-0.12	0.0-2.9	0.0-0.5	.28	.28			
St—Stumble loamy sand, 0 to 3 percent slopes														
Stumble	0-5	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17	5	2	134
	5-29	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.15	.15			
	29-49	-81-	-17-	0- 3- 5	1.45-1.55	42.34-141.14	0.04-0.06	0.0-2.9	0.0	.10	.24			
	49-81	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06	0.0-2.9	0.0	.15	.15			
Fruitland	0-8	-43-	-40-	10-18-25	1.40-1.50	4.23-14.11	0.15-0.17	0.0-2.9	0.0-0.5	.37	.37	5	5	56
	8-60	-68-	-21-	5-12-18	1.45-1.55	14.11-42.34	0.11-0.13	0.0-2.9	0.0-0.5	.28	.28			

Physical Soil Properties– San Juan County, New Mexico, Eastern Part															
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
SZ—Stumble-Slickspots complex, gently sloping														
Stumble	0-4	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.17	.17	5	2	134
	4-60	-79-	-17-	0- 5- 10	1.45-1.55	42.34-141.14	0.06-0.08	0.0-2.9	0.0-0.5	.15	.15			
Slickspots	0-2	-32-	-31-	15-37-45	1.45-1.55	0.00-0.42	—	—	0.5-1.0					
	2-60	-32-	-31-	15-37-45	1.45-1.55	0.00-1.41	—	—	0.0-0.5					
Tt—Turley clay loam, wet, 0 to 2 percent slopes														
Turley variant	0-9	-35-	-33-	28-32- 35	1.40-1.50	1.41-4.23	0.15-0.19	3.0-5.9	0.0-0.5	.32	.32	5	4L	86
	9-60	-35-	-33-	28-32- 35	1.40-1.50	1.41-4.23	0.15-0.19	3.0-5.9	0.0-0.5	.32	.32			
W—Lakes, rivers, reservoirs														
Water	—	—	—	—	—	—	—	—	—					

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Appendix C

Investigation Derived Waste (IDW) Management Plan

IDW Management Plan

All IDW will be properly characterized and disposed of in accordance with all federal, State, and local rules and regulations for storage, labeling, handling, transport, and disposal of waste. If soils are found to be non-hazardous and concentrations of constituents are less than the NMED residential soil screening levels, then soils may be reused on-site pursuant to the approval of the NMED. The IDW may be characterized for disposal based on the known or suspected contaminants potentially present in the waste. It is assumed that there are no listed wastes present in environmental media at any of the planned investigation areas.

A dedicated decontamination facility will be setup prior to any sample collection activities. The decontamination facility will be designed so as to capture and contain all decontamination fluids (e.g., wash water and rinse water) and foreign materials washed off the sampling equipment. The fluids will be pumped directly into suitable storage containers (e.g., labeled 55-gallon drums), which will be located at satellite accumulation areas until the fluids are disposed in the refinery wastewater treatment system upstream of the API separator. The solids captured in the decontamination facility will be shoveled into 55-gallon drums and stored at the designated satellite accumulation area pending proper waste characterization for off-site disposal.

Drill cuttings generated during installation of soil borings will be placed directly into 55-gallon drums and staged in the satellite accumulation area pending results of the waste characterization sampling. The portion of soil cores, which are not retained for analytical testing, will be placed into the same 55-gallon drums used to store the associated drill cuttings.

The solids (e.g., drill cuttings and used soil cores) will be characterized by testing to determine if there are any hazardous characteristics in accordance with 40 Code of Federal Regulations (CFR) Part 261. This includes tests for ignitability, corrosivity, reactivity, and toxicity. If the materials are not characteristically hazardous, then further testing will be performed pursuant to the requirements of the facility to which the materials will be transported. Depending upon the results of analyses for individual investigation soil samples, additional analyses may include TPH and polynuclear aromatic hydrocarbons.

All miscellaneous waste materials (e.g., discarded gloves, packing materials, etc.) will be placed into the refinery's solid waste storage containers for off-site disposal.